



VOLUME I-GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

CHANGE 1—SEPTEMBER 27, 1973

OSHA 2077

INTRODUCTION

This change incorporates the following revisions or additions from the Federal Register.

1. Amends 29 CFR 1910.217(f)(1). (See 37 F.R. 23718, 11/8/72.)
2. Adds 29 CFR 1910.93b. (See 37 F.R. 24749, 11/21/72.)
3. Amends 29 CFR 1910.12(d). (See 37 F.R. 24880, 11/23/72.)
4. Amends 29 CFR 1910.11. (See 37 F.R. 26008, 12/7/72.)
5. Amends 29 CFR 1910.111. (See 38 F.R. 3598, 2/8/73.)
6. Amends 29 CFR 1910.116. (See 38 F.R. 3598, 2/8/73.)
7. Revokes 29 CFR 1910.141(f). (See 38 F.R. 9078, 4/10/73.)
8. Revises 29 CFR 1910.141. (See 38 F.R. 10930, 5/3/73.)
9. Amends 29 CFR 1910.177 through .181 and .243. (See 38 F.R. 14371, 6/1/73.)
10. Amends 29 CFR 1910.68(c)(1)(i). (See 38 F.R. 16223, 6/21/73.)
11. Amends 29 CFR 1910.217(b)(2). (See 38 F.R. 16223, 6/21/73.)
12. Amends 29 CFR 1910.263(h)(2). (See 38 F.R. 16223, 6/21/73.)
13. Amends 29 CFR 1910.157 and .160. (See 38 F.R. 19030, 7/17/73.)

INSTRUCTIONS

1. Substitute the attached Title page and the numbered pages in this supplement for the corresponding pages in the basic manual.

2. Enter a record of this change on page i.

This coversheet may be retained as a record of the content of this change.

October 1973
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NOTICE TO SUBSCRIBERS
Volume I - General Industry Standards
and Interpretations
Change 1

Subsequent to the cutoff date for the preparation of this change, the following change had appeared in the Federal Register.

<u>Date</u>	<u>Part</u>	<u>Change</u>	<u>Title</u>
9/28/73	1910.106/108	Revision	Flammable and Combustible Liquids.

Supplement #2, incorporating the above changes, will be issued at a later date.

OCCUPATIONAL SAFETY AND HEALTH

VOLUME I

**GENERAL INDUSTRY
STANDARDS
AND
INTERPRETATIONS**

OCTOBER, 1972

Change 1
September 27, 1973



UNITED STATES DEPARTMENT OF LABOR
Peter J. Brennan, Secretary
Occupational Safety and Health Administration
Office of Standards

STANDARDS AND INTERPRETATIONS

LIST OF EFFECTIVE PAGES

TOTAL NUMBER OF PAGES IS 773 AS FOLLOWS:

Page No.	Issue	Page No.	Issue
*Title	Change 1	*433	Change 1
*A	Change 1	434 thru 442	Original
i thru viii	Original	*443 thru 444.2	Change 1
1 thru 11	Original	445 thru 484	Original
*12 thru 12.2	Change 1	*485 thru 486.2	Change 1
13 thru 106	Original	487 thru 491	Original
*107 thru 108	Change 1	*492 thru 492.2	Change 1
109 thru 122	Original	493 thru 512	Original
*123 thru 124.2	Change 1	*513 thru 514.2	Change 1
125 thru 317	Original	*515 thru 516.2	Change 1
*318 thru 318.2	Change 1	517 thru 518	Original
319 thru 335	Original	*519 thru 520	Change 1
*336	Change 1	521 thru 590	Original
337 thru 347	Original	*591 thru 592.2	Change 1
*348 thru 350.2	Change 1	593 thru 646	Original
*351	Change 1	*647	Change 1
352 thru 375	Original	648 thru 654	Original
*376	Change 1	*655	Change 1
377 thru 384	Original	656 thru 657	Original
*385	Change 1	*658	Change 1
386 thru 405	Original	659 thru 661	Original
*406	Change 1	*662	Change 1
*407 thru 408	Deleted Change 1	663 thru 669	Original
*409	Change 1	*670 thru 671	Change 1
410 thru 414	Original	672 thru 676	Original
*415 thru 416.2	Change 1	*677	Change 1
417 thru 420	Original	678	Original
*421 thru 422.4	Change 1	*679 thru 680	Change 1
423 thru 432	Original	681 thru 738	Original

*Indicates pages changed, added, or deleted by the current change.

A

Change 1

PART 1910**OCCUPATIONAL SAFETY AND HEALTH STANDARDS****SUBPART B—ADOPTION AND EXTENSION OF ESTABLISHED
FEDERAL STANDARDS**

1910.11	Scope and purpose.
1910.12	Construction work.
1910.13	Ship repairing.
1910.14	Shipbuilding.
1910.15	Shipbreaking.
1910.16	Longshoring.
1910.17	Effective dates
1910.18	Changes in established Federal standards.
1910.19	Asbestos dust.

STANDARDS AND INTERPRETATIONS

SUBPART B—ADOPTION AND EXTENSION OF ESTABLISHED FEDERAL STANDARDS

1910.11—SCOPE AND PURPOSE

(e) The provisions of this Subpart B adopt and extend the applicability of, established Federal standards in effect on April 28, 1971, with respect to every employer, employee, and employment covered by the Act.

(b) It bears emphasis that only standards (i.e., substantive rules) relating to safety or health are adopted by any incorporations by reference of standards prescribed elsewhere in this chapter or this title. Other materials contained in the referenced parties are not adopted. Illustrations of the types of materials which are not adopted are these. The incorporations by reference of Parts 1915,

1916, 1917, 1918 in §§ 1910.13, 1910.14, 1910.15, and 1910.16 are not intended to include the discussion in those parts of the coverage of the Longshoremen's and Harbor Workers' Compensation Act or the penalty provisions of the Act. Similarly, the incorporation by reference of Part 1926 in § 1910.12 is not intended to include references to interpretative rules having relevance to the application of the Construction Safety Act, but having no relevance to the application to the Occupational Safety and Health Act.

[37 F.R. 28008, December 7, 1972.]

1910.12—CONSTRUCTION WORK

(a) Standards.

The standards prescribed in Part 1926 of this chapter are adopted as occupational safety and health standards under section 6 of the Act and shall apply, according to the provisions thereof, to every employment and place of employment of every employee engaged in construction work. Each employer shall protect the employment and places of employment of each of his employees engaged in construction work by complying with the appropriate standards prescribed in this paragraph.

(b) Definition.

For purposes of this section, "construction work" means work for construction, alteration, and/or repair, including painting and decorating. See discussion of these terms in § 1926.13 of this title.

(c) Construction Safety Act distinguished.

This section adopts as occupational safety

and health standards under section 6 of the Act the standards which are prescribed in Part 1926 of this chapter. Thus, the standards (substantive rules) published in Subpart C and the following subparts of Part 1926 of this chapter are applied. This section does not incorporate Subparts A and B of Part 1926 of this chapter. Subparts A and B have pertinence only to the application of section 107 of the Contract Work Hours and Safety Standards Act (the Construction Safety Act). For example, the interpretation of the term "subcontractor" in paragraph (c) of § 1926.13 of this chapter is significant in discerning the coverage of the Construction Safety Act and duties thereunder. However, the term "subcontractor" has no significance in the application of the Act, which was enacted under the Commerce Clause and which establishes duties for "employers" which are not dependent for their application upon any contractual relationship with the Federal Government or upon any form of Federal financial assistance.

STANDARDS AND INTERPRETATIONS

(d) For the purposes of this part, to the extent that it may not already be included in paragraph (b) of this section, "construction work" includes the erection of new electric transmission and distribution lines and equip-

ment, and the alteration, conversion, and improvement of the existing transmission and distribution lines and equipment.

[37 F.R. 24880, November 23, 1972.]

1910.13—SHIP REPAIRING

(a) Adoption and extension of established safety and health standards for ship repairing.

The standards prescribed by Part 1501 of this title and in effect on April 28, 1971, are adopted as occupational safety or health standards under section 6(a) of the Act and

Change 1

12.1

1910.13(a)

))

12.2

Change 1

STANDARDS AND INTERPRETATIONS

(15) **Weather protection.** The entire manlift and its driving mechanism shall be protected from the weather at all times.

(c) **Mechanical requirements.**

(1) **Machines, general.**

(i) **Brakes.** Brakes provided for stopping and holding a manlift shall be inherently self-engaging, by requiring power or force from an external source to cause disengagement. The brakes shall be electrically released, and shall be applied to the motor shaft for direct-connected units or to the input shaft for belt-driven units. The brake shall be capable of stopping and holding the manlift when the descending side is loaded with 250 pounds on each step.

[38 F.R. 16223, June 21, 1973.]

(ii) **Belt.**

(a) The belts shall be of hard-woven canvas, rubber-coated canvas, leather, or other material meeting the strength requirements of paragraph (b)(3) of this section and having a coefficient of friction such that when used in conjunction with an adequate tension device it will meet the brake test specified in subdivision (i) of this subparagraph.

(b) The width of the belt shall be not less than 12 inches for a travel not exceeding 100 feet, not less than 14 inches for a travel greater than 100 feet but not exceeding 150 feet and 16 inches for a travel exceeding 150 feet.

(c) A belt that has become torn while in use on a manlift shall not be spliced and put back in service.

(2) **Speed.**

(i) **Maximum speed.** No manlift designed for a speed in excess of 80 feet per minute shall be installed.

(3) **Platforms or steps.**

(i) **Minimum depth.** Steps or platforms shall be not less than 12 inches nor more than 14 inches deep, measured from the belt to the edge of the step or platform.

(ii) **Width.** The width of the step or platform shall be not less than the width of the belt to which it is attached.

(iii) **Distance between steps.** The distance between steps shall be equally spaced and not less than 16 feet measured from the upper surface of one step to the upper surface of the next step above it.

(iv) **Angle of step.** The surface of the step shall make approximately a right angle with the "up" and "down" run of the belt, and shall travel in the approximate horizontal position with the "up" and "down" run of the belt.

(v) **Surfaces.** The upper or working surfaces of the step shall be of a material having inherent nonslip characteristics (coefficient of friction not less than 0.5) or shall be covered completely by a nonslip tread securely fastened to it.

(vi) **Strength of step supports.** When subjected to a load of 400 pounds applied at the approximate center of the step, step frames, or supports and their guides shall be of adequate strength to:

(a) Prevent the disengagement of any step roller.

(b) Prevent any appreciable misalignment.

(c) Prevent any visible deformation of the steps or its support.

(vii) **Prohibition of steps without handholds.** No steps shall be provided unless there is a corresponding handhold above or below it meeting the requirements of subparagraph (4) of this paragraph. If a step is removed for repairs or permanently, the handholds immediately above and below it shall be removed before the lift is again placed in service.

(4) **Handholds.**

STANDARDS AND INTERPRETATIONS

(i) **Location.** Handholds attached to the belt shall be provided and installed so that they are not less than 4 feet nor more than 4 feet 8 inches above the step tread. These shall be so located as to be available on the both "up" and "down" run of the belt.

(ii) **Size.** The grab surface of the handhold shall be not less than 4½ inches in width, not less than 3 inches in depth, and shall provide 2 inches of clearance from the belt. Fastenings for handholds shall be located not less than 1 inch from the edge of the belt.

(iii) **Strength.** The handhold shall be capable of withstanding, without damage, a load of 300 pounds applied parallel to the run of the belt.

(iv) **Prohibition of handhold without steps.** No handhold shall be provided without a corresponding step. If a handhold is removed permanently or temporarily, the corresponding step and handhold for the opposite direction of travel shall also be removed before the lift is again placed in service.

(v) **Type.** All handholds shall be of the closed type.

(5) Up limit stops.

(i) **Requirements.** Two separate automatic stop devices shall be provided to cut off the power and apply the brake when a loaded step passes the upper terminal landing. One of these shall consist of a split-rail switch mechanically operated by the step roller and located not more than 6 inches above the top terminal landing. The second automatic stop device may consist of any of the following:

(a) Any split-rail switch placed 6 inches above and on the side opposite the first limit switch.

(b) An electronic device.

(c) A switch actuated by a lever, rod, or plate, the latter to be placed on the "up" side of the head pulley so as to just clear a passing step.

(ii) **Manual reset location.** After the manlift has been stopped by a stop device it shall be necessary to reset the automatic stop manually. The device shall be so located that a person resetting it shall have a clear view of both the "up" and "down" runs of the manlift. It shall not be possible to reset the device from any step or platform.

(iii) **Cut-off point.** The initial limit stop device shall function so that the manlift will be stopped before the loaded step has reached a point 24 inches above the top terminal landing.

(iv) Electrical requirements.

(a) Where such switches open the main motor circuit directly they shall be of the multipole type.

(b) Where electronic devices are used they shall be so designed and installed that failure will result in shutting off the power to the driving motor.

(c) Where flammable vapors or dusts may be present all electrical installations shall be in accordance with the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968), requirements for such locations.

(d) Unless of the oil-immersed type controller contacts carrying the main motor current shall be copper to carbon or equal, except where the circuit is broken at two or more points simultaneously.

(6) Emergency stop.

(i) **General.** An emergency stop means shall be provided.

(ii) **Location.** This stop means shall be within easy reach of the ascending and descending runs of the belt.

(iii) **Operation.** This stop means shall be so connected with the control lever or operating mechanism that it will cut off the power and apply the brake when pulled in the direction of travel.

STANDARDS AND INTERPRETATIONS

this section shall be notified in writing of the exposure as soon as practicable but not later than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(i) Medical examinations.

(1) General. The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.

(2) Preplacement. The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}).

(3) Annual examinations. On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}).

(4) Termination of employment. The employer shall provide, or make available, within 30

calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}).

(5) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(6) Medical records.

(i) Maintenance. Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be retained by employers for at least 20 years.

(ii) Access. The contents of the records of the medical examinations required by this paragraph shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of NIOSH, to authorized physicians and medical consultants of either of them, and, upon the request of an employee or former employee, to his physician. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer of the examined employee all the information specifically required by this paragraph, and any other medical information related to occupational exposure to asbestos fibers.

STANDARDS AND INTERPRETATIONS

**1910.93b—COAL TAR PITCH VOLATILES; INTERPRETATION
OF TERM**

As used in § 1910.93 (Table G-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distil-

lation residues of coal, petroleum, wood, and other organic matter.

[37 F.R. 24749, November 21, 1972.]

1910.94—VENTILATION

(a) Abrasive blasting.

(i) Abrasive. A solid substance used in an abrasive blasting operation.

(1) Definitions applicable to this paragraph.

Change 1

124.1

STANDARDS AND INTERPRETATIONS

(ii) **Abrasive-blasting respirator.** A continuous flow air-line respirator constructed so that it will cover the wearer's head, neck, and shoulders to protect him from rebounding abrasive.

(iii) **Blast cleaning barrel.** A complete enclosure which rotates on an axis, or which has an internal moving tread to tumble the parts, in order to expose various surfaces of the parts to the action of an automatic blast spray.

(iv) **Blast cleaning room.** A complete enclosure in which blasting operations are performed and where the operator works inside of the room to operate the blasting nozzle and direct the flow of the abrasive material.

(v) **Blasting cabinet.** An enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure.

(vi) **Clean air.** Air of such purity that it will not cause harm or discomfort to an individual if it is inhaled for extended periods of time.

(vii) **Dust collector.** A device or combination of devices for separating dust from the air handled by an exhaust ventilation system.

(viii) **Exhaust ventilation system.** A system for removing contaminated air from a space, comprising two or more of the following elements (a) enclosure or hood, (b) duct work, (c) dust collecting equipment, (d) exhauster, and (e) discharge stack.

(ix) **Particulate-filter respirator.** An air purifying respirator, commonly referred to as a dust or a fume respirator, which removes most of the dust or fume from the air passing through the device.

(x) **Respirable dust.** Airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lung passages.

(xi) **Rotary blast cleaning table.** An enclosure

where the pieces to be cleaned are positioned on a rotating table and are passed automatically through a series of blast sprays.

(xii) **Abrasive blasting.** The forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure, or centrifugal force.

(2) **Dust hazards from abrasive blasting.**

(i) Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. The composition and toxicity of the dust from these sources shall be considered in making an evaluation of the potential health hazards.

(ii) The concentration of respirable dust or fume in the breathing zone of the abrasive-blasting operator or any other worker shall be kept below the levels specified in § 1910.93.

(iii) Organic abrasives which are combustible shall be used only in automatic systems. Where flammable or explosive dust mixtures may be present, the construction of the equipment, including the exhaust system and all electric wiring, shall conform to the requirements of American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), and the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968). The blast nozzle shall be bonded and grounded to prevent the build-up of static charges. Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts, and the dust collector shall be constructed with loose panels or explosion venting areas, located on sides away from any occupied area, to provide for pressure relief in case of explosion, following the principles set forth in the National Fire Protection Association Explosion Venting Guide, NFPA 68-1954.

(3) **Blast-cleaning enclosures.**

STANDARDS AND INTERPRETATIONS

sight of the customer being served. Letters on such signs shall be not less than 4 inches high. The motors of all vehicles being fueled shall be shut off during the fueling operations.

(13) **Electrical.** Electrical equipment and installations shall conform to paragraphs (b) (17) and (18) of this section.

(14) **Fire protection.** Each service station shall be provided with at least one approved portable fire extinguisher having at least an 8-B, C, rating.

(i) **Scope.**(1) **Application.**

(i) Paragraph (b) of this section applies to installations made in accordance with the requirements of paragraphs (c), (d), (e), (g), and (h) of this section, except as noted in each of those paragraphs.

(ii) Paragraphs (c) through (h) of this section apply as provided in each of those paragraphs.

(2) **Inapplicability.** This section does not apply to:

(i) Marine and pipeline terminals, natural gas processing plants, refineries, or tank farms other than those at industrial sites.

(ii) LP-Gas refrigerated storage systems;

(iii) LP-Gas when used with oxygen. The requirements of § 1910.252 shall apply to such use;

(iv) LP-Gas when used in utility gas plants. The National Fire Protection Association Standard for the Storage and Handling of Liquefied Petroleum Gases

at Utility Gas Plants, NFPA No. 59-1968, shall apply to such use;

(v) Low-pressure (not in excess of one-half pound per square inch or 14 inches water column) LP-Gas piping systems, and the installation and operation of residential and commercial appliances including their inlet connections, supplied through such systems. For such systems, the National Fire Protection Association Standard for the Installation of Gas Appliances and Gas Piping, NFPA 54-1969 shall apply.

(3) **Retrospectivity.** Unless otherwise stated, it is not intended that the provisions of this section be retroactive.

(i) Existing plants, appliances, equipment, buildings, structures, and installations for the storage, handling or use of LP-Gas, which were in compliance with the current provisions of the National Fire Protection Association Standard for the Storage and Handling of Liquefied Petroleum Gases, NFPA No. 58, at the time of manufacture or installation may be continued in use, if such continued use does not constitute a recognized hazard that is causing or is likely to cause death or serious physical harm to employees.

(ii) Stocks of equipment and appliances on hand in such locations as manufacturers' storage, distribution warehouses, and dealers' storage and showrooms, which were in compliance with the current provisions of the National Fire Protection Association Standard for the Storage and Handling of Liquefied Petroleum Gases, NFPA No. 58, at the time of manufacture, may be placed in service, if such use does not constitute a recognized hazard that is causing or is likely to cause death or serious physical harm to employees.

1910.111—STORAGE AND HANDLING OF ANHYDROUS AMMONIA

(a) **General.**(1) **Scope.**

STANDARDS AND INTERPRETATIONS

(i) This standard is intended to apply to the design, construction, location, installation, and operation of anhydrous ammonia systems including refrigerated ammonia storage systems.

(ii) This standard does not apply to:

(a) Ammonia manufacturing plants.

(b) Refrigeration plants where ammonia is used solely as a refrigerant.

(2) Definitions. As used in this section.

(i) "Appurtenances"—All devices such as pumps, compressors, safety relief devices, liquid-level gaging devices, valves and pressure gages.

[38 F.R. 3598, February 8, 1973.]

(ii) "Cylinder"—A container of 1,000 pounds of water capacity or less constructed in accordance with Department of Transportation specifications.

(iii) "Code"—The Boiler and Pressure Vessel Code, Section VIII, Unfired Pressure Vessels of the American Society of Mechanical Engineers (ASME)—1968.

(iv) "Container"—Includes all vessels, tanks, cylinders, or spheres used for transportation, storage, or application of anhydrous ammonia.

(v) "DOT"—U.S. Department of Transportation.

(vi) "Design pressure" is identical to the term "Maximum Allowable Working Pressure" used in the Code.

(vii) "Farm vehicle" (implement of husbandry)—A vehicle for use on a farm on which is mounted a container of not over 1,200 gallons water capacity.

(viii) "Filling density"—the percent ratio of the weight of the gas in a container to the weight of water at 60° F. that the container will hold.

(ix) "Gas"—Anhydrous ammonia in either the gaseous or liquefied state.

(x) "Gas mask"—Gas masks approved by the Bureau of Mines, U.S. Department of the Interior.

(xi) "Capacity"—Total volume of the container in standard U.S. gallons.

(xii) DOT specifications—Regulations of the Department of Transportation published in 49 CFR Chapter I.

(xiii) "DOT regulations"—See § 1910.111(a)(2)(xii).

(xiv) "DOT requirements"—See § 1910.111(a)(2)(xii).

(b) Basic rules.

This paragraph applies to all paragraphs of this section unless otherwise noted.

(1) Approval of equipment and systems. Each appurtenance shall be approved in accordance with paragraph (b) (1) (i), (ii), (iii), or (iv) of this section.

(i) It was installed before February 8, 1973, and was approved, tested, and installed in accordance with either the provisions of the American National Standard for the Storage and Handling of Anhydrous Ammonia, K61.1, or the Fertilizer Institute Standards for the Storage and Handling of Agricultural Anhydrous Ammonia, M-1, in effect at the time of installation; or

(ii) It is accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory, such as, but not limited to, Underwriters' Laboratories, Inc. and Factory Mutual Research Corporation; or

(iii) It is a type which no nationally recognized testing laboratory does, or will undertake to, accept, certify, list, label, or determine to be safe; and such equipment is inspected or tested by any

STANDARDS AND INTERPRETATIONS

Federal, State, municipal, or other local authority responsible for enforcing occupational safety provisions of a Federal, State, municipal or other local law, code, or regulation pertaining to the storage, handling, transport, and use of anhydrous ammonia, and found to be in compliance with either the provisions of the American National Standard for the Storage and Handling of Anhydrous Ammonia, K61.1, or the Fertilizer Institute Standards for the Storage and Handling of Agricultural Anhydrous Ammonia, M-1, in effect at the time of installation; or

(iv) It is a custom-designed and custom-built unit, which no nationally recognized testing laboratory, or Federal, State, municipal or local authority responsible for the enforcement of a Federal, State, municipal, or local law, code or regulation pertaining to the storage, transportation and use of anhydrous ammonia is willing to undertake to accept, certify, list, label or determine to be safe, and the employer has on file a document attesting to its safe condition following the conduct of appropriate tests. The document shall be signed by a registered professional engineer or other person having special training or experience sufficient to permit him to form an opinion as to safety of the unit involved. The document shall set forth the test bases, test data and results, and also the qualifications of the certifying person.

(v) For the purposes of this paragraph (b)(1), the word "listed" means that equipment is of a kind mentioned in a list which is published by a nationally recognized laboratory which makes periodic inspection of the production of such equipment, and states such equipment

meets nationally recognized standards or has been tested and found safe for use in a specified manner. "Labeled" means there is attached to it a label, symbol, or other identifying mark of a nationally recognized testing laboratory which, makes periodic inspections of the production of such equipment, and whose labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner. "Certified" means it has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner, or is of a kind whose production is periodically inspected by a nationally recognized testing laboratory, and it bears a label, tag, or other record of certification.

[38 F.R. 3598, February 8, 1973.]

(2) Requirements for construction, original test and requalification of nonrefrigerated containers.

(i) Containers used with systems covered in paragraphs (c), (f), (g), and (h) of this section shall be constructed and tested in accordance with the Code except that construction under Table UW12 at a basic joint efficiency of under 80 percent is not authorized.

(ii) Containers built according to the Code do not have to comply with Paragraphs UG125 to UG128 inclusive, and Paragraphs UG132 and UG133 of the Code.

(iii) Containers exceeding 36 inches in diameter or 250 gallons water capacity shall be constructed to comply with one or more of the following:

STANDARDS AND INTERPRETATIONS

318.2

Change 1

15834

1910.113 [RESERVED]**1910.114—EFFECTIVE DATES**

(a) The provisions of this Subpart H shall become effective on August 27, 1971, except as provided in the remaining paragraphs of this section.

§ 1910.108 (g)(6) and (h).
§ 1910.110.
§ 1910.111.

(b) The following provisions shall become effective on February 15, 1972:

§ 1910.101(b).
§ 1910.102.
§ 1910.103 (a)(2), (b)(1)(i), (b)(1)(iii), (b)(2)(ii), and (b)(3).
§ 1910.105.
§ 1910.106 (b)(1), (b)(2), (b)(3), and (b)(4).
§ 1910.106 (b)(5), (c)(1), (c)(2), (c)(3), (c)(4), (c)(5), (c)(6), (d)(2), (d)(3)(ii), (d)(4)(i), (d)(4)(iii), (d)(4)(iv), (d)(5)(v), (d)(5)(vi)(a), (e)(3)(iii), (e)(3)(v), (e)(4), (e)(7), (f)(2)(iii), (f)(3)(i), (f)(4)(iii), (f)(4)(iv), (f)(4)(viii), (f)(5), (g), (h), and (i).
§ 1910.107 (b)(1), (b)(2), (b)(3), (b)(4), (b)(5)(i), (b)(5)(iii), (b)(5)(iv), (b)(6), (b)(7), (b)(8), (b)(10), (c)(1), (c)(4), (c)(5), (c)(6), (c)(7), (d), (e)(7), (e)(8), (f)(1), (f)(2), (h), (i), (j), (l)(2), (l)(3), (l)(5), (l)(6), (l)(7), and (m)(1).
§ 1910.108 (b), (c), (e)(1), (g)(2), (g)(3), (g)(4), and (g)(5).

(c) Notwithstanding anything in paragraph (a), (b), or (d) of this section, any provision in any other section of this subpart which contains in itself a specific effective date or time limitation shall become effective on such date or shall apply in accordance with such limitation.

(d) Notwithstanding anything in paragraph (a), or (b) of this section, if any standard in 41 CFR Part 50-204, other than a national consensus standard incorporated by reference in § 50-204.2(a)(1), is or becomes applicable at any time to any employment and place of employment, by virtue of the Walsh-Healey Public Contracts Act, or the Service Contract Act of 1965, or the National Foundation on Arts and Humanities Act of 1965, any corresponding established Federal standard in this Subpart H which is derived from 41 CFR Part 50-204 shall also become effective, and shall be applicable to such employment and place of employment, on the same date.

1910.115—SOURCES OF STANDARDS

Sec.	Source		
1910.101	41 CFR 50-204.67, 70, and 71.	1910.107	Combustible Liquids Code.
1910.102	41 CFR 50-204.66.		NFPA No. 33-1969, Standard for Spray Finishing using Flammable and Combustible Materials.
1910.103	NFPA No. 50B-1968, Standard for Liquefied Hydrogen Systems at Consumer Sites.	1910.108	NFPA No. 34-1966, Standard for Dip Tanks Containing Flammable or Combustible Liquids.
1910.104	NFPA No. 566-1965, Standard for the Installation of Bulk Oxygen Systems at Consumer Sites.	1910.109	NFPA No. 492-1970, Code for Manufacture, Transportation, Storage and Use of Explosives and Blasting
1910.105	NFPA No. 30-1969, Flammable and		

STANDARDS AND INTERPRETATIONS

1910.110 Agents.
NFPA 58-69, Standard for the Handling of Liquefied Petroleum Cases.

1910.111 ANSI K61.1-1966, Storage and Handling of Anhydrous Ammonia.

1910.116—STANDARDS ORGANIZATIONS

National Fire Protection Association (NFPA), 60 Batterymarch Street, Boston, MA 02110.

National Plant Food Institute, 1700 K Street NW., Washington, DC 20006.

Compressed Gas Association, Inc., 500 Fifth Avenue, New York, NY 10036.

American Society of Mechanical Engineers, Inc., United Engineering Center, 345 East 47th Street, New York, NY 10017.

American Petroleum Institute, 1801 K Street NW., Washington, DC 20006.

National Board of Boiler and Pressure Vessel Inspectors, 1155 North High Street, Columbus, OH 43201.

American National Standards Institute, 1430 Broadway, New York, NY 10018.

American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103.

Underwriters' Laboratories, Inc. (UL), 207 East Ohio Street, Chicago, IL 60611.

Fertilizer Institute, 1015 18th Street N.W., Washington, DC 20036

[38 F.R. 3598, February 8, 1973.]

PART 1910**OCCUPATIONAL SAFETY AND HEALTH STANDARDS****SUBPART J—GENERAL ENVIRONMENTAL CONTROLS**

- 1910.141 Sanitation.
- 1910.142 Temporary labor camps.
- 1910.143 Nonwater carriage disposal systems.
- 1910.144 Safety color code for marking physical hazards.
- 1910.145 Specifications for accident prevention signs and tags.
- 1910.146 [Reserved]
- 1910.147 Sources of standards.
- 1910.148 Standards organizations.

STANDARDS AND INTERPRETATIONS

SUBPART J—GENERAL ENVIRONMENTAL CONTROLS

1910.141—SANITATION

(a) General.

(1) **Scope.**—This section applies to permanent places of employment.

(2) Definitions applicable to this section.

(i) "Lavatory" means a basin or similar vessel used exclusively for washing of the hands, arms, faces, and head.

(ii) "Nonwater carriage toilet facility," means a toilet facility not connected to a sewer.

(iii) "Number of employees" means, unless otherwise specified, the maximum number of employees present at any one time on a regular shift.

(iv) "Personal service room," means a room used for activities not directly connected with the production or service function performed by the establishment. Such activities include, but are not limited to, first-aid, medical services, dressing, showering, toilet use, washing, and eating.

(v) "Potable water" means water which meets the quality standards prescribed in the U.S. Public Health Service Drinking Water Standards, published in 42 CFR part 72, or water which is approved for drinking purposes by the State or local authority having jurisdiction.

(vi) "Toilet facility," means a fixture maintained within a toilet room for the purpose of defecation or urination, or both.

(vii) "Toilet room," means a room maintained within or on the premises of any place of employment, containing toilet facilities for use by employees.

(viii) "Toxic material" means a material in concentration or amount which ex-

ceeds the applicable limit established by a standard, such as §§ 1910.93 and 1910.93a or, in the absence of an applicable standard, which is of such toxicity so as to constitute a recognized hazard that is causing or is likely to cause death or serious physical harm.

(ix) "Urinal" means a toilet facility maintained within a toilet room for the sole purpose of urination.

(x) "Water closet" means a toilet facility maintained within a toilet room for the purpose of both defecation and urination and which is flushed with water.

(xi) "Wet process" means any process or operation in a workroom which normally results in surfaces upon which employees may walk or stand becoming wet.

(3) Housekeeping.

(i) All places of employment shall be kept clean to the extent that the nature of the work allows.

(ii) The floor of every workroom shall be maintained, so far as practicable, in a dry condition. Where wet processes are used, drainage shall be maintained and false floors, platforms, mats, or other dry standing places shall be provided, where practicable, or appropriate waterproof footwear shall be provided.

(iii) To facilitate cleaning, every floor, working place, and passageway shall be kept free from protruding nails, splinters, loose boards, and unnecessary holes and openings.

(4) Waste disposal.

(i) Any receptacle used for putrescible solid or liquid waste or refuse shall be so constructed that it does not leak and may be thoroughly cleaned and main-

Change 1

STANDARDS AND INTERPRETATIONS

tained in a sanitary condition. Such a receptacle shall be equipped with a solid tight-fitting cover, unless it can be maintained in a sanitary condition without a cover. This requirement does not prohibit the use of receptacles which are designed to permit the maintenance of a sanitary condition without regard to the aforementioned requirements.

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

(5) **Vermin control.** Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practicable, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected.

(b) **Water supply.**

(1) **Potable water.**

(i) Potable water shall be provided in all places of employment, for drinking, washing of the person, cooking, washing of foods, washing of cooking or eating utensils, washing of food preparation or processing premises, and personal service rooms.

(ii) Drinking fountain surfaces which become wet during fountain operation shall be constructed of materials impervious to water and not subject to oxidation. The nozzle of the fountain shall be at an angle and so located to prevent the return of water in the jet or bowl to the nozzle orifice. A guard shall be provided over the nozzle to prevent contact with the nozzle by the mouth or nose of persons using the drinking fountain. The drain from the bowl of the fountain shall not have a direct physical connection with a waste pipe, unless it is trapped.

(iii) Portable drinking water dispensers shall be designed, constructed, and serv-

iced so that sanitary conditions are maintained, shall be capable of being closed, and shall be equipped with a tap.

(iv) Ice in contact with drinking water shall be made of potable water and maintained in a sanitary condition.

(v) 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, are prohibited.

(vi) A common drinking cup and other common utensils are prohibited.

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

(2) **Nonpotable water.**

(i) Outlets for nonpotable water, such as water for industrial or firefighting purposes, shall be posted or otherwise marked in a manner that will indicate clearly that the water is unsafe and is not to be used for drinking, washing of the person, cooking, washing of food, washing of cooking or eating utensils, washing of food preparation or processing premises, or personal service rooms, or for washing clothes.

(ii) Construction of nonpotable water systems or systems carrying any other nonpotable substance shall be such as to prevent backflow or backsiphonage into a potable water system.

(iii) Nonpotable water shall not be used for washing any portion of the person, cooking or eating utensils, or clothing. Nonpotable water may be used for cleaning work premises, other than food processing and preparation premises and personal service rooms: *Provided*, That this nonpotable water does not contain concentrations of chemicals, fecal coliform, or other substances which could create insanitary conditions or be harmful to employees.

STANDARDS AND INTERPRETATIONS

(c) Toilet facilities.

(1) General.

(i) Except as otherwise indicated in this subdivision (i), toilet facilities, in toilet rooms separate for each sex, shall be provided in all places of employment in accordance with table J-1 of this section. The number of facilities to be provided for each sex shall be based on the number of employees of that sex for whom the facilities are furnished. Where toilet rooms will be occupied by no more than one person at a time, can be locked from the inside, and contain at least one water closet, separate toilet rooms for each sex need not be provided. Where such single-occupancy rooms have more than one toilet facility, only one such facility in each toilet room shall be counted for the purpose of table J-1.

TABLE J-1

Number of employees:	Minimum number of water closets ¹
1 to 15	1.
16 to 35	2.
36 to 55	3.
56 to 80	4.
81 to 110	5.
111 to 150	6.
Over 150	1 additional fixture for each additional 40 employees.

¹ Where toilet facilities will not be used by women, urinals may be provided instead of water closets, except that the number of water closets in such cases shall not be reduced to less than $\frac{2}{3}$ of the minimum specified.

(ii) The requirements of subdivision (i) of this subparagraph do not apply to mobile crews or to normally unattended work locations so long as employees working at these locations have transportation immediately available to nearby toilet facilities which meet the other requirements of this subparagraph.

(iii) The sewage disposal method shall not endanger the health of employees.

(iv) When persons other than employees are permitted the use of toilet facilities on the premise, the number of such facilities shall be appropriately increased in accordance with table J-1 of this section in determining the minimum number of

toilet facilities required.

(v) Toilet paper with holder shall be provided for every water closet.

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

(vii) For each three required toilet facilities at least one lavatory shall be located either in the toilet room or adjacent thereto. Where only one or two toilet facilities are provided at least one lavatory so located shall be provided.

(2) Construction of toilet rooms.

(i) Each water closet shall occupy a separate compartment with a door and wall or partitions between fixtures sufficiently high to assure privacy.

(ii) In all toilet rooms installed on or after August 31, 1971, the floor and side walls, including the angle formed by the floor and sidewalls, and excluding door ways and entrances, shall be watertight. The sidewalls shall be watertight to a height of at least 5 inches.

(iii) The floors, walls, ceilings, partitions and doors of all toilet rooms shall be of a finish that can be easily cleaned. In installations made on or after August 31, 1971, cove bases shall be provided to facilitate cleaning.

(3) Construction and installation of toilet facilities.

(i) Every water carriage toilet facility shall be set entirely free and open from all enclosing structures and shall be so installed that the space around the facility can be easily cleaned. This provision does not prohibit the use of wall-hung-type water closets or urinals.

(ii) Every water closet shall have a hinged seat made of substantial material having a nonabsorbent finish. Seats installed or replaced after June 4, 1973, shall be of the open-front type.

(iii) Nonwater carriage toilet facilities and disposal systems shall be in accordance with § 1910.143.

STANDARDS AND INTERPRETATIONS

(d) Washing facilities.

(1) **General.** Washing facilities shall be maintained in a sanitary condition.

(2) Lavatories.

(i) Lavatories shall be made available in all places of employment in accordance with the requirements for lavatories as set forth in table J-2 of this section. In a multiple-use lavatory, 24 lineal inches of wash sink or 20 inches of a circular basin, when provided with water outlets for each space, shall be considered equivalent to one lavatory. The requirements of this subdivision do not apply to mobile crews or to normally unattended work locations if employees working at these locations have transportation readily available to nearby washing facilities which meet the other requirements of this paragraph.

TABLE J-2

Type of employment	Number of employees	Minimum number of lavatories
Nonindustrial—office buildings, public buildings, and similar establishments.	1-15	1.
	16-35	2.
	36-60	3.
	61-90	4.
	91-125	5.
	Over 125	1 additional fixture for each additional 45 employees.
Industrial—factories, warehouses, loft buildings, and similar establishments.	1-100	1 fixture for each 10 employees.
	Over 100	1 fixture for each additional 15 employees.

(ii) Each lavatory shall be provided with hot and cold running water, or tepid running water.

(iii) Hand soap or similar cleansing agents shall be provided.

(iv) Individual hand towels or sections thereof, of cloth or paper, warm air blowers or clean individual sections of continuous cloth toweling, convenient to the lavatories, shall be provided.

(v) Receptacles shall be provided for disposal of used towels.

(vi) Warm air blowers shall provide air at

not less than 90° F. and shall have means to automatically prevent the discharge of air exceeding 140° F.

(vii) Electrical components of warm air blowers shall meet the requirements of Subpart S of this part.

(3) Showers.

(i) Whenever showers are required by a particular standard, the showers shall be provided in accordance with subdivisions (ii) through (v) of this subparagraph.

(ii) One shower shall be provided for each 10 employees of each sex, or numerical fraction thereof, who are required to shower during the same shift.

(iii) Body soap or other appropriate cleansing agents convenient to the showers shall be provided as specified in paragraph (d)(2)(iii) of this section.

(iv) Showers shall be provided with hot and cold water feeding a common discharge line.

(v) Employees who use showers shall be provided with individual clean towels.

(e) Change rooms.

Whenever employees are required by a particular standard to wear protective clothing because of the possibility of contamination with toxic materials, change rooms equipped with storage facilities for street clothes and separate storage facilities for the protective clothing shall be provided.

(f) Clothes drying facilities.

Where working clothes are provided by the employer and become wet or are washed between shifts, provision shall be made to insure that such clothing is dry before reuse.

(g) Consumption of food and beverages on the premises.

(1) **Application.** This paragraph shall apply only where employees are permitted to consume food or beverages, or both, on the

Change 1

350.1

1910.141(g)(1)

STANDARDS AND INTERPRETATIONS

premises.

(2) **Eating and drinking areas.** No employee shall be allowed to consume food or beverages in a toilet room nor in any area exposed to a toxic material.

(3) **Waste disposal containers.** Receptacles constructed of smooth, corrosion resistant, easily cleanable, or disposable materials, shall be provided and used for the disposal of waste food. The number, size, and location of such receptacles shall encourage their use and not result in overfilling. They shall be emptied not less frequently than once each working day, unless unused, and shall be maintained in a clean and sanitary condition. Receptacles shall be provided with a solid tight-fitting cover unless sanitary conditions can be maintained

without use of a cover.

(4) **Sanitary storage.** No food or beverages shall be stored in toilet rooms or in an area exposed to a toxic material.

(h) **Food handling.**

All employee food service facilities and operations shall be carried out in accordance with sound hygienic principles. In all places of employment where all or part of the food service is provided, the food dispensed shall be wholesome, free from spoilage, and shall be processed, prepared, handled, and stored in such a manner as to be protected against contamination.

[38 F.R. 10930, May 3, 1973.]

1910.142—TEMPORARY LABOR CAMPS

(a) Site.

(1) All sites used for camps shall be adequately drained. They shall not be subject to periodic flooding, nor located within 200 feet of swamps, pools, sink holes, or other surface collections of water unless such quiescent water surfaces can be sub-

jected to mosquito control measures. The camp shall be located so the drainage from and through the camp will not endanger any domestic or public water supply. All sites shall be graded, ditched, and rendered free from depressions in which water may become a nuisance.

Change 1

351

1910.142(a)(1)

15843

STANDARDS AND INTERPRETATIONS

(2) All sites shall be adequate in size to prevent overcrowding of necessary structures. The principal camp area in which food is prepared and served and where sleeping quarters are located shall be at least 500 feet from any area in which livestock is kept.

(3) The grounds and open areas surrounding the shelters shall be maintained in a clean and sanitary condition free from rubbish, debris, waste paper, garbage, or other refuse.

(4) Whenever the camp is closed for the season or permanently, all garbage, manure, and other refuse shall be collected and so disposed of as to prevent nuisance. All abandoned privy pits shall be filled with earth and the grounds and buildings left in a clean and sanitary condition. If privy buildings remain, they shall be locked or otherwise secured to prevent entrance.

(b) Shelter.

(1) Every shelter in the camp shall be constructed in a manner which will provide protection against the elements.

(2) Each room used for sleeping purposes shall contain at least 50 square feet of floor space for each occupant. At least a 7-foot ceiling shall be provided.

(3) Beds, cots, or bunks, and suitable storage facilities such as wall lockers for clothing and personal articles shall be provided in every room used for sleeping purposes. Such beds or similar facilities shall be spaced not closer than 36 inches both laterally and end to end, and shall be elevated at least 12 inches from the floor. If double-deck bunks are used, they shall be spaced not less than 48 inches both laterally and end to end. The minimum clear space between the lower and upper bunk shall be not less than 27 inches. Triple-deck bunks are prohibited.

(4) The floors of each shelter shall be constructed of wood, asphalt, or concrete. Wooden floors shall be of smooth and tight construction. The floors shall be kept in good repair.

(5) All wooden floors shall be elevated not less than 1 foot above the ground level at all points to prevent dampness and to permit free circulation of air beneath.

(6) Nothing in this section shall be construed to prohibit "banking" with earth or other suitable material around the outside walls in areas subject to extreme low temperatures.

(7) All living quarters shall be provided with windows the total of which shall be not less than one-tenth of the floor area. At least one-half of each window shall be so constructed that it can be opened for purposes of ventilation.

(8) All exterior openings shall be effectively screened with 16-mesh material. All screen doors shall be equipped with self-closing devices.

(9) In a room where workers cook, live, and sleep a minimum of 100 square feet per person shall be provided. Sanitary facilities shall be provided for storing and preparing food.

(10) In camps where cooking facilities are used in common, stoves (in ratio of one stove to 10 persons or one stove to two families) shall be provided in an enclosed and screened shelter. Sanitary facilities shall be provided for storing and preparing food.

(11) All heating, cooking, and water heating equipment shall be installed in accordance with State and local ordinances, codes, and regulations governing such installations. If a camp is used during cold weather, adequate heating equipment shall be provided.

(c) Water supply.

(1) An adequate and convenient water supply, approved by the appropriate health authority, shall be provided in each camp for drinking, cooking, bathing, and laundry purposes.

(2) A water supply shall be deemed adequate if it is capable of delivering 35 gallons per

STANDARDS AND INTERPRETATIONS

any flow of water from a sprinkler system equal to or greater than that from a single automatic sprinkler will result in an audible alarm signal on the premises.

(k) Class of service—standpipe systems: "Standpipe systems" are grouped into three general classes of service for the intended use in the extinguishment of fire.

(1) Class I: For use by fire departments and those trained in handling heavy fire streams (2½-inch hose).

(2) Class II: For use primarily by the building occupants until the arrival of the fire department (small hose).

(3) Class III: For use by either fire departments and those trained in handling heavy hose streams or by the building occupants.

(l) Class I service: "Class I service" is a standpipe system capable of furnishing the effective fire streams required during the more advanced stages of fire on the inside of buildings or for exposure fire.

(m) Class II service: "Class II service" is a standpipe system which affords a ready means for the control of incipient fires by the occupants of buildings during working hours and by watchmen and those present during the night time and holidays.

(n) Class III service: "Class III service" is a standpipe system capable of furnishing the effective fire streams required during the more advanced stages of fire on the inside of buildings as well as providing a ready means for the control of fires by the occupants of the building.

(o) Standpipe systems: "Standpipe systems" are usually of the following types:

(1) A wet standpipe system having a supply valve open and water pressure maintained at all times.

(2) A standpipe system so arranged through the use of approved devices as to admit water to the system automatically by opening a hose valve.

(3) A standpipe system arranged to admit water to the system through manual operation of approved remote control devices located at each hose station.

(4) Dry standpipe having no permanent water supply. See also paragraph (k) of this section.

(p) Type I storage: "Type I storage" is that in which combustible commodities or noncombustible commodities involving combustible packaging or storage aids are stored over 15 feet but not more than 21 feet high in solid piles or over 12 feet but not more than 21 feet high in piles that contain horizontal channels. Minor quantities of commodities of hazard greater than ordinary combustibles may be included without affecting this general classification.

(q) Type II storage: "Type II storage" is that in which combustible commodities or noncombustible commodities involving combustible packaging or storage aids are stored not over 15 feet high in solid piles or not over 12 feet high in piles that contain horizontal channels. Minor quantities of commodities of hazard greater than ordinary combustibles may be included without affecting this general classification.

(r) Type III storage: "Type III storage" is that in which the stored commodities, packaging, and storage aids are noncombustible or contain only a small concentration of combustibles which are incapable of producing a fire that would cause appreciable damage to the commodities stored or to noncombustible wall, floor or roof construction. Ordinary combustible commodities in completely sealed noncombustible containers may qualify in this classification. General commodity storage that is subject to frequent changing and storage of combustible packaging and storage aids is excluded from this category.

(s) "Approved": "Approved" means listed or approved by: (1) At least one of the following nationally recognized testing laboratories: Factory Mutual Engineering Corp.; Underwriters' Laboratories, Inc., or (2) Federal agencies such as Bureau of Mines, Department of the Interior; Department of Transportation; or U.S. Coast Guard, which issue approvals for such equipment.

PORTABLE FIRE SUPPRESSION EQUIPMENT

1910.157—PORTABLE FIRE EXTINGUISHERS

(a) General requirements.

(1) **Operable condition.** Portable extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used.

(2) **Location.** Extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. They shall be located along normal paths of travel.

(3) **Marking of location.** Extinguishers shall not be obstructed or obscured from view. In large rooms, and in certain locations where visual obstruction cannot be completely avoided, means shall be provided to indicate the location and intended use of extinguishers conspicuously.

(4) **Marking of extinguishers.** If extinguishers intended for different classes of fire are grouped, their intended use shall be marked conspicuously to insure choice of the proper extinguisher at the time of a fire.

(5) **Mounting of extinguishers.** Extinguishers shall be installed on the hangers or in the brackets supplied, mounted in cabinets, or set on shelves unless the extinguishers are of the wheeled type.

(6) **Height of mounting.** Extinguishers having a gross weight not exceeding 40 pounds shall be installed so that the top of the extinguisher is not more than 5 feet above the floor. Extinguishers having a gross weight greater than 40 pounds (except wheeled types) shall be so installed that the top of the extinguisher is not more than 3½ feet above the floor.

(7) **Cabinet mounting.** Extinguisher mounted in cabinets or wall recesses or set on shelves

shall be placed in a manner such that the extinguisher operating instructions face outward. The location of such extinguishers shall be marked conspicuously.

(8) **Vibrating locations.** Extinguishers installed under conditions where they are subject to severe vibration shall be installed in brackets specifically designed to cope with this vibration.

(9) **Temperature range.** Extinguishers shall be suitable for use within a temperature range of at least plus 40° to 120° Fahrenheit.

(10) **Extreme temperature exposure.** When extinguishers are installed in locations subjected to temperatures outside the range prescribed in this subparagraph, they shall be of a type approved or listed for the temperature to which they will be exposed, or placed in an enclosure capable of maintaining the temperature within the range prescribed in this subparagraph.

(b) Selection of extinguishers.

(1) **General.** The selection of extinguishers for a given situation will depend upon the character of the fires anticipated, the construction and occupancy of the individual property, the vehicle or hazard to be protected, ambient-temperature conditions, and other factors. The number of extinguishers required shall be determined by reference to paragraph (c) of this section. Approved fire extinguishers shall be used to meet the requirements of this section.

[38 F.R. 19030, July 17, 1973.]

(2) Selection by hazard.

(i) Extinguishers shall be selected for the specific class or classes of hazards to be protected in accordance with the following paragraphs.

(ii) Extinguishers for protecting Class A hazards shall be selected from among the

1910.160—FIXED DRY CHEMICAL EXTINGUISHING SYSTEMS**(a) General requirements.**

(1) **Design.** When dry chemical extinguishing systems are provided they shall meet the design requirements of the National Fire Protection Association's "Standard For Dry Chemical Extinguishing Systems" NFPA No. 17-1969 and the requirements of this section.

(2) **Safety requirements.** Where there is a possibility that personnel may be exposed to a dry chemical discharge, suitable safeguards shall be provided to insure prompt evacuation of such locations, and also to provide means for prompt rescue of any trapped personnel.

(b) Alarms and indicators.

(1) **General.** Alarms and/or indicators are used to indicate the operation of the system, hazard to personnel, or failure of any supervised device or equipment. The devices may be audible or visual. The type, number, and location of the devices shall be such that their purpose is satisfactorily accomplished.

[38 F.R. 19030, July 17, 1973.]

(2) Operation alarm.

(i) An alarm or indicator shall be provided to show that the system has operated, that personnel response may be needed, and that the system should be charged.

(ii) Alarms indicating failure of supervised devices or equipment shall give prompt and positive indication of any failure and shall be distinctive from alarms indicating operation or hazardous conditions.

(c) Inspection and maintenance.**(1) Inspection and tests.**

(i) At least annually, all dry chemical systems including alarms, shutdowns, and

Change 1

other associated equipment, shall be thoroughly inspected and checked for proper operation by a competent inspector.

(ii) The purpose of the inspection and testing prescribed by paragraph (c) of this section shall be not only to insure that the system is in full operating condition but also to indicate the probable continuance of that condition until the next inspection. Attention at this inspection shall be given to any extension of the hazard protected by the system.

(iii) The inspector's report, with recommendations, if any, shall be filed with the employer or with whomsoever is designated by the employer.

(iv) Between the regular annual inspection or tests, the system shall be inspected visually or otherwise by competent personnel, following a predetermined schedule.

[38 F.R. 19030, July 17, 1973.]

(v) At least semiannually, all expellant gas containers shall be checked by pressure or weight against the required minimums.

(vi) At least semiannually, all stored pressure dry chemical containers shall be checked by pressure and weight against the required minimums.

(vii) Except for stored pressure systems, at least annually the dry chemical in the system storage container shall be sampled from the top center and also near the wall to determine the existence of lumps harder than will be friable when dropped from a height of 4 inches.

(2) Maintenance.

(i) These fixed dry chemical systems shall

STANDARDS AND INTERPRETATIONS

be maintained in full operating condition at all times. Use, impairment, and restoration of this protection shall be reported promptly to the employer.

(ii) Any troubles or impairments shall be corrected at once by competent personnel.

1910.161—CARBON DIOXIDE EXTINGUISHING SYSTEMS

(a) General requirements.

(1) **Design.** When carbon dioxide extinguishing systems are provided they shall meet the design requirements of the National Fire Protection Association's "Standard on Carbon Dioxide Extinguishing Systems" NFPA No. 12-1968 and the requirements of this section.

(2) **Safety requirements.** In any use of carbon dioxide where there is a possibility that employees may be trapped in, or enter into atmospheres made hazardous by a carbon dioxide discharge, suitable safeguards shall be provided to insure prompt evacuation of and to prevent entry into such atmospheres and also to provide means for prompt rescue of any trapped personnel. Such safety items as personnel training, warning signs, discharge alarms, predischARGE alarms, and breathing apparatus shall be considered.

(b) Inspection and maintenance.**(1) Inspection and tests.**

(i) At least annually, all carbon dioxide systems shall be thoroughly inspected and tested for proper operation by a competent engineer or inspector.

(ii) The goal of this inspection and testing shall be not only to insure that the system is in full operating condition but shall

indicate the probable continuance of that condition until the next inspection.

(iii) Suitable discharge tests shall be made when any inspection indicates their advisability.

(iv) Between the regular service contract inspection or tests, the system shall be inspected visually or otherwise by competent personnel, following a schedule.

(v) At least semiannually, all high pressure cylinders shall be weighed. If, at any time, a container shows a loss in net content of more than 10 percent, it shall be refilled or replaced.

(vi) If, at any time, a low pressure container shows a loss of more than 10 percent, it shall be refilled, unless the minimum gas requirements are still provided.

(2) Maintenance.

(i) These carbon dioxide systems shall be maintained in full operating condition at all times.

(ii) Any troubles or impairments shall be corrected at once by competent personnel.

1910.162—OTHER SPECIAL FIXED EXTINGUISHING SYSTEMS.
[RESERVED]

PART 1910**OCCUPATIONAL SAFETY AND HEALTH STANDARDS****SUBPART N—MATERIALS HANDLING AND STORAGE**

1910.176	Handling materials—general.
1910.177	Indoor general storage.
1910.178	Powered industrial trucks.
1910.179	Overhead and gantry cranes.
1910.180	Crawler, locomotive, and truck cranes.
1910.181	Derricks.
1910.182	Additional delay in effective date.
1910.183	Sources of standards.
1910.184	Standards organizations.

STANDARDS AND INTERPRETATIONS

SUBPART N—MATERIALS HANDLING AND STORAGE

1910.176—HANDLING MATERIALS—GENERAL

(a) Use of mechanical equipment.

Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard. Permanent aisles and passageways shall be appropriately marked.

(b) Secure storage.

Storage of material shall not create a hazard. Bags, containers, bundles, etc., stored in tiers shall be stacked, blocked, interlocked and limited in height so that they are stable and secure against sliding or collapse.

(c) Housekeeping.

Storage areas shall be kept free from accumulation of materials that constitute

hazards from tripping, fire, explosion, or pest harborage. Vegetation control will be exercised when necessary.

(d) Drainage.

Proper drainage shall be provided.

(e) Clearance limits.

Clearance signs to warn of clearance limits shall be provided.

(f) Rolling railroad cars.

Derail and/or bumper blocks shall be provided on spur railroad tracks where a rolling car could contact other cars being worked, enter a building, work or traffic area.

(g) Guarding.

Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc.

1910.177—INDOOR GENERAL STORAGE

1910.177 REVOKED

[38 F.R. 14371, June 1, 1973.]

Pages 407 and 408 deleted

1910.178—POWERED INDUSTRIAL TRUCKS

(a) General requirements.

(1) This section contains safety requirements relating to fire protection, design, maintenance, and use of fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines. This section does not apply to compressed air or nonflammable compressed gas-operated industrial trucks, nor to farm vehicles, nor to vehicles intended primarily for earth moving or over-the-road hauling.

[38 F.R. 14371, June 1, 1973.]

(2) All new powered industrial trucks acquired and used by an employer after the effective date specified in paragraph (b) of § 1910.182 shall meet the design and construction requirements for powered industrial trucks established in the "American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969", except for vehicles intended primarily for earth moving or over-the-road hauling.

(3) Approved trucks shall bear a label or some other identifying mark indicating approval by the testing laboratory. See subparagraph (7) of this paragraph and paragraph 405 of "American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969", which is incorporated by reference in subparagraph (2) of this paragraph and which provides that if the powered industrial truck is accepted by a nationally recognized testing laboratory it should be so marked.

Change 1

(4) Modifications and additions which affect capacity and safe operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

(5) If the truck is equipped with front-end attachments other than factory installed attachments, the user shall request that the truck be marked to identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with load laterally centered.

(6) The user shall see that all nameplates and markings are in place and are maintained in a legible condition.

(7) As used in this section, the term, "approved truck" or "approved industrial truck" means a truck that is listed or approved for fire safety purposes for the intended use by a nationally recognized testing laboratory, e.g., Underwriters' Laboratories, Inc.; Factory Mutual Engineering Corp., using nationally recognized testing standards.

[38 F.R. 14371, June 1, 1973.]

(b) Designations.

For the purpose of this standard there are eleven different designations of industrial

STANDARDS AND INTERPRETATIONS

trucks or tractors as follows: D, DS, DY, E, ES, EE, EX, G, GS, LP, and LPS.

(1) The D designated units are units similar to the G units except that they are diesel engine powered instead of gasoline engine powered.

(2) The DS designated units are diesel powered units that are provided with additional safeguards to the exhaust, fuel and electrical systems. They may be used in some locations where a D unit may not be considered suitable.

(3) The DY designated units are diesel powered units that have all the safeguards of the DS units and in addition do not have any electrical equipment including the ignition and are equipped with temperature limitation features.

(4) The E designated units are electrically powered units that have minimum acceptable safeguards against inherent fire hazards.

(5) The ES designated units are electrically powered units that, in addition to all of the requirements for the E units, are provided with additional safeguards to the electrical system to prevent emission of hazardous sparks and to limit surface temperatures. They may be used in some locations where the use of an E unit may not be considered suitable.

(6) The EE designated units are electrically powered units that have, in addition to all of the requirements for the E and ES units, the electric motors and all other electrical equipment completely enclosed. In certain locations the EE unit may be used where the use of an E and ES unit may not be considered suitable.

(7) The EX designated units are electrically powered units that differ from the E, ES, or EE units in that the electrical fittings and equipment are so designed, constructed and assembled that the units may be used in certain atmospheres containing flammable vapors or dusts.

(8) The G designated units are gasoline pow-

ered units having minimum acceptable safeguards against inherent fire hazards.

(9) The GS designated units are gasoline powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of a G unit may not be considered suitable.

(10) The LP designated unit is similar to the G unit except that liquefied petroleum gas is used for fuel instead of gasoline.

(11) The LPS designated units are liquefied petroleum gas powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of an LP unit may not be considered suitable.

(12) The atmosphere or location shall have been classified as to whether it is hazardous or nonhazardous prior to the consideration of industrial trucks being used therein and the type of industrial truck required shall be as provided in paragraph (d) of this section for such location.

(c) Designated locations.

(1) The industrial trucks specified under subparagraph (2) of this paragraph are the minimum types required but industrial trucks having greater safeguards may be used if desired.

(2) For specific areas of use see Table N-1 which tabulates the information contained in this section. References in parentheses are to the corresponding classification as used in the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968) for the convenience of persons familiar with those classifications.

References in parentheses are to the corresponding classification as used in the National Electrical Code (NFPA No. 70, ANSI Standard C1-1968) for the convenience of persons familiar with those classifications.

STANDARDS AND INTERPRETATIONS

truck. Methods shall be devised to train operators in the safe operation of powered industrial trucks.

(m) Truck operations.

(1) Trucks shall not be driven up to anyone standing in front of a bench or other fixed object.

(2) No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.

(3) Unauthorized personnel shall not be permitted to ride on powered industrial trucks. A safe place to ride shall be provided where riding of trucks is authorized.

(4) The employer shall prohibit arms or legs from being placed between the uprights of the mast or outside the running lines of the truck.

(5)

(i) When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.

(ii) A powered industrial truck is unattended when the operator is 25 feet or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in his view.

(iii) When the operator of an industrial truck is dismounted and within 25 feet of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.

[38 F.R. 14371, June 1, 1973.]

(6) A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Trucks shall not be used for opening or closing freight doors.

(7) Brakes shall be set and wheel blocks shall be in place to prevent movement of trucks.

Change 1

trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semitrailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers, and railroad cars shall be checked for breaks and weakness before they are driven onto.

(8) There shall be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.

(9) An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.

(10) A load backrest extension shall be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.

(11) Only approved industrial trucks shall be used in hazardous locations.

(12) Whenever a truck is equipped with vertical only, or vertical and horizontal controls elevatable with the lifting carriage or forks for lifting personnel, the following additional precautions shall be taken for the protection of personnel being elevated.

(i) Use of a safety platform firmly secured to the lifting carriage and/or forks.

(ii) Means shall be provided whereby personnel on the platform can shut off power to the truck.

(iii) Such protection from falling objects as indicated necessary by the operating conditions shall be provided.

(13) [Revoked]

[38 F.R. 14371, June 1, 1973.]

(14) Fire aisles, access to stairways, and fire equipment shall be kept clear.

(n) Traveling.

STANDARDS AND INTERPRETATIONS

(1) All traffic regulations shall be observed, including authorized plant speed limits. A safe distance shall be maintained approximately three truck lengths from the truck ahead, and the truck shall be kept under control at all times.

(2) The right of way shall be yielded to ambulances, fire trucks, or other vehicles in emergency situations.

(3) Other trucks traveling in the same direction at intersections, blind spots, or other

Change 1

416.1

15855

STANDARDS AND INTERPRETATIONS

dangerous locations shall not be passed.

(4) The driver shall be required to slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.

(5) Railroad tracks shall be crossed diagonally wherever possible. Parking closer than 8 feet from the center of railroad tracks is prohibited.

(6) The driver shall be required to look in the direction of, and keep a clear view of the path of travel.

(7) Grades shall be ascended or descended slowly.

(i) When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade.

(ii) Unloaded trucks should be operated on all grades with the load engaging means downgrade.

(iii) On all grades the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface.

(8) Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.

(9) Stunt driving and horseplay shall not be permitted.

(10) The driver shall be required to slow down for wet and slippery floors.

(11) Dockboard or bridgeplates, shall be properly secured before they are driven over. Dockboard or bridgeplates shall be driven over carefully and slowly and their rated capacity never exceeded.

(12) Elevators shall be approached slowly, and then entered squarely after the elevator car is properly leveled. Once on the elevator, the controls shall be neutralized,

power shut off, and the brakes set.

(13) Motorized hand trucks must enter elevator or other confined areas with load end forward.

(14) Running over loose objects on the roadway surface shall be avoided.

(15) While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

(c) Loading.

(1) Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered.

(2) Only loads within the rated capacity of the truck shall be handled.

(3) The long or high (including multiple-tiered) loads which may affect capacity shall be adjusted.

(4) When attachments are used, particular care should be taken in securing, manipulating, positioning, and transporting the load. Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load.

(5) A load engaging means shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load.

(6) Extreme care shall be used when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated shall be prohibited except to pick up a load. An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

STANDARDS AND INTERPRETATIONS

specifications by February 15, 1972, unless it can be shown that the crane cannot feasibly or economically be altered and that the crane substantially complies with the requirements of this section.

(3) **Modifications.** Cranes may be modified and rerated provided such modifications and the supporting structure are checked thoroughly for the new rated load by a qualified engineer or the equipment manufacturer. The crane shall be tested in accordance with paragraph (k)(2) of this section. New rated load shall be displayed in accordance with subparagraph (5) of this paragraph.

(4) **Wind indicators and rail clamps.** Outdoor storage bridges shall be provided with automatic rail clamps. A wind-indicating device shall be provided which will give a visible or audible alarm to the bridge operator at a predetermined wind velocity. If the clamps act on the rail heads, any beads or weld flash on the railheads shall be ground off.

(5) **Rated load marking.** The rated load of the crane shall be plainly marked on each side of the crane, and if the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block and this marking shall be clearly legible from the ground or floor.

(6) **Clearance from obstruction.**

(i) Minimum clearance of 3 inches overhead and 2 inches laterally shall be provided and maintained between crane and obstructions in conformity with Crane Manufacturers Association of America, Inc., Specification No. 61 (formerly the Electric Overhead Crane Institute, Inc.).

(ii) Where passageways or walkways are provided obstructions shall not be placed so that safety of personnel will be jeopardized by movements of the crane.

(7) **Clearance between parallel cranes.** If the runways of two cranes are parallel, and there are no intervening walls or structure, there shall be adequate clearance provided and maintained between the two bridges.

(8) **Designated personnel.** Only designated personnel shall be permitted to operate a crane covered by this section.

[39 F.R. 14371, June 1, 1973.]

(c) **Cabs.**

(1) **Cab location.**

(i) The general arrangement of the cab and the location of control and protective equipment shall be such that all operating handles are within convenient reach of the operator when facing the area to be served by the load hook, or while facing the direction of travel of the cab. The arrangement shall allow the operator a full view of the load hook in all positions.

(ii) The cab shall be located to afford a minimum of 3 inches clearance from all fixed structures within its area of possible movement.

(iii) The clearance of the cab above the working floor or passageway should be not less than 7 feet.

(2) **Access to crane.** Access to the cab and/or bridge walkway shall be by a conveniently placed fixed ladder, stairs, or platform requiring no step over any gap exceeding 12 inches. Fixed ladders shall be in conformance with the American National Standard Safety Code for Fixed Ladders, ANSI A14.3-1956.

(3) **Fire extinguisher.** A carbon dioxide, dry-chemical, or equivalent hand fire extinguisher should be kept in the cab. Carbon tetrachloride extinguishers shall not be used.

(4) **Lighting.** Light in the cab shall be sufficient to enable the operator to see clearly enough to perform his work.

(d) **Footwalks and ladders.**

(1) **Location of footwalks.**

(i) If sufficient headroom is available on cab-operated cranes, a footwalk shall be provided on the drive side along the entire length of the bridge of all cranes having

STANDARDS AND INTERPRETATIONS

the trolley running on the top of the girders. To give sufficient access to the opposite side of the trolley, there should

be provided either a footwalk mounted on the trolley, a suitable footwalk or plat-

Change 1

422.1

15859

STANDARDS AND INTERPRETATIONS

form in the building, or a footwalk on the opposite side of the crane at least twice the length of the trolley.

(ii) Footwalks should be located to give a headroom not less than 78 inches. In no case shall less than 48 inches be provided. If 48 inches of headroom cannot be provided, footwalks should be omitted from the crane and a stationary platform or landing stage built for workmen making repairs.

(2) Construction of footwalks.

(i) Footwalks shall be of rigid construction and designed to sustain a distributed load of at least 50 pounds per square foot.

(ii) Footwalks shall have a walking surface of antislip type.

NOTE: Wood will meet this requirement.

(iii) Footwalks should be continuous and permanently secured.

(iv) Footwalks should have a clear passageway at least 18 inches wide except opposite the bridge motor, where they should be not less than 15 inches. The inner edge shall extend at least to the line of the outside edge of the lower cover plate or flange of the girder.

(3) Toeboards and handrails for footwalks. Toeboards and handrails shall be in compliance with section 1910.23 of this part.

(4) Ladders and stairways.

(i) Gantry cranes shall be provided with ladders or stairways extending from the ground to the footwalk or cab platform.

(ii) Stairways shall be equipped with rigid and substantial metal handrails. Walking surfaces shall be of an antislip type.

(iii) Ladders shall be permanently and securely fastened in place and shall be constructed in compliance with § 1910.27.

(e) Stops, bumpers, rail sweeps, and guards.

(1) Trolley stops.

(i) Stops shall be provided at the limits of travel of the trolley.

(ii) Stops shall be fastened to resist forces applied when contacted.

(iii) A stop engaging the tread of the wheel shall be of a height at least equal to the radius of the wheel.

(2) Bridge bumpers.

(i) A crane shall be provided with bumpers or other automatic means providing equivalent effect, unless the crane travels at a slow rate of speed and has a faster deceleration rate due to the use of sleeve bearings, or is not operated near the ends of bridge and trolley travel, or is restricted to a limited distance by the nature of the crane operation and there is no hazard of striking any object in this limited distance, or is used in similar operating conditions. The bumpers shall be capable of stopping the crane (not including the lifted load) at an average rate of deceleration not to exceed 3 ft/s/s when traveling in either direction at 20 percent of the rated load speed.

(a) The bumpers shall have sufficient energy absorbing capacity to stop the crane when traveling at a speed of at least 40 percent of rated load speed.

(b) The bumper shall be so mounted that there is no direct shear on bolts.

(ii) Bumpers shall be so designed and installed as to minimize parts falling from the crane in case of breakage.

(3) Trolley bumpers.

(i) A trolley shall be provided with bumpers or other automatic means of equivalent effect, unless the trolley travels at a slow rate of speed, or is not operated near the ends of bridge and trolley travel, or is restricted to a limited distance of the runway and there is no hazard of striking any object in this limited distance, or is used in similar operating con-

[38: F.R. 14371, June 1, 1973.]

STANDARDS AND INTERPRETATIONS

ditions. The bumpers shall be capable of stopping the trolley (not including the lifted load) at an average rate of deceleration not to exceed 4.7 ft/s/s when traveling in either direction at one-third of the rated load speed.

(ii) When more than one trolley is operated

on the same bridge, each shall be equipped with bumpers or equivalent on their adjacent ends.

(iii) Bumpers or equivalent shall be designed and installed to minimize parts falling from the trolley in case of age.

[38 F.R. 14371, June 1, 1973.]

Change 1

422.3

1910.179(e)(3)(iii)

15861

STANDARDS AND INTERPRETATIONS

422.4

Change 1

15862

STANDARDS AND INTERPRETATIONS

which the rope travels around drums and sheaves.

(34) "Rope" refers to a wire rope unless otherwise specified.

(35) "Side loading" means a load applied at an angle to the vertical plane of the boom.

(36) A "standby crane" is a crane which is not in regular service but which is used occasionally or intermittently as required.

(37) A "standing (guy) rope" is a supporting rope which maintains a constant distance between the points of attachment to the two components connected by the rope.

(38) "Structural competence" means the ability of the machine and its components to withstand the stresses imposed by applied loads.

(39) "Superstructure" means the rotating upper frame structure of the machine and the operating machinery mounted thereon.

(40) "Swing" means the rotation of the superstructure for movement of loads in a horizontal direction about the axis of rotation.

(41) "Swing mechanism" means the machinery involved in providing rotation of the superstructure.

(42) "Tackle" is an assembly of ropes and sheaves arranged for hoisting and pulling.

(43) "Transit" means the moving or transporting of a crane from one jobsite to another.

(44) "Travel" means the function of the machine moving from one location to another, on a jobsite.

(45) The "travel mechanism" is the machinery involved in providing travel.

(46) "Wheelbase" means the distance between centers of front and rear axles. For a multiple axle assembly the axle center for wheelbase measurement is taken as the midpoint of the assembly.

Change 1

(47) The "whipline" (auxiliary hoist) is a separate hoist rope system of lighter load capacity and higher speed than provided by the main hoist.

(48) A "winch head" is a power driven spool for handling of loads by means of friction between fiber or wire rope and spool.

(b) General requirements.

(1) **Application.** This section applies to crawler cranes, locomotive cranes, wheel mounted cranes of both truck and self-propelled wheel type, and any variations thereof which retain the same fundamental characteristics. This section includes only cranes of the above types, which are basically powered by internal combustion engines or electric motors and which utilize drums and ropes. Cranes designed for railway and automobile wreck clearances are excepted. The requirements of this section are applicable only to machines when used as lifting cranes.

(2) **New and existing equipment.** All new crawler, locomotive, and truck cranes constructed and utilized on or after August 31, 1971, shall meet the design specifications of the American National Standard Safety Code for Crawler, Locomotive, and Truck Cranes, ANSI B30.5-1968. Crawler, locomotive, and truck cranes constructed prior to August 31, 1971, should be modified to conform to those design specifications by February 15, 1972, unless it can be shown that the crane cannot feasibly or economically be altered and that the crane substantially complies with the requirements of this section.

(3) **Designated personnel.** Only designated personnel shall be permitted to operate a crane covered by this section.

[38 F.R. 14371, June 1, 1973.]

(c) Load ratings.

(1) **Load ratings—where stability governs lifting performance.**

(i) The margin of stability for determination of load ratings, with booms of stipulated lengths at stipulated working radii for the various types of crane mountings, is established by taking a percent

1910.180(c)(1)(i)

STANDARDS AND INTERPRETATIONS

age of the loads which will produce a condition of tipping or balance with the boom in the least stable direction, relative to the mounting. The load ratings shall not exceed the following percentages for cranes, with the indicated types of mounting under conditions stipulated in subdivisions (ii) and (iii) of this subparagraph.

Type of crane mounting	Maximum load ratings (percent of tipping loads)
Locomotive, without outriggers:	
Booms 60 feet or less	85
Booms over 60 feet	85
Locomotive, using outriggers fully extended	80
Crawler, without outriggers	75
Crawler, using outriggers fully extended ..	85
Truck and wheel mounted without outriggers or using outriggers fully extended ..	85

¹ Unless this results in less than 30,000 pound-feet net stabilizing moment about the rail, which shall be minimum with such booms.

(ii) The following stipulations shall govern the application of the values in subdivision (i) of this subparagraph for locomotive cranes:

(a) Tipping with or without the use of outriggers occurs when half of the wheels farthest from the load leave the rail.

(b) The crane shall be standing on track which is level within 1 percent grade.

(c) Radius of the load is the horizontal distance from a projection of the axis of rotation to the rail support surface, before loading, to the center of vertical hoist line or tackle with load applied.

(d) Tipping loads from which ratings are determined shall be applied under static conditions only, i.e., without dynamic effect of hoisting, lowering, or swinging.

(e) The weight of all auxiliary handling devices such as hoist blocks, hooks, and slings shall be considered a part of the load rating.

(iii) Stipulations governing the application of the values in subdivision (i) of this subparagraph for crawler, truck, and wheel-mounted cranes shall be in accordance with Crane Load-Stability Test Code, Society of Automotive Engineers (SAE) J765.

(iv) The effectiveness of these preceding stability factors will be influenced by such additional factors as freely suspended loads, track, wind, or ground conditions, condition and inflation of rubber tires, boom lengths, proper operating speeds for existing conditions, and, in general, careful and competent operation. All of these shall be taken into account by the user.

(2) **Load rating chart.** A substantial and durable rating chart with clearly legible letters and figures shall be provided with each crane and securely fixed to the crane cab in a location easily visible to the operator while seated at his control station.

(d) **Inspection classification.**

(1) **Initial inspection.** Prior to initial use all new and altered cranes shall be inspected to insure compliance with provisions of this section.

(2) **Regular inspection.** Inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as "frequent" and "periodic", with respective intervals between inspections as defined below:

(i) **Frequent inspection:** Daily to monthly intervals.

(ii) **Periodic inspection:** 1- to 12-month intervals, or as specifically recommended by the manufacturer.

(3) **Frequent inspection.** Items such as the following shall be inspected for defects at

STANDARDS AND INTERPRETATIONS

angle to the vertical plane of the boom.

(31) The "sill" is a member connecting the foot block and stiffleg or a member connecting the lower ends of a double member mast.

(32) A "standby derrick" is a derrick not in regular service which is used occasionally or intermittently as required.

(33) "Stiffleg" means a rigid member supporting the mast at the head.

(34) "Swing" means rotation of the mast and/or boom for movements of loads in a horizontal direction about the axis of rotation.

(b) General requirements.

(1) **Application.** This section applies to guy, stiffleg, basket, breast, gin pole, Chicago boom and A-frame derricks of the stationary type, capable of handling loads at variable reaches and powered by hoists through systems of rope reeving, used to perform lifting hook work, single or multiple line bucket work, grab, grapple, and magnet work. Derricks may be permanently installed for temporary use as in construction work. The requirements of this section also apply to any modification of these types which retain their fundamental features, except for floating derricks.

(2) **New and existing equipment.** All new derricks constructed and installed on or after August 31, 1971, shall meet the design specifications of the American National Standard Safety Code for Derricks, ANSI B30.6-1969. Derricks constructed prior to August 31, 1971, should be modified to conform to those design specifications by February 15, 1972, unless it can be shown that the derrick cannot feasibly or economically be altered and that the derrick substantially complies with the requirements of this section.

(3) **Designated personnel.** Only designated personnel shall be permitted to operate a derrick covered by this section.

[38 F.R. 14371, June 1, 1973.]

Change 1

(c) Load ratings.

(1) **Rated load marking.** For permanently installed derricks with fixed lengths of boom, guy, and mast, a substantial, durable, and clearly legible rating chart shall be provided with each derrick and securely affixed where it is visible to personnel responsible for the safe operation of the equipment. The chart shall include the following data:

(i) Manufacturer's approved load ratings at corresponding ranges of boom angle or operating radii.

(ii) Specific lengths of components on which the load ratings are based.

(iii) Required parts for hoist reeving. Size and construction of rope may be shown either on the rating chart or in the operating manual.

(2) **Nonpermanent installations.** For nonpermanent installations, the manufacturer shall provide sufficient information from which capacity charts can be prepared for the particular installation. The capacity charts shall be located at the derricks or the jobsite office.

(d) Inspection.

(1) Inspection classification.

(i) Prior to initial use all new and altered derricks shall be inspected to insure compliance with the provisions of this section.

(ii) Inspection procedure for derricks in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the derrick and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as frequent and periodic with respective intervals between inspections as defined below:

(a) **Frequent inspection**—Daily to monthly intervals.

STANDARDS AND INTERPRETATIONS

(b) Periodic inspection—1- to 12-month intervals, or as specified by the manufacturer.

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444

Change 1

15866

Change 1

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15867

STANDARDS AND INTERPRETATIONS

(2) **Frequent inspection.** Items such as the following shall be inspected for defects at intervals as defined in subparagraph (1)(ii)(a) of this paragraph or as specifically indicated, including observation during operation for any defects which might appear between regular inspections. Deficiencies shall be carefully examined for any safety hazard:

(i) All control mechanisms: Inspect daily for adjustment, wear, and lubrication.

(ii) All chords and lacing: Inspect daily, visually.

(iii) Tension in guys: Daily.

(iv) Plumb of the mast.

(v) Deterioration or leakage in air or hydraulic systems: Daily.

(vi) Derrick hooks for deformations or cracks; for hooks with cracks or having more than 15 percent in excess of normal throat opening or more than 10° twist from the plane of the unbent hook, refer to paragraph (e)(3)(iii) of this section.

(vii) Rope reeving; visual inspection for noncompliance with derrick manufacturer's recommendations.

(viii) Hoist brakes, clutches, and operating levers: check daily for proper functioning before beginning operations.

(ix) Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation.

(3) **Periodic inspection.**

(i) Complete inspections of the derrick shall be performed at intervals as generally defined in subparagraph (1)(ii)(b) of this paragraph depending upon its activity, severity of service, and environment, or as specifically indicated below. These inspections shall include the requirements of subparagraph (2) of this paragraph and in addition, items such as the following. Deficiencies shall be care-

fully examined and a determination made as to whether they constitute a safety hazard:

(a) Structural members for deformations, cracks, and corrosion.

(b) Bolts or rivets for tightness.

(c) Parts such as pins, bearings, shafts, gears, sheaves, drums, rollers, locking and clamping devices, for wear, cracks, and distortion.

(d) Gudgeon pin for cracks, wear, and distortion each time the derrick is to be erected.

(e) Powerplants for proper performance and compliance with applicable safety requirements.

(f) Hooks, magnetic particle or other suitable crack detecting inspection should be performed at least once each year.

(ii) Foundation or supports shall be inspected for continued ability to sustain the imposed loads.

(4) **Derricks not in regular use.**

(i) A derrick which has been idle for a period of 1 month or more, but less than 6 months, shall be given an inspection conforming with requirements of subparagraph (2) of this paragraph and paragraph (g)(3) of this section before placing in service.

(ii) A derrick which has been idle for a period of over 6 months shall be given a complete inspection conforming with requirements of subparagraphs (2) and (3) of this paragraph and paragraph (g)(3) of this section before placing in service.

(iii) Standby derricks shall be inspected at least semiannually in accordance with requirements of subparagraph (2) of this paragraph and paragraph (g)(3) of this section. Those exposed to adverse environment should be inspected more fre-

STANDARDS AND INTERPRETATIONS

tances shall be expressed in inches of surface travel of the roll from the instant the emergency stopping device is actuated.

(2) **Stopping limits for mills.** All mills irrespective of the size of the rolls or their arrangement (individually or group-driven) shall be stopped within a distance, as measured in inches of surface travel, not greater than $1\frac{1}{2}$ percent of the peripheral no-load surface speeds of the respective rolls as determined in feet per minute.

(3) **Stopping limits for calenders.**

(i) All calenders, irrespective of size of the rolls or their configuration, shall be stopped within a distance, as measured in inches of surface travel, not greater than $1\frac{1}{4}$ percent of the peripheral no-

load surface speeds of the respective calender rolls as determined in feet per minute.

(ii) Where speeds above 250 feet per minute as measured on the surface of the drive roll are used, stopping distances of more than $1\frac{1}{4}$ percent are permissible. Such stopping distances shall be subject to engineering determination.

(g) **Alarm.**

Where an exposure is created by the operation, and the operators are not within sight or hearing of other employees, a suitable alarm device should be provided so that assistance will be available in case of accidents.

1910.217—MECHANICAL POWER PRESSES

(a) **General requirements.**

(1) **New installations.** The requirements of this section pertaining to construction shall apply to all mechanical power presses installed on or after August 31, 1971.

(2) **Former installations.** All mechanical power presses installed prior to August 31, 1971, shall be brought into conformity with the requirements of this section not later than August 31, 1974.

(3) **All installations.** The requirements of this section pertaining to the care and use of mechanical power presses shall apply to all mechanical power press operations as of February 15, 1972.

(4) **Reconstruction and modification.** It shall be the responsibility of any person reconstructing, or modifying a mechanical power press to do so in accordance with paragraph (b) of this section.

(5) **Excluded machines.** Press brakes, hydraulic and pneumatic power presses, bulldozers,

not bending and hot metal presses, forging presses and hammers, riveting machines and similar types of fastener applicators are excluded from the requirements of this section.

(b) **Mechanical power press guarding and construction, general.**

(1) **Hazards to personnel associated with broken or falling machine components.** Machine components shall be designed, secured, or covered to minimize hazards caused by breakage, or loosening and falling or release of mechanical energy (i.e. broken springs).

(2) **Brakes.** Friction brakes provided for stopping or holding a slide movement shall be inherently self-engaging by requiring power or force from an external source to cause disengagement. Brake capacity shall be sufficient to stop the motion of the slide quickly and capable of holding the slide and its attachments at any point in its travel.

[38 F.R. 16223, June 21, 1973.]

STANDARDS AND INTERPRETATIONS

(3) Machines using full revolution positive clutches.

(i) Machines using full revolution clutches

191

1910.217(b)(3)(i)

486

Change 1

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Change 1

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STANDARDS AND INTERPRETATIONS

shall incorporate a single-stroke mechanism.

(ii) If the single-stroke mechanism is dependent upon spring action, the spring(s) shall be of the compression type, operating on a rod or guided within a hole or tube, and designed to prevent interleaving of the spring coils in event of breakage.

(4) Foot pedals (treadle).

(i) The pedal mechanism shall be protected to prevent unintended operation from falling or moving objects or by accidental stepping onto the pedal.

(ii) A pad with a nonslip contact area shall be firmly attached to the pedal.

(iii) The pedal return spring(s) shall be of the compression type, operating on a rod or guided within a hole or tube, or designed to prevent interleaving of spring coils in event of breakage.

(iv) If pedal counterweights are provided, the path of the travel of the weight shall be enclosed.

(5) Hand operated levers.

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

(ii) The operating levers on handtripped presses having more than one operating station shall be interlocked to prevent the tripping of the press except by the "concurrent" use of all levers.

(6) Two-hand trip.

(i) A two-hand trip shall have the individual operator's hand controls protected against unintentional operation and have the individual operator's hand controls arranged by design and construction and/or separation to require the use of both hands to trip the press and use a control arrangement requiring con-

current operation of the individual operator's hand controls.

(ii) Two-hand trip systems on full revolution clutch machines shall incorporate an antirepeat feature.

(iii) If two-hand trip systems are used on multiple operator presses, each operator shall have a separate set of controls.

(7) Machines using part revolution clutches.

(i) The clutch shall release and the brake shall be applied when the external clutch engaging means is removed, deactivated, or deenergized.

(ii) A red color stop control shall be provided with the clutch/brake control system. Momentary operation of the stop control shall immediately deactivate the clutch and apply the brake. The stop control shall override any other control, and reactivation of the clutch shall require use of the operating (tripping) means which has been selected.

(iii) A means of selecting Off, "Inch," Single Stroke, and Continuous (when the continuous function is furnished) shall be supplied with the clutch/brake control to select type of operation of the press. Fixing of selection shall be by means capable of supervision by the employer.

(iv) The "Inch" operating means shall be designed to prevent exposure of the workers hands within the point of operation by:

(a) Requiring the concurrent use of both hands to actuate the clutch, or

(b) Being a single control protected against accidental actuation and so located that the worker cannot reach into the point of operation while operating the single control.

(v) Two-hand controls for single stroke shall conform to the following requirements:

STANDARDS AND INTERPRETATIONS

trip is used as a point of operation device it shall meet the construction requirements of paragraph (b)(6) of this section.

(ix) Two-hand tripping devices used with full revolution clutches shall be considered as a point of operation device only when installed on presses of high speed, short stroke, or by having these control mechanisms mounted at a distance away from the point of operation so as to insure that the operator cannot inadvertently reach into the point of operation after tripping the clutch and at any time prior to die closure.

(4) **Hand feeding tools.** Hand feeding tools are intended for placing and removing materials in and from the press. Hand feeding tools are not a point of operation guard or protection device and shall not be used in lieu of the "guards" or devices required in this section.

(d) Design, construction, setting, and feeding of dies.

(1) **General requirements.** It shall be the responsibility of the employer to institute die procurement, construction and modification policies and procedures that will eliminate by August 31, 1974, the need for the operator to place his hands or fingers within the point of operation. Effective August 31, 1974, the employer shall:

(i) Use dies designed and constructed to eliminate hazards to operating personnel.

(ii) Furnish and enforce the use of a hand-tool specifically designed for the purpose of freeing and/or removing stuck work or scrap pieces from the die to avoid requiring the operator to place his hands or fingers within the point of operation, and

(iii) Furnish and enforce the use of hand feeding tools when necessary with manual feeding methods to avoid requiring the operator to place his hands or fingers within the point of operation.

(2) Ejecting stock and scrap.

(i) Dies shall be designed to permit use of press knockouts and lower liftouts where the press is so equipped.

(ii) Spring or rubber strippers or an equivalent means shall be provided on punching or piercing dies, to prevent material from riding up with the punch, except where a special mechanism is provided for scrap ejection. Dies should be designed to allow automatic ejection of stock and scrap.

(3) **Scrap handling.** The employer shall provide means for handling scrap from roll feed or random length stock operations. Scrap cutters used in conjunction with scrap handling systems shall be safeguarded in accordance with paragraph (b) of this section and with § 1910.219.

(4) **Guide post hazard.** The hazard created by a guide post (when it is located in the immediate vicinity of the operator) when separated from its bushing by more than one-fourth inch shall be considered as a point of operation hazard and be protected in accordance with paragraph (c) of this section.

(5) **Unitized tooling.** If unitized tooling is used, the opening between the top of the punch holder and the face of the slide, or striking pad, shall be safeguarded in accordance with the requirements of paragraph (b) of this section.

(6) **Tonnage, stroke, and weight designation.** All dies shall be:

(i) Stamped with the tonnage and stroke requirements, or have these characteristics recorded if these records are readily available to the die setter;

(ii) Stamped to indicate upper die weight when necessary for air counterbalance pressure adjustment; and

(iii) Stamped to indicate complete die weight when handling equipment may become overloaded.

STANDARDS AND INTERPRETATIONS

(7) **Die fastening.** Provision shall be made in both the upper and lower shoes for securely mounting the die to the bolster and slide. Where clamp caps or setscrews are used in conjunction with punch stems, additional means of securing the upper shoe to the slide shall be used.

(8) **Die handling.** Handling equipment attach points shall be provided on all dies requiring mechanical handling.

(9) **Diesetting.**

(i) The employer shall establish a die-setting procedure that will insure compliance with paragraph (b) of this section.

(ii) The employer shall provide spring loaded turnover bars, for presses designed to accept such turnover bars.

(iii) The employer shall provide die stops or other means to prevent losing control of the die while setting or removing dies in presses which are inclined.

(iv) The employer shall provide and enforce the use of safety blocks for use whenever dies are being adjusted or repaired in the press.

(v) The employer shall provide brushes, swabs, lubricating rolls, and automatic or manual pressure guns so that operators and diesetters shall not be required to reach into the point of operation or other hazard areas to lubricate material, punches or dies.

(e) **Inspection, maintenance, and modification of presses.**

(1) **Inspection and maintenance records.** It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all their parts, auxiliary equipment, and safeguards are in a safe operating condition and adjustment. The employer shall maintain records of these inspections and the maintenance work performed.

(2) **Modification.** It shall be the responsibility of any person modifying a power press to

furnish instructions with the modification to establish new or changed guidelines for use and care of the power press so modified.

(3) **Training of maintenance personnel.** It shall be the responsibility of the employer to insure the original and continuing competence of personnel caring for, inspecting, and maintaining power presses.

(f) **Operation of power presses.**

(1) **Employment of minors.** The employer shall permit no one under 18 years of age to operate or assist in the operation of machinery covered in this section, except that this paragraph shall not be deemed to prohibit the employment of persons who are 16 or 17 years of age in an apprenticeship training program which meets the requirements contained in §§ 570.59 and 570.50 (b) and (c) of this title.

[37 F.R. 23718, November 8, 1972.]

(2) **Instruction to operators.** The employer shall train and instruct the operator in the safe method of work before starting work on any operation covered by this section. The employer shall insure by adequate supervision that correct operating procedures are being followed.

(3) **Work area.** The employer shall provide clearance between machines so that movement of one operator will not interfere with the work of another. Ample room for cleaning machines, handling material, work pieces, and scrap shall also be provided. All surrounding floors shall be kept in good condition and free from obstructions, grease, oil, and water.

(4) **Overloading.** The employer shall operate his presses within the tonnage and attachment weight ratings specified by the manufacturer.

This table shows the distances that guards shall be positioned from the danger line in accordance with the required openings.

TABLE O-10

<i>Distance of opening from point of opera- tion hazard (inches)</i>	<i>Maximum width of opening (inches)</i>
$\frac{1}{2}$ to $1\frac{1}{2}$ -----	$\frac{1}{4}$
$1\frac{1}{2}$ to $2\frac{1}{2}$ -----	$\frac{3}{8}$
$2\frac{1}{2}$ to $3\frac{1}{2}$ -----	$\frac{1}{2}$
$3\frac{1}{2}$ to $5\frac{1}{2}$ -----	$\frac{3}{4}$
$5\frac{1}{2}$ to $6\frac{1}{2}$ -----	$\frac{7}{8}$
$6\frac{1}{2}$ to $7\frac{1}{2}$ -----	$1\frac{1}{8}$
$7\frac{1}{2}$ to $12\frac{1}{2}$ -----	$1\frac{1}{4}$
$12\frac{1}{2}$ to $15\frac{1}{2}$ -----	$1\frac{1}{2}$
$15\frac{1}{2}$ to $17\frac{1}{2}$ -----	$1\frac{3}{4}$
$17\frac{1}{2}$ to $31\frac{1}{2}$ -----	$2\frac{1}{4}$

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1910.243—GUARDING OF PORTABLE POWERED TOOLS

(a) Portable powered tools.

(1) Portable circular saws.

(i) All portable, power-driven circular saws having a blade diameter greater than 2 inches 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 minimum arc required to permit the base to be tilted for bevel cuts. 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.

(ii) Paragraph (a)(1)(i) of this section does not apply to circular saws used in the meat industry for meat cutting purposes.

(2) Switches and controls.

(i) All hand-held powered circular saws having a blade diameter greater than 2 inches, electric, hydraulic or pneumatic chain saws, and percussion tools without positive accessory holding means shall be equipped with a constant pressure switch or control that will shut off the power when the pressure is released. All hand-held gasoline powered chain saws shall be equipped with a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.

(ii) All hand-held powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 2 inches in diameter, disc sanders with discs greater than 2 inches in diameter, belt sanders, reciprocating saws, saber, scroll, and jig saws with blade shanks greater than a nominal one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control, and may have

a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

(iii)

(a) All other hand-held powered tools, such as, but not limited to, platen sanders, grinders with wheels 2 inches in diameter or less, disc sanders with discs 2 inches in diameter or less, routers, planers, laminate trimmers, nibblers, shears, saber, scroll, and jig saws with blade shanks a nominal one-fourth of an inch wide or less, may be equipped with either a positive "on-off" control, or other controls as described by paragraph (a)(2)(i) and (ii) of this section.

(b) Saber, scroll, and jig saws with nonstandard blade holders may use blades with shanks which are nonuniform in width, provided the narrowest portion of the blade shank is an integral part in mounting the blade.

(c) Blade shank width shall be measured at the narrowest portion of the blade shank when saber, scroll, and jig saws have nonstandard blade holders.

(d) "Nominal" in this subparagraph means ± 0.05 inch.

(iv) The operating control on hand-held power tools shall be so located as to minimize the possibility of its accidental operation, if such accidental operation would constitute a hazard to employees.

(v) This subparagraph does not apply to concrete vibrators, concrete breakers, powered tampers, jack hammers, rock drills, garden appliances, household and kitchen appliances, personal care appliances, medical or dental equipment, or to fixed machinery.

STANDARDS AND INTERPRETATIONS

(3) **Portable belt sanding machines.** Belt sanding machines shall be provided with guards at each nip point where the sanding belt runs onto a pulley. These guards shall effectively prevent the hands or fingers of the operator from coming in contact with the nip points. The unused run of the sanding belt shall be guarded against accidental contact.

(4) **Cracked saws.** All cracked saws shall be removed from service.

(5) **Grounding.** Portable electric powered tools shall meet the electrical requirements of Subpart S of this part.

(b) **Pneumatic powered tools and hose.**

(1) **Tool retainer.** A tool retainer shall be installed on each piece of utilization equipment which, without such a retainer, may eject the tool.

(2) **Airhose.** Hose and hose connections used for conducting compressed air to utilization equipment shall be designed for the pressure and service to which they are subjected.

(c) **Portable abrasive wheels.**

(1) **General requirements.** Abrasive wheels shall be used only on machine provided with safety guards as defined in paragraph (c) (1) through (4) of this section.

(i) **Exceptions.** The requirements of this subparagraph (1) shall not apply to the

following classes of wheels and conditions:

(a) Wheels used for internal work while within the work being ground;

(b) Mounted wheels used in portable operations 2 inches and smaller in diameter; (see definition § 1910.241 (b)(1)); and

(c) Types 16, 17, 18, 18R, and 19 cones, and plugs, and threaded hole pot balls where the work offers protection.

(ii)

(a) A safety guard shall cover the spindle end, nut and flange projections. The safety guard shall be mounted so as to maintain proper alignment with the wheel, and the strength of the fastenings shall exceed the strength of the guard.

(b) **Exception.**—Safety guards on all operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut and outer flange are exposed. Where the nature of the work is such as to entirely cover the side of the wheel, the side covers of the guard may be omitted.

(c) **Exception.**—The spindle end, nut, and outer flange may be exposed on portable machines designed for, and used with, type 6, 11, 27, and 28 abrasive wheels, cutting off wheels, and tuck pointing wheels.

[38 F.R. 14371, June 1, 1973.]

Change 1

514.1

15879

STANDARDS AND INTERPRETATIONS

(2) **Cup wheels.** Cup wheels (Types 6 and 11) shall be protected by:

(i) Safety guards as specified in subparagraph (1) of this paragraph; or,

(ii) Special "revolving cup guards" which mount behind the wheel and turn with it. They shall be made of steel or other material with adequate strength and shall enclose the wheel sides upward from the back for one-third of the wheel thickness. The mounting features shall conform with all regulations. (See subparagraph (5) of this paragraph.) It is necessary to maintain clearance between the wheel side and the guard. The clearance shall not exceed one-sixteenth inch; or,

(iii) Some other form of guard that will insure as good protection as that which would be provided by the guards specified in subdivision (i) or (ii) of this subparagraph.

(3) **Vertical portable grinders.** Safety guards used on machines known as right angle head or vertical portable grinders shall have a maximum exposure angle of 180° , and the guard shall be so located so as to be between the operator and the wheel during use. Adjustment of guard shall be such that pieces of an accidentally broken wheel will be deflected away from the operator. (See Figure P-4.)

(4) **Other portable grinders.** The maximum angular exposure of the grinding wheel periphery and sides for safety guards used on other portable grinding machines shall not exceed 180° and the top half of the wheel shall be enclosed at all times. (See Figures P-5 and P-6.)

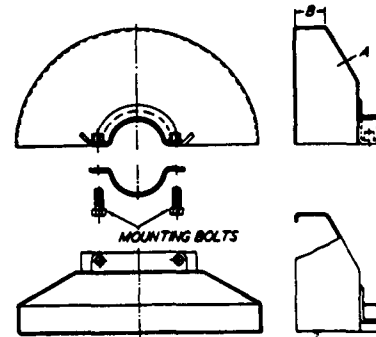


FIGURE NO. P-4

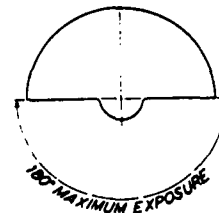


FIGURE NO. P-5

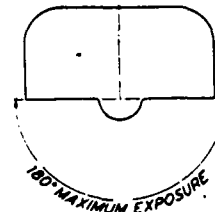


FIGURE NO. P-6

STANDARDS AND INTERPRETATIONS

(5) Mounting and inspection of abrasive wheels.

(i) Immediately before mounting, all wheels shall be closely inspected and sounded by the user (ring test, see Subpart O, § 1910.215(d)(1)) to make sure they have not been damaged in transit, storage, or otherwise. The spindle speed of the machine shall be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel.

(ii) Grinding wheels shall fit freely on the spindle and remain free under all grinding conditions. A controlled clearance between the wheel hole and the machine spindle (or wheel sleeves or adaptors) is essential to avoid excessive pressure from mounting and spindle expansion. To accomplish this, the machine spindle shall be made to nominal (standard) size plus zero minus .002 inch, and the wheel hole shall be made suitably oversize to assure safety clearance under the conditions of operating heat and pressure.

(iii) All contact surfaces of wheels, blotters, and flangers shall be flat and free of foreign matter.

(iv) When a bushing is used in the wheel hole it shall not exceed the width of the wheel and shall not contact the flanges.

(v) Requirements for the use of flanges and blotters, see Subpart O, § 1910.215(c).

(6) Excluded machinery. Natural sandstone wheels and metal, wooden, cloth, or paper discs, having a layer of abrasive on the surface are not covered by this paragraph.
[38 F.R. 14871, June 1, 1973.]

(d) Explosive actuated fastening tools.**(1) General requirements.**

(i) Explosive-actuated fastening tools which are actuated by explosives or any similar means and propel a stud, pin, fastener, or other object for the purpose of affixing it by penetration to any other object shall meet the design requirements in "American National Standard Safety Requirements for Explosive-

Actuated Fastening Tools," ANSI A10.3-1970. This requirement does not apply to devices designed for attaching objects to soft construction materials, such as wood, plaster, tar, dry wallboard, and the like, or to stud welding equipment.

(ii) Operators and assistants using tools shall be safeguarded by means of eye protection. Head and face protection shall be used, as required by working conditions, as set forth in Subpart I.

(2) Inspection, maintenance, and tool handling.

(i) **High-velocity tools.** Tools of this type shall have the characteristics outlined in (a) through (h) of this subdivision and, at the discretion of the manufacturer, any additional safety features he may wish to incorporate.

(a) The muzzle of the tool shall have a protective shield or guard at least 3½ inches in diameter, mounted perpendicular to and concentric with the barrel, and designed to confine any flying fragments or particles that might otherwise create a hazard at the time of firing.

(b) Where a standard shield or guard cannot be used, or where it does not cover all apparent avenues through which flying particles might escape, a special shield, guard, fixture, or jig designed and built by the manufacturer of the tool being used, which provides this degree of protection, shall be used as a substitute.

(c) The tool shall be so designed that it cannot be fired unless it is equipped with a standard protective shield or guard, or a special shield, guard, fixture, or jig.

(d)

(1) The firing mechanism shall be so designed that the tool cannot fire during loading or preparation to fire, or if the tool should be dropped while loaded.

STANDARDS AND INTERPRETATIONS

(2) Firing of the tool shall be dependent upon at least two separate and

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STANDARDS AND INTERPRETATIONS

distinct operations of the operator, with the final firing movement being separate from the operation of bringing the tool into the firing position.

(e) The tool shall be so designed as not to be operable other than against a work surface, and unless the operator is holding the tool against the work surface with a force at least 5 pounds greater than the total weight of the tool.

(f) The tool shall be so designed that it will not operate when equipped with the standard guard indexed to the center position if any bearing surface of the guard is tilted more than 8° from contact with the work surface.

(g) The tool shall be so designed that positive means of varying the power are available or can be made available to the operator as part of the tool, or as an auxiliary, in order to make it possible for the operator to select a power level adequate to perform the desired work without excessive force.

(h) The tool shall be so designed that all breeching parts will be reasonably visible to allow a check for any foreign matter that may be present.

(iii) Tools of the low-velocity-piston type shall have the characteristics outlined in (a) through (e) of this subdivision and, at the discretion of the manufacturer, any additional safety features he may wish to incorporate.

(a) The muzzle end of the tool shall be designed so that suitable protective shields, guards, jigs, or fixtures, designed and built by the manufacturer of the tool being used, can be mounted perpendicular to the barrel. A standard spall shield shall be supplied with each tool.

(b)

(1) The tool shall be designed so that it shall not in ordinary usage propel or discharge a stud, pin, or fastener

while loading or during preparation to fire, or if the tool should be dropped while loaded.

(2) Firing of the tool shall be dependent upon at least two separate and distinct operations of the operator, with the final firing movement being separate from the operation of bringing the tool into the firing position.

(c) The tool shall be so designed as not to be operable other than against a work surface, and unless the operator is holding the tool against the work surface with a force at least 5 pounds greater than the total weight of the tool.

(d) The tool shall be so designed that positive means of varying the power are available or can be made available to the operator as part of the tool, or as an auxiliary, in order to make it possible for the operator to select a power level adequate to perform the desired work without excessive force.

(e) The tool shall be so designed that all breeching parts will be reasonably visible to allow a check for any foreign matter that may be present.

(iii) Tools of the hammer-operated piston tools—low-velocity type shall have the characteristics outlined in (a) through (e) of this subdivision and, at the discretion of the manufacturer, any additional safety features he may wish to incorporate.

(a) The muzzle end of the tool shall be so designed that suitable protective shields, guards, jigs, or fixtures, designed and built by the manufacturer of the tool being used, can be mounted perpendicular to the barrel. A standard spall shield shall be supplied with each tool.

(b) The tool shall be so designed that it shall not in ordinary usage propel or discharge a stud, pin, or fastener while loading, or during preparation to fire, or if the tool should be dropped while loaded.

STANDARDS AND INTERPRETATIONS

(ii) Guards which must be removed to install a catcher assembly shall comply with the following:

(a) Warning instructions shall be affixed to the mower near the opening stating that the mower shall not be used without either the catcher assembly or the guard in place.

(b) The catcher assembly or the guard shall be shipped and sold as part of the mower.

(c) The instruction manual shall state that the mower shall not be used without either the catcher assembly or the guard in place.

(d) The catcher assembly, when properly and completely installed, shall not create a condition which violates the limits given for the guarded opening.

(iii) Openings in the blade enclosure, intended for the discharge of grass, shall be limited to a maximum vertical angle of the opening of 30°. Measurements shall be taken from the lowest blade position.

(iv) The total effective opening area of the grass discharge opening(s) shall not exceed 1,000 square degrees on units having a width of cut less than 27½ inches, or 2,000 square degrees on units having a width of cut 27½ inches or over.

(v) The word "Caution," or stronger wording, shall be placed on the mower at or near each discharge opening.

(vi) [Revoked]

[38 F.R. 14371, June 1, 1973.]

(vii) Blade(s) shall stop rotating from the manufacturer's specified maximum speed within 15 seconds after declutching, or shutting off power.

(viii) In a multipiece blade, the means of fastening the cutting members to the body of the blade or disc shall be so designed that they will not become worn to a hazardous condition before the cutting members themselves are worn beyond use.

(ix) The maximum tip speed of any blade shall be 19,000 feet per minute.

(3) Walk-behind rotary mowers.

(i) The horizontal angle of the opening(s) in the blade enclosure, intended for the discharge of grass, shall not contact the operator area.

(ii) There shall be one of the following at all openings in the blade enclosure intended for the discharge of grass:

(a) A minimum unobstructed horizontal distance of 3 inches from the end of the discharge chute to the blade tip circle.

(b) A rigid bar fastened across the discharge opening, secured to prevent removal without the use of tools. The bottom of the bar shall be no higher than the bottom edge of the blade enclosure.

(iii) The highest point(s) of the front of the blade enclosure, except discharge openings, shall be such that any line extending a maximum of 15° downward from the horizontal toward the blade shaft axis (axes) shall not intersect the horizontal plane within the blade tip circle. The highest point(s) on the blade enclosure front, except discharge openings, shall not exceed 1¼ inches above the lowest cutting point of the blade in the lowest blade position. Mowers with a swingover handle are to be considered as having no front in the blade enclosure and therefore shall comply with subparagraph (2)(i) of this paragraph.

[38 F.R. 14371, June 1, 1973.]

(iv) The mower handle shall be fastened to the mower so as to prevent loss of control by unintentional uncoupling while in operation.

Change 1

519

1910.243(e)(3)(iv)

15885

STANDARDS AND INTERPRETATIONS

(v) A positive upstop or latch shall be provided for the mower handle in the normal operating position(s). The upstop shall not be subject to unintentional disengagement during normal operation of the mower. The upstop or latch shall not allow the center or the handle grips to come closer than 17 inches horizontally behind the closest path of the mower blade(s) unless manually disengaged.

(vi) A swing-over handle, which complies with the above requirements, will be permitted.

(vii) Wheel drive disengaging controls, except deadman controls, shall move opposite to the direction of the vehicle motion in order to disengage the drive. Deadman controls shall comply with § 1910.241(c)(11) and may operate in any direction to disengage the drive.

(4) Riding rotary mowers.

(i) The highest point(s) of all openings in the blade enclosure, front shall be limited by a vertical angle of opening of 15° and a maximum distance of 1¼ inches above the lowest cutting point of the blade in the lowest blade position.

(ii) Opening(s) shall be placed so that grass or debris will not discharge directly

toward any part of an operator seated in a normal operator position.

(iii) There shall be one of the following at all openings in the blade enclosure intended for the discharge of grass.

(a) A minimum unobstructed horizontal distance of 6 inches from the end of the discharge chute to the blade tip circle.

(b) A rigid bar fastened across the discharge opening, secured to prevent removal without the use of tools. The bottom of the bar shall be no higher than the bottom edge of the blade enclosure.

(iv) Mowers shall be provided with stops to prevent jackknifing or locking of the steering mechanism.

(v) Vehicle stopping means shall be provided.

(vi) Hand-operated wheel drive disengaging controls shall move opposite to the direction of vehicle motion in order to disengage the drive. Foot-operated wheel drive disengaging controls shall be depressed to disengage the drive. Deadman controls, both hand and foot operated, shall comply with § 1910.241(c)(11) and may operate in any direction to disengage the drive.

[38 F.R. 14371, June 1, 1973.]

1910.244—OTHER PORTABLE TOOLS AND EQUIPMENT

(a) Jacks.

(1) Loading and marking.

(i) The operator shall make sure that the jack used has a rating sufficient to lift and sustain the load.

(ii) The rated load shall be legibly and permanently marked in a prominent location on the jack by casting, stamping, or other suitable means.

(2) Operation and maintenance.

(i) In the absence of a firm foundation, the base of the jack shall be blocked. If there is a possibility of slippage of the cap, a block shall be placed in between the cap and the load.

(ii) The operator shall watch the stop indicator, which shall be kept clean, in order to determine the limit of travel. The indicated limit shall not be overrun.

(iii) After the load has been raised, it shall be cribbed, blocked, or otherwise secured at once.

1910.244(a)(2)(iii)

520

Change 1

STANDARDS AND INTERPRETATIONS

(3) **Rear of divider.** The back of the divider shall have a complete cover to enclose all of the moving parts, or each individual part shall be enclosed or guarded to remove the separate hazards. The rear cover shall be provided with a limit switch in order that the machine cannot operate when this cover is open. The guard on the back shall be hinged so that it cannot be completely removed and if a catch or brace is provided for holding the cover open, it shall be designed so that it will not release due to vibrations or minor bumping whereby the cover may drop on an employee.

(4) **Oil holes in knife.** The oil holes in the knife at the back of the divider shall be of such size that an employee's finger cannot go through the hole.

(5) **Knife actuating arm.** There shall be a saddle guard or other protective device on any elongated hole in the knife actuating arm at the back of the divider.

(6) **Shear pins.** Dividers shall be equipped with mechanical overload release devices such as shear pins.

(g) Moulders.

(1) **Hoppers.** Mechanical feed moulders shall be provided with hoppers so designed and connected to the proofer that an employee's hands cannot get into the hopper where they will come in contact with the in-running rolls.

(2) **Hand-fed moulders.** Hand-fed moulders shall be provided with a belt-feed device or the hopper shall be extended high enough so that the hands of the operator cannot get into the feed rolls. The top edge of such a hopper shall be well rounded to prevent injury when it is struck or bumped by the employee's hand.

(3) **Stopping devices.** There shall be a stopping device within easy reach of the operator who feeds the moulder and another stopping device within the reach of the employee taking the dough away from the moulder.

(4) **Cleanout holes.** Machines shall be so

designed that there is no shear point in close proximity to the cleanout holes.

(5) **Rear of moulders.** At the rear of moulders all revolving shafts shall have round corners or cylindrical surfaces, and all bolts shall be flush. Tie rods shall be far enough from revolving parts to prevent a shearing or pinching hazard.

(6) **Adjustment crank.** Where a removable crank is used to adjust the moulder for different sizes of loaf, brackets shall be provided on the side of the machine for holding the crank when it is not in use.

(h) Manually fed dough brakes.

(1) **Top-roll protection.** The top roll shall be protected by a heavy gage metal shield extending over the roll to go within 6 inches of the hopper bottom board. The shield may be perforated to permit observation of the dough entering the rolls.

(2) **Emergency stop bar.** An emergency stop bar shall be provided, and so located that the body of the operator will press against the bar if the operator slips and falls toward the rolls, or if the operator gets his hand caught in the rolls. The bar shall apply the body pressure to open positively a circuit that will deenergize the drive motor. In addition, a brake which is inherently self-engaging by requiring power or force from an external source to cause disengagement shall be activated at the same time causing the rolls to stop instantly. The emergency stop bar shall be checked for proper operation every 30 days.

[38 F.R. 16223, June 21, 1973.]

(i) Miscellaneous equipment.

(1) **Proof boxes.** All door locks shall be operable both from within and outside the box. Guide rails shall be installed to center the rack as it enters, passes through, and leaves the proof box.

(2) **Fermentation room.** Fermentation room doors shall have nonshatterable wire glass or plastic panels for vision through doors.

STANDARDS AND INTERPRETATIONS

(3) *Troughs.* Troughs shall be mounted on antifriction bearing casters thus making it possible for the operator to move and direct

the motion of the trough with a minimum of effort.

Change 1

592

1910.269(X3)

15888

Change 1

592.1

STANDARDS AND INTERPRETATIONS

(4) Hand trucks.

(i) Casters shall be set back from corners to be out of the way of toes and heels, but not far enough back to cause the truck to be unstable.

(ii) A lock or other device shall be provided to hold the handle in vertical position when the truck is not in use.

(5) Lift trucks. A lock or other device shall be provided to hold the handle in vertical position when the truck is not in use.

(6) Racks.

(i) Sharp splintered or rough corners and edges shall be eliminated.

(ii) Racks shall be equipped with handles so located with reference to the frame of the rack that no part of the operator's hands extends beyond the outer edge of the frame when holding onto the handles.

(iii) Antifriction bearing casters shall be used to give the operator better control of the rack.

(iv) End guards shall be used at shelf levels on proofing racks.

(7) Conveyors.

(i) Wherever a conveyor passes over a main aisleway, regularly occupied work area, or passageway, the underside of the conveyor shall be completely enclosed to prevent broken chains or other material from falling in the passageway.

(ii) Stop bumpers shall be installed on all delivery ends of conveyors, wherever manual removal of the product carried is practiced.

(iii) Where hazard of getting caught exists a sufficient number of stop buttons shall be provided to enable quick stopping of the conveyor.

(8) Overhead rail systems.

(i) Handles for operating devices for trolley switches which hang less than 6 feet 8 inches from the floor shall be of pliable material.

(ii) Floor scales. Nonshatterable transparent material shall be used to cover dials.

(9) Dough chutes. The entrance to the chute shall be guarded so as to protect the employee from falling into chute, stepping into chute, or tripping over too low an edge of the chute.

(10) Skids.

(i) All sharp corners or edges shall be eliminated on all metal skids.

(ii) All edges and corners shall be protected on skids to prevent exposed splinters.

(11) Ingredient premixers, emulsifiers, etc.

(i) All top openings shall be provided with covers attached to the machines. These covers should be so arranged and interlocked that power will be shutoff whenever the cover is opened to a point where the operator's fingers might come in contact with the beaters.

(ii) Portable electrical agitators for ingredient premixers shall have the attachment cord so wired that the agitator will be grounded whenever it is connected to a source of power.

(12) Chain tackle.

(i) All chain tackle shall be marked prominently, permanently, and legibly with maximum load capacity.

(ii) All chain tackle shall be marked permanently, and legibly with minimum support specification.

(iii) Safety hooks shall be used.

(13) Trough hoists, etc.

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Ceiling Workers' Scaffolds: (see also Plasterers' Scaffolds)	.28(o)	Electrical	.137
Chain Guarding	.219(f)	Eye	.133
Change Rooms:		Face	.133
Asbestos	.93a(d)(4)	Footwear	.136
Drying Facilities	.141(f)	Goggles	.133
Separate Facilities	.141(e)	Head	.135
Charge Initiation	.109(e)(4)	Helmets	.135
Chemical Plants: (see also Refineries, Chemical Plants and Distilleries)	.106(i)	Rubber	.137
Chicago Boom Derricks: (see also Derricks)	.181	Storage	.107(g)(4)
Chicken Ladders: (see also Crawling Boards)	.28(t)	Welders	.252(e)(3)
Chute Openings	.23(a)(3)	Clutches	.217(b)(3),(7)
Circular Resaws	.213(e)	Definition	.180(a)(19)
Circular Saws	.213(f)	Power Transmission Apparatus	.219(k)
Arbors	.213(s)(4)	Coatings, Spray:	
Portable	.243(a)(1)	Dual Component	.107(m)
Clean Air, Spray Finishing	.94(c)(7)	Organic Peroxide	.107(m)
Cleaning:		Powder	.107(l)
Air Receivers	.169	Undercoatings	.107(h)
Bulk Oxygen Systems	.104(b)(8)(i)	Collars	.219(i)
Compressed Air	.242(b)	Color Codes:	
Powder Coatings	.107(l)(4)(i),(ii)	Air Contaminants	.134(g)(6)
Powered Platforms	.66(e)(7)	Danger	.144(a)(1)(ii)
Respirators	.134(f)(3)	Effective Dates	.149
Solvents	.107(g)(5)	Fire Protection	.144(a)(1)(i)
Spray	.94(d)(5)	Gas Mask Canisters	.134(g)(6)
Spray Booths	.107(b)(9)	Physical Hazards, Colors	.144(a)
Spraying Operations	.107(g)(2)	Black	.144(a)(7)
Cleaning Compounds	.252(f)(11)	Blue	.144(a)(5)
Degreasing	.252(f)(11)(ii)	Green	.144(a)(4)
Manufacturer's Instructions	.252(f)(11)(i)	Orange	.144(a)(2)
Cleaning Solvents:		Purple	.144(a)(6)
Spraying	.107(g)(5)	Red	.144(a)(1)
Clear Zones:		White	.144(a)(7)
Bulk Oxygen Systems	.104(b)(10)	Yellow	.144(a)(3)
Industrial Plants	.106(e)(9)(iv)	Respirators	.134(g)(6)
Liquefied Hydrogen Systems	.103(c)(5)(ii)	Specifications	.144(b)
Processing Plants	.106(h)(8)(iv)	Standards Sources	.144(b), .147
Clearances:		Stop	.144(a)(1)(iii)
Cranes	.179(b)(6), .180(j)(1)	Combustible Dusts, Trucks Used	.178(c)(2)(vi)
Derricks	.181(j)(5)	Combustible Liquids: (see Flammable and Combustible Liquids)	.106
Fixed Ladders	.27(c)	Effective Dates	.114
Back	.27(c)(4)	Standards Sources	.115
Climbing Side	.27(c)(1)	Combustible Materials:	
Grab Bars	.27(c)(5)	Welding	.252(d)(2)
Hatch Covers	.27(c)(7)	Commercial Stepladders, Type II	.25(c)(2)(iii)
Step-Across Distance	.27(c)(6)	Communicable Diseases Reporting:	
With Cages or Baskets	.27(c)(3)	Labor Camps	.142(l)
Without Cages or Wells	.27(c)(2)	Communications, Emergency:	
Manlifts	.68(b)(11)	Type F Powered Platforms	.66(c)(23)
Spraying Discharges	.107(d)(8)	Type T Powered Platforms	.66(d)(7)
Sprinkler Systems	.159(e)	Compressed Air, Cleaning	.242(b)
Stairs	.24(i)	Compressed Air Equipment: (see also Compressed Gas Equipment)	
Clothing, Protective: (see also Personal Protective Equipment)	.252(e)(3)	Air Receivers	.169
Asbestos	.93a(d)(3)	Compressed Gas Cylinders: (see also Compressed Gases)	.252(a)(2)
		Acetylene Cylinders	.166(c)

Change 1

647

STANDARDS AND INTERPRETATIONS

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Aluminum Cylinders	166(d)(4)	Containers, Liquefied Petroleum	
Approval	252(a)(2)(i)	Gases	110
Cargo Tanks	168	Accessories	110(b)(7);(c)(6); (d)(3);(8);(e)(5)
Definitions	166(a)	Awaiting Use or Resale	110(f)
Inspection	101(a), 166	Capacity	110(d)(6);(e)(10), (h)(5)
High Pressure	166(e)	Charging Plants	110(d)(13)
Low Pressure	166(c),(d)	Construction	110(b)(3)
Manifolding	252(a)(3)	Cylinder Systems	110(c)
Markings	252(a)(2)(i)	Accessories	110(c)(6)
Operating Procedures	252(a)(2)(v)	Indoor	110(c)(5)
Oxygen Manifolds	252(a)(3)(ii),(iii)	Markings	110(c)(2)
Portable Tanks	168	Outdoor	110(c)(4)
Public Protection	101(c), 252(a)(8)	Valves	110(c)(6)
Safety Relief Valves	167, 168	Filling Densities	110(b)(12)
Standards Sources	166(b)(1)(ii), 170	Fire Protection	110(d)(14)
Storage	167, 168, 252(a)(2)(ii)-(iv)	Fittings	110(b)(8);(e)(6); (g)(10);(h)(7),(9)
Compressed Gas Equipment: (see Com-		Hoses	110(b)(9)
pressed Gas Cylinders)		Industrial Plants	110(d)(12)
Compressed Gases: (see also Com-		Installation	110(e)(4);(h)(6)
pressed Gas Cylinders)		Lighting	110(d)(16)
Effective Dates	101	Location	110(b)(6);(f)(5)
Handling	101(b)	Markings	110(b)(5);(c)(2)
Safety Relief Devices	101(c), 167, 168	Non-DOT Containers	110(d)
Standards Sources	115	Accessories	110(d)(3)
Storage	101(b)	Capacity	110(d)(6)
Conductors:		Installation	110(d)(7)
Cranes	179(g)(1)(iv),(6)	Pipes	110(d)(3)
Confined Spaces, Welding	252(d)(4);(e)(4)	Pressure, Design	110(d)(2)
Beryllium	252(f)(8)	Reinstallation	110(d)(5)
Cadmium	252(f)(9)(ii)	Safety Relief Devices	110(d)(4)
Electrode Removal	252(e)(4)(v)	Valves	110(d)(3)
Fluorine Compounds	252(f)(5)	Original Testing	110(b)(4)
Gas Cylinder Shutoff	252(e)(4)(vi)	Painting	110(d)(15)
Lead	252(f)(7)(i),(iii)	Piping	110(b)(8);(d)(3), (e)(6);(g)(10);(h)(5)
Lifelines	252(e)(4)(iv)	Pressure Design	110(d)(2);(e)(3)
Mercury	252(f)(10)	Safety Relief Devices	110(b)(10);(c)(7), (d)(4);(e)(7), (g)(7);(h)(4)
Ventilation	252(e)(4)(ii),(f)(4)	Tubing	110(b)(8);(e)(6), (g)(10)
Warning Signs	252(e)(4)(vii)	Valves	110(b)(7);(c)(6), (d)(3);(e)(5);(g)(6)
Zinc	252(f)(6)(i)	Vaporizers	110(b)(11);(d)(17) (e)(8)
Containers: (see also Tank Storage,		Welding	110(b)(4)
Portable)		Controllers:	
Ammonium Nitrate	109(i)(3)	Cranes	179(g)(4)
Bulk Oxygen Systems	104(b)(4);(6)	Conveyors:	
Gaseous	104(b)(4)(iii)	Bakeries	263(d)(7);(h)(7)
Liquid	104(b)(4)(ii)	Dip Tanks	108(c)(6)
Bulk Plants	106(f)	Electrostatic Spraying	107(b)(7)
Flammable Liquids, Filling	106(f)(2)(iii)(c)	Forging Machines	218(j)(3)
Gaseous Hydrogen Systems	103(b)(1)(i)	Hoop	214(f)
Guarding	212(a)(4)	Sawmills	265(c)(18)
Incidental Storage	106(e)(2)(ii)	Spray Booths	107(b)(7)
Indoor	106(d)(5)(ii)		
Industrial Plants	106(e)(2)(ii)		
Liquefied Hydrogen Systems	103(c)(1)(i)		
Liquefied Petroleum Gases	110		
Spraying	107(e)(3);(5)		
Welding, Gas	252(a)(2)		

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Welding	252(d)(2)(iii)	Diameter Uniformity	215(c)(4)
First Aid	262(pp)	Dimensions	215(c)(8)
Eye Flushing	151(c)	Driving	215(c)(7)
Labor Camps	142(k)	Finish	215(c)(3)
Pulpwood Logging	266(c)(1)(vii)	General Requirements	215(c)(1)
Standards Sources	153	Maintenance	215(c)(9)
Welding	252(f)(13)	Material	215(c)(2)(ii)
Fittings: (see Piping, Fittings and Tubing; Piping, Valves and Fittings)		Recess	215(c)(5)
Fixed Dry Chemical Extinguishers: (see also Dry Chemical Extinguishers)	160	Repairs	215(c)(9)
Fixed Industrial Stairs: (see Stairs, Fixed Industrial)	24	Types	215(c)(1)(iv)
Fixed Ladders: (see Ladders, Fixed)	27	Undercut	215(c)(5)
Flammable and Combustible Liquids:		Flash Welding Equipment	252(c)(4)
Application	106(j)	Fire Curtains	252(c)(4)(ii)
Bulk Plants	106(f)	Ventilation	252(c)(4)(i)
Chemical Plants	106(i)	Float Scaffolds	28(u)
Containers	106(a)	Bearers Under Platforms	28(u)(3)
Definitions	106(a)	Construction	28(u)(1)
Dip Tanks	108	Employee Occupancy	28(u)(1)
Distilleries	106(i)	Platforms	28(u)(2)
Ignition Sources	106(b)(6)	Wood Edgings	28(u)(4)
Industrial Plants	106(e)	Flooding, Tank Areas	106(b)(5)(vi)
Piping, Valves and Fittings	106(c)	Floor Loading	22(d)
Pressure Vessels	106(b)(1)(v)	Floor Openings (Holes)	23(a)
Processing Plants	106(h)	Manlifts	68(b)(5), (7)
Refineries	106(i)	Flooring: (see also Floor Openings; Floors)	
Service Stations	106(g)	Type F Powered Platforms	66(c)(12)
Spray Finishing	107	Type T Powered Platforms	68(b)(5)(iii), (d)
Storage and Handling	107(e)	Floors:	
Conformance	107(e)(1)	Covers, Hinged	23(a)(3)(i)
Containers	107(e)(3), (5)	Open-Sided	23(c)
Hoses	107(e)(6)	Spray Booths	107(b)(3)
Grounding	107(c)(9), (e)(9)	Flow Coatings	108(h)(2)
Liquid Heaters	107(e)(7)	Fluidized Beds	107(i)(7)
Liquid Transfer	107(e)(4)	Fluorine Compounds, Welding: (see also Air Contaminants)	252(f)(1)(v)(c), (5)
Pipes	107(e)(6)	Foam Extinguishers, Dip Tanks	108(g)(3)
Pump Relief	107(e)(8)	Folding Ladder Scaffolds	29(c)(5)
Quantity	107(e)(2)	Folding Stairway Scaffolds	29(c)(4)
Safety Relief Devices	107(e)(8)	Food Handling	141(h)
Spraying Containers	107(e)(5)	Foot Pedals, Power Presses	217(b)(4)
Storage Containers	106(d)	Foot Protection	136
Storage Tanks	106(b), (d)	Footwalks:	
Tanks	106(b), (d)	Cranes	179(d)
Flammable Liquid Container Marking	144(a)(1)(ii)	Forging Hammers	218(a)(3)
Flammable Liquids:		Foot-Operated Devices	218(b)(2)
Effective Dates	114	Gravity	218(e)
Sawmills	265(c)(16)	Air Lifts	218(e)(1)
Standards Sources	115	Board Drop Hammers	218(e)(2)
Flammable Materials:		Keys	218(b)(1)
Trucks Used	178(c)(2)	Power-Driven	218(d)
Flanges, Abrasive Wheel Machinery	215(a)(3), (c)	Cylinder Draining	218(d)(3)
Balance	215(c)(3)	Pressure Pipes	218(d)(4)
Blotter	215(c)(1)(v), (c)(6), (d)(8)	Safety Cylinder Heads	218(d)(1)
Design	215(c)(2)(i), (iii)	Shutoff Valves	218(d)(2)
		Forging Machine Area	30(b)
		Forging Machines:	
		Billet Shears	218(j)(1)

Change 1

655

15893

STANDARDS AND INTERPRETATIONS

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Boltheaded	.218(i)(1)	Machinery: Cutoff Wheels	.243(c)(3),(4)
Conveyors	.218(j)(3)	Grinding, Forging Equipment	.218(j)(5)
Definitions	.211(e)	Grinding Machines:	
Effective Dates	.220	Cylindrical	.215(b)(4)
Grinding	.218(j)(5)	Flanges	.215(a)(3)
Hammers	.218(a)(3),(b),(d),(e)	Surface Grinders	.215(b)(5)
Inspections	.218(a)(2)	Swing Frame Grinders	.215(b)(6)
Lead Use	.218(a)(1)	Top Grinding	.215(b)(8)
Maintenance	.218(a)(2)	Work Rest	.215(a)(4)
Presses	.218(a)(3),(c),(f),(g)	Grinding, Polishing, and Buffing:	
Rivet Making	.218(i)(2)	Branch Pipes	.94(b)(3)
Saws	.218(j)(2)	Definitions	.94(b)(1)
Shot Blast	.218(j)(4)	Enclosure Design	.94(b)(5)
Standards Sources	.221	Exhaust Systems	.94(b)(4)
Upsetters	.218(h)	Hoods	.94(b)(3),(5)
Forging Presses	.218(f)	Grinding, Top	.215(b)(8)
Fork Trucks: (see also Powered Industrial Trucks)	.178	Grounding:	
Fuel-Gas Systems: (see also Oxygen-Fuel Gas Systems)	.252(a)	Bulk Oxygen Systems	.104(b)(7)(iv)
Fuels: (see also Refueling)		Circuits	.314
Handling and Storage	.178(f)	Electrostatic Spraying	.107(b)(5),(i)(5)-(7)
Furnishings:		Hand Spraying	.107(b)(5)-(7)
Egress	.37(l)	Ignition Sources	.107(c)(9)
Explosives	.37(l)	Liquefied Hydrogen Systems	.103(c)(4)(iv)
Fusible Plugs:		Liquid Transfer	.107(c)(9)
Cylinders	.167(b)(2)	Methods	.314(e)
Tanks	.168(b)(3)(ix)	Spray Booths	.107(h)(10)
Fusion Apparatus: (see Drying, Curing and Fusion Apparatus)		Spraying Operations	.107(c)(9),(e)(9), (i)(5)-(7)
		Welding	.252(b)(3)(ii), (4)(iii); (c)(2)(ix),(3)(vi)
		Woodworking Tools	.243(a)(5)
		Guarding: (see also Term To Which It Applies)	.211-.222
		Abrasive Wheels, Portable	.243(c)
		Floor Openings (Holes)	.23(a)
		Hatchways	.23(a)(3)
		Ladderways	.23(a)(2)
		Machinery	.211-.222
		Mechanical Power Transmission Apparatus	.219(m)
		Clutches	.219(k)
		Friction Drives	.219(g)
		Prime Movers	.219(b)
		Pulleys	.219(d)
		Open-Sided Floors	.23(c)
		Platforms	.23(c)
		Powered Tools, Portable	.243
		Railings	.23(e)
		Runways	.23(c)
		Skylight	.23(a)(4)
		Spraying Equipment	.107(h)(10)
		Stairways	.23(a)(1),(d)
		Wall Openings (Holes)	.23(b)
		Guardrails:	
		Definitions	.21(f)(10)
		Manlifts	.68(b)(8)(i),(10)(iv)
		Power Transmission Apparatus	.219(a)(5)
		Removable	.23(a)(3)

G

Gantry Cranes: (see also Overhead and Gantry Cranes)	.179
Garages, Undercoating Operations	.107(k)
Garnett Machines	.262(f)
Gas Cylinder Inspection	.101(a)
Gaging Devices	.110(b)(19)
Gas Mask Canisters	.134(g)
Color Codes	.134(g)(6)
Labeling	.134(g)
Gaseous Hydrogen Systems: (see Hydrogen)	
Gasoline Powered Trucks	.178(b)(8),(9)
Gears	.219(f)
Gill Boxes	.262(k)
Gin Pole Derricks: (see also Derricks)	.181(a)(6)
Gloves, Rubber Insulating	.137
Glue Spreaders	.213(r)
Goggles: (see also Eye Protection; Eye and Face Protection)	.133
Grain Handling:	
Trucks Used	.178(c)(2)(vi)
Gravity Hammers	.218(e)
Grinders: (see also Abrasive Wheel	

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Type F Powered Platforms	.66(c)(9),(11)	Spray Finishing	.107
Working Platforms	.66(c)(9)	Spraying Operations	.107(g)(6)
Working Surfaces	.22(c)	Standards Sources	.115
Guardrails, Scaffolds: (see Listing Under Specific Type Scaffold)		Storage and Handling:	
Guards: (see also Guardrails)		Anhydrous Ammonia	.111
Derricks	.181(j)(1)	Liquefied Petroleum Gases	.110
Hoisting Ropes	.179(e)(5)	Trucks Used	.178(c)(2)
Manlifts	.68(b)(7)-(9)	Hazards:	
Moving Parts	.179(e)(6)	Guide Posts	.217(d)(4)
Trucks	.178(e)	Personnel	.217(b)(1)
Guide Posts	.217(d)(4)	Head Charring Machines	.214(m)
Gudgeon Pin	.181(a)(20)	Head Protection	.135
Guy Derricks	.181(a)(7)	Head Sanding Machines	.214(r)
		Head-Up Machines	.214(l)
		Heading Bolt Saws	.214(a)
		Headroom:	
		Egress	.37(i)
		Heating:	
		Dip Tanks	.108(c)(7)
		Heating Equipment	.177(f)(1),(2)
		Bulk Plants	.106(f)(2)(ii)
		Service Stations	.106(g)(6)
		Helmets	.135
			.252(e)(2)
			.266(c)(1)(iii)
		High Pressure Cylinders:	
		Inspection:	
		Exterior	.166(e)(3)
		Preparation	.166(e)(2)
		Specification	.166(e)(1)
		Hinged Floor Covers	.23(a)(3)(i)
		Holst Limit Switches	.179(n)(4)
		Hoisting Equipment:	
		Cranes	.179(e)(5),(h)
		Powered Platforms	.66(e)(8)
		Rope Guards	.179(e)(5)
		Type F Powered Platforms	.66(c)(17)-(20)
		Type T Powered Platforms	.66(d)(3),(5)
		Holding Brakes	.179(f)(2)
		Holes: (see also Floor Openings (Holes); Wall Openings (Holes)).	.23
		Hooks:	
		Cranes	.179(h)(4)
		Derricks	.181(j)(2)
		Hoop Machines:	
		Coiling	.214(t)
		Conveyors	.214(o)
		Drivers	.214(q)
		Elevators	.214(o)
		Expanding	.214(v)
		Flaring	.214(v)
		Punching	.214(t)
		Ring Removers	.214(n)
		Riveting	.214(u)
		Trussers	.214(q)
		Horse Scaffolds	.28(m)
		Cross Bracing	.28(m)(5)
		Guardrails	.28(m)(7)
		Height	.28(m)(1)

H

Hammers, Forging: (see Forging Hammers)

Hand Joints .214(s)

Hand Spraying Equipment: (see Electrostatic Hand Spraying Equipment)

Hand Tools .242

Dead-Man Controls .243(a)(2)

Pulp and Paper Mills .261(c)(13)

Handholds: .68(c)(4)

Handling: (see also Materials Handling and Storage)

Anhydrous Ammonia .111

Compressed Gases .101(b)

Liquefied Hydrogen Systems .103(c)(2)(iii)

Liquefied Petroleum Gases .110

Liquids .106(h)(4)

Service Stations .106(g)(1)

Handrails .24(h)

Cranes .179(d)(3),(4)(ii)

Mobile Ladder Stands .29(f)(4)

Hangers .219(p)(4)

Hardening Tanks .108(h)(1)

Hatchways Guarding .23(a)(3)

Hazardous Materials:

Acetylene .102

Anhydrous Ammonia .111

Blasting Agents .109

Bulk Oxygen Systems .104

Combustible Liquids .106-108

Compressed Gases .101

Dip Tanks .108

Effective Dates .114

Explosives .109

Flammable Liquids .106-108

Hydrogen .103

Liquefied Petroleum Gases .110

Nitrous Oxide .105

Oxygen .104

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Shakers	.264(c)(2)(iv)	Electrical Equipment	.114
Starching Machines	.264(c)(2)(i)	Engines in Buildings	.110(b)(17),(18); (h)(13)
Ventilation	.264(c)(4)(ii)	Equipment Approval	.110(e)(11),(12)
Washroom Machines	.264(c)(1)	Fire Extinguishers	.110(b)(2)
Lavatories	.141(d)(2)	Fire Protection	.110(g)(14)
Lawn Mowers, Power	.243(e)	Fire Protection	.110(d)(14),(f)(7), (h)(14)
Definitions	.241(c)	Fuel Handling and Storage	.178(f)
General Requirements	.243(e)(1)	Gaging Devices	.110(b)(19)
Riding Rotary	.243(e)(2),(4)	Garaging Vehicles	.110(e)(14)
Walk-Behind	.243(e)(2),(3)	Handling	.110
Lead	.252(f)(7)	Liquid Level Gaging Device	.110(b)(19)
Concentration	.261(g)(15)(iv)	Liquid Transfer	.110(b)(14)
Confined Spaces	.252(f)(7)(i),(iii)	Loading	.110(b)(15)
Forging Machines	.218(a)(1)	Motor Fuel	.110(e)
Indoors	.252(f)(7)(ii),(iii)	Odorizing Gases	.110(b)(1)
Ventilation	.252(f)(7)(iii)	Pits and Drains	.110(d)(11)
Leakage, Bulk Oxygen Systems	.104(b)(2)(iii)	Regulating Equipment	.110(b)(6),(e)(5); (d)(9);(e)(9)
Lever, Hand-Operated	.217(b)(5)	Indoor	.110(e)(5)
Lifelines: (see also Safety Belts)		Location	.110(b)(6)
Confined Spaces	.252(e)(4)(iv)	Outdoor	.110(e)(4)
Crawling Boards	.28(t)(2)	Sawmills	.265(e)(14)
Powered Platforms	.66(d)(9)	Service Stations	.110(h)
Welding	.252(e)(4)(iv)	Standards Sources	.115
Chicken Ladders	.28(t)(2)	Storage	.110
Lighting: (see also Lamps)		Tank Car Loading	.110(b)(15)
Container Areas	.110(d)(16)	Transport Trucks	.110(b)(15)
Cranes	.179(c)(4),(g)(7)	Trucks	.178(b)(10),(11)
Exits and Exit Signs	.37(q)	Trucks Conversion	.178(d),(q)(12)
Labor Camps	.142(g)	Liquid Fuels:	
Laundries	.264(f)(2)(i)	Handling and Storage	.178(f)
Machinery, Basement Areas	.219(c)(5)	Heating Systems	.177(f)(5)
Manlifts	.68(b)(6)(iii),(14)	Liquid Heaters, Spray	.107(e)(7)
Operating Areas, Industrial Trucks	.178(h)	Liquid Transfer:	
Pulp and Paper Mills	.261(b)(7),(c)(10), (k)(21)	Anhydrous Ammonia	.111(b)(12),(f)(6)
Pulpwood Harvesting	.266(e)(15)	Flammable Liquids	.107(e)(4),(9)
Sawmills	.265(c)(5)(iii),(9), (23)(iii)	Liquefied Petroleum Gases	.110(b)(14)
Spray Booths	.107(b)(10)	Load Handling:	
Storage Areas	.177(f)(1), .178(h)	Crawler, Locomotive and Truck	
Lighting Receptacles:		Cranes	.180(h)
Cranes	.179(g)(7)	Attaching	.180(h)(2)
Liquefied Hydrogen Systems: (see		Holding	.180(h)(4)
Hydrogen)		Moving	.180(h)(3)
Liquefied Petroleum Gases: (see also		Size	.180(h)(1)
Containers, Liquefied Petroleum		Derricks	.181
Gases)	.110, .168(b)(3)(x)	Attaching	.181(i)(2)
Appliances	.110(b)(20)	Boom Securing	.181(i)(6)
Attendant	.110(b)(14)	Holding	.181(i)(4)
Buildings:		Moving	.181(i)(3)
Engines Use	.110(e)(11),(12)	Size	.181(i)(1)
Industrial Trucks	.110(e)(13)	Winch Heads	.181(i)(5)
Inside Storage	.110(f)	Overhead and Gantry Cranes	.179(n)
Piping Into	.110(b)(13)	Attaching	.179(n)(2)
Commercial Vehicles	.110(g)	Hoist Limit Switches	.179(n)(4)
Condensed Gas Drips	.110(d)(9)	Moving	.179(n)(3)
Definitions	.110(a)	Size	.179(n)(1)
Effective Dates	.110(b)(19)(i),		

STANDARDS AND INTERPRETATIONS

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Load Ratings:		Machines:	
Cranes	.180(c)	Abrasive Wheels	.215
Derricks	.181(c)	Cooperage	.214
Overhead and Gantry Cranes	.179(b)(5)	Definitions	.211
Powered Platforms	.66(c)(7)	Forging	.218
Loading:		Laundry	.264
Bulk Plants	.106(f)(3)	Mills and Calenders	.216
Explosives	.109(e)(3)	Power Transmission, Mechanical	.219
Industrial Plants	.106(e)(4)	Presses, Mechanical	.217
Liquefied Petroleum Gases	.110(b)(15)	Textiles	.262
Processing Plants	.106(h)(5)	Woodworking	.213
Scaffolds	.29(a)(2)	Magazines, Explosives	.109(c)(2)
Locomotive Cranes: (see also Crawler, Locomotive and Truck Cranes)	.180	Class I	.109(c)(3)
Log Handling: (see also Sawmills)	.265(d)	Class II	.109(c)(4)
Looms	.262(n)	Class III	.109(c)(5)
Low Pressure Cylinder Inspection	.166(c), (d)	Maintenance: (see also Term To Which It Applies)	
Exterior	.166(c)(3), (d)(4)	Bulk Oxygen Systems	.104(b)(10)
Fire Damage	.166(c)(3)(x)	Cranes	.179(d), .180(f)
Hydrostatic Testing	.166(d)	Derricks	.181(f)
Interior	.166(d)(3)	Egress	.36(d), .37(k)
Preparation	.166(c)(2), (d)(2)	Fire Alarm Systems	.183(c)
Rejection	.166(c)(3)(i)	Fire Extinguishers:	
Low Pressure Tanks	.106(b)(1)(iv)	Carbon Dioxide	.161(b)(2)
LP-Gases: (see Liquefied Petroleum Gases)		Dry Chemical	.160(c)(2)
Lumber Handling	.265(c)(27), (28)	Portable	.158(d)(3)
Lunchrooms	.141(g)	Gaseous Hydrogen Systems	.103(b)(5)
Location	.141(g)(1), (2)	Industrial Plants	.106(e)(9)
Waste Disposal Containers	.141(g)(3)	Liquefied Hydrogen Systems	.103(c)(5)
		Powder Coatings	.107(l)(4)
		Powered Industrial Trucks	.178(q)
		Powered Platforms	.66(e)(6)
		Processing Plants	.106(h)(8)
		Respirators	.134(f)
		Safety Relief Devices	.167(b)(5), .168(b)(4)
		Sprinkler Systems	.159(d)
		Type F Powered Platforms	.66(c)(5)
		Manifolding Gas Cylinders	.252(a)(3)
		Fuel-Gas	.252(a)(3)(i)
		Operating Procedures	.252(a)(3)(iv)
		Oxygen	.252(a)(3)(iii), (iii)
		Portable Outlet Headers	.252(a)(3)(iv)
		Manholes	.23(a)(6)
		Manlifts	.68
		Application	.68(b)(1)
		Belts	.68(c)(1)(ii)
		Brakes	.68(c)(1)(i)
		Clearances	.68(b)(11)
		Definitions	.68(a)
		Design	.68(b)(3)
		Exit Protection	.68(b)(8)
		Floor Openings	.68(b)(3), (7)
		General Requirements	.68(b)
		Guardrails	.68(b)(8)(i), (10)(iv)
		Guards	.68(b)(7), (9)
		Handholds	.68(c)(4)
		Inspections	.68(e)
		Instruction Signs	.68(c)(7)
		Ladders	.68(b)(12)

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

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STANDARDS AND INTERPRETATIONS

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Power Platforms Inspection	.66(e)(3)	Inspection	.134(b)(7),(f)
Power Presses Inspection	.217(e)(1)	Labeling	.134(g)
Radiation Exposure	.96(b)(2)(iii),(m)(1) (n),(o)(1)	Maintenance	.134(f)
Records Disclosure,		Minimum Acceptable Program	.134(b)
Ionizing Radiation	.96(o)(1)	Open Surface Tanks	.94(d)(9)(vi)
Respirators	.134(e)(2),(f)(2)(iv)	Pulp and Paper Mills	.261(b)(2),(3),(g) (2),(6),(10),(15)(ii)
Welding Operations	.252(c)(6),(f)(13)	Repairs	.134(f)(4)
Records:		Selection	.134(c)
Asbestos	.93a(i),(j)(6)	Storage	.134(b)(6),(f)(5)
Ionizing Radiation	.96(m),(n)	Textiles	.262(qq)(2)
Mechanical Power Presses	.217(e)(1)	Training	.134(b)(3)
Refineries, Chemical Plants and		Use	.134(e)
Distilleries	.106(i)	Welding	.252(f)(4)(ii),(iii); (5)(ii),(7)(ii),(8)(9)(1)
Application	.106(j)	Respiratory Protection: (see also Res-	
Fire Protection	.106(i)(5)	pirators)	.134
Pressure Vessels	.106(i)(3)	Air Quality	.94(a)(6), .134(d)
Process Unit Location	.106(i)(4)	Air Supply	.94(a)(6), .134(d)
Storage Tanks	.106(i)(1)	Gas Mask Canister Identification	.134(g)
Wharves	.106(i)(2)	Minimum Acceptable Program	.134(b)
Refrigerated Containers:		Permissible Practices	.134(a)(1)
Anhydrous Ammonia	.111(d)	Respirators	.134(a)(2),(b),(c), (e),(f)
Refrigeration Systems	.177(f)(4)	Use	.134(e)
Refueling:		Ring Test	.215(d)(1)
Cranes	.180(i)(4)	Ripsaws	.213(c), .214(d)
Derricks	.181(j)(4)	Risers, Open	.24(j)
Trucks	.178(p)(2)	Rodent Control	.141(a)(5)
Refuse:		Labor Camps	.142(j)
Collection	.142(a)(4)	Roll Coatings	.108(h)(4)
Disposal	.142(h)	Rolling Scaffolds: (see Work Platforms,	
Receptacles	.141(a)(4)	Mobile)	
Relief Devices: (see Safety Relief		Roof Cars:	
Devices)		Type F Powered Platforms	.66(c)
Remote Gas Pumping Systems	.106(g)(3)(v)	Type T Powered Platforms	.66(d)(1)
Residue Disposal: (see Waste Disposal)		Roofing Brackets	.28(s)
Resistance Welding Equipment	.252(c)	Catch Platforms	.28(s)(3)
Capacitor Discharge Welding	.252(c)(2)(ii)	Construction	.28(s)(1)
Foot Switches	.252(c)(2)(vi)	Supports	.28(s)(2)
Grounding	.252(c)(2)(ix)	Rope Inspections:	
Guarding	.252(c)(1)(iv), .252(c)(2)(iv)	Cranes	.179(m), .180(g)
Installation	.252(c)(1)(i)	Derricks	.181(g)
Interlocks	.252(c)(2)(iii)	Ropes:	
Safety Pins	.252(c)(2)(viii)	Cranes	.179(m), .180(g)
Shields	.252(c)(2)(v)	Hoists	.179(h)(2)
Spot and Seam Welding	.252(c)(2)	Inspections	.179(m), .180(g)
Stop Buttons	.252(c)(2)(vii)	Running	.179(m)(1)
Thermal Protection	.252(c)(1)(ii)	Derricks	.181(g)
Resistors:		Idle Ropes	.181(g)(3)
Cranes	.179(g)(4)	Limited Travel	.181(g)(2)
Respirators: (see also Gas Mask Canis-		Nonrotating Ropes	.181(g)(4)
ters)	.134	Running	.181(g)(1)
Abrasive Blasting	.94(a)(1)(ii),(a)(5)	Type F Powered Platforms	.66(c)(20)
Air Supply	.94(a)(6), .134(d)	Type T Powered Platforms	.66(d)(5)
Asbestos	.93a(d)(1),(2)	Rotary Lawn Mowers	.243(e)(1)(4)
Cleaning	.134(b)(5),(f)(3)	Rotating Work Platforms: (see also	
Color Codes	.134(g)(6)	Vehicle-Mounted Work Platforms)	.67
Employer Provided	.134(a)(2)		
Identification	.134(g)		

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Rubber Industry: (see also Mills, Rubber and Plastics Industry)		Gaseous Hydrogen Systems	.103(b)(1)(ii)
Auxiliary Equipment	.216(a)(3),(b)(3)	Liquefied Hydrogen Systems	.103(c)(1)(iv)
Effective Dates	.216(a)(1),(2); .220	Liquefied Petroleum Gases	.110(b)(10),(c)(7), (d)(4),(e)(7), (g)(7),(h)(4)
Installations:		Non-DOT Containers	.110(d)(4)
Existing	.216(a)(2)	Spraying	.107(e)(8)
New	.216(a)(1)	Tanks, Cargo and Portable	.168
Mills and Calenders	.216	Definitions	.168(a)
Standards Sources	.221	Fusible Plugs	.168(b)(3)(ix)
Rubber Protective Equipment	.137	Liquefied Petroleum Gases	.168(b)(3)
Rung Ladders, Portable	.25(c)(3)	Maintenance	.168(b)(4)
Extension Trestle	.25(c)(3)(v)	Pressures	.168(b)(3)(ii)
General Requirements	.25(c)(3)(i)	Requirements	.168(b)(3)
Sectional	.25(c)(3)(iv)	Specifications	.168(b)(2)
Single	.25(c)(3)(ii)	Standards Sources	.168(b)(2), .170
Trestle	.25(c)(3)(v)	Testing	.168(b)(2)
Two-Section	.25(c)(3)(iii)	Safety-Toe Footwear: (see Foot Protection)	
Running Ropes:		Sanding Machines	.213(p), .243(a)(3)
Cranes	.179(m)(1), .180(g)(1)	Barrel	.214(p)
Derricks	.181(g)(1)	Head	.214(r)
Runway Conductors:		Sanitation	.141
Cranes	.179(g)(6)	Application	.141(a)(1)
Runway Protection	.23(c)	Change Rooms	.141(e)
		Effective Dates	.149
S		Food Handling	.141(h)
Safety Belts: (see also Lifelines)		Housekeeping	.141(a)(3)
Powered Platforms	.66(d)(8)	Insect Control	.141(a)(5)
Pulp, Paper, and Paperboard Mills	.261(b)(5),(g)(4),(15)	Lunchrooms	.141(g)
Scaffolding	.28(j)(4),(n)(8),(a)(3), (t)(2),(u)(6)	Rodent Control	.141(a)(5)
Tanks	.94(d)(11)(v)	Sawmills	.265(h)
Welding	.252(e)(4)(iv)	Standards Sources	.147
Safety Color Codes:		Toilet Facilities	.141(c)
Effective Dates	.149	Vermin Control	.141(a)(5)
Standards Sources	.147	Washing Facilities	.141(d)
Safety Devices:		Waste Disposal	.141(a)(4)
Ladders	.27(d)(5)	Water Supply	.141(b)
Safety Guard Design, Abrasive Wheel Machinery	.215(a)(2), (b)(10)-(12)	Sawmills:	
Safety Instruction Signs	.145(c)(3),(d)(6)	Bins, Bunkers, Hoppers, and Fuel Houses	.265(c)(23)
Safety Relief Devices:		Lighting	.265(c)(23)(iii)
Bulk Oxygen Systems	.104(b)(6),(7)(ii)	Loading Bins	.265(c)(23)(ii)
Compressed Gas Cylinders	.167	Blower Systems	.265(c)(20)
Definitions	.167(a)	Building Facilities	.265(c)
Frangible Discs	.167(b)(2),(4)(iii)	Docks	.265(c)(4)
Fusible Plugs	.167(b)(2)	Emergency Exits	.265(c)(6)
Maintenance	.167(b)(5)	Fire Escapes	.265(c)(6)
Requirements	.167(b)(4)	Floors	.265(c)(3)
Specifications	.167(b)(3)	Lighting	.265(c)(9)
Standards Sources	.167(b)(1),(3)	Platforms	.265(c)(4)
Testing	.167(b)(3)	Stairways	.265(c)(5)
Types	.167(b)(2)	Handrails	.265(c)(5)(ii)
Compressed Gases	.107(e)(8)	Lighting	.265(c)(5)(iii)
Flammable Liquids	.107(e)(8)	Tanks	.265(c)(8)
		Vats	.265(c)(8)

Change 1

671

STANDARDS AND INTERPRETATIONS

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Ventilation	265(c)(7)	Ripsaws	213(c)
Walkways	265(c)(4)	Self-Feed Equalizer	214(e)
Work Areas	265(c)(2)	Stave Bolt	214(b),(c)
Burners	265(c)(29)	Swing Cutoff	213(g)
Chemicals	265(c)(17)	Table	213(d)
Chippers	265(c)(21)	Scaffolding: (see also Scaffolds)	
Conveyors	265(c)(18)	Safety Requirements	28
Definitions	265(b)	Scaffolds: (see also Ladder Stands List- ings by Names of Scaffolds)	
Effective Dates	265(j)	Boatswain's Chair	28(j)
Electrical Wiring	265(c)(12)	Bricklayers' Square	28(l)
Exhaust Systems	265(c)(20)	Carpenters' Bracket	28(k)
Fire Protection	265(i)	Casters	29(a)(4)
Flammable Liquids	265(c)(16)	Chicken Ladders	28(t)
Gas Piping and Appliances	265(c)(15)	Coupler	28(c)
General Requirements	265(a)	Coupler, Mobile	29(d)
Hydraulic Systems	265(c)(13)	Crawling Boards	28(t)
Kilns, Dry	265(f)	Decorators'	28(o)
Ladders	265(c)(10)	Design Loads	29(a)(2)
Liquefied Petroleum Gases	265(c)(14)	Float	28(u)
Log Breakdown	265(e)	Folding Ladder	29(c)(5)
Log Handling, Sorting, and Storage	265(d)	Folding Stairway	29(c)(4)
Barking Devices	265(d)(4)	Horse	28(m)
Log Decks	265(d)(3)	Interior Hung	28(p)
Storage Areas	265(d)(2)	Ladder-Jack	28(q)
Unloading	265(d)(1)	Masons' Adjustable Multiple-Point	
Unloading Areas	265(d)(2)	Suspension	28(f)
Lumber:		Needle Beam	28(n)
Loading	265(c)(28)	Outrigger	28(e)
Piling	265(c)(27)	Plasterers'	28(o)
Storage	265(c)(27)	Roofing Brackets	28(s)
Marking Physical Hazards	265(c)(11)	Ship	28(u)
Open Surface Tanks	265(c)(17)(iii)	Single-Point Adjustable Suspen- sion	28(i)
Personal Protective Equipment	265(c)(17)(ii),(g)	Standards Sources	31
Power Transmission Apparatus	265(c)(22)	Stone Setters' Adjustable Multiple Point Suspension	28(h)
Refuse Removal	265(c)(20)(vi)	Suspension	28(f),(g),(h),(i)
Ropes, Cables, Slings, and Chains	265(c)(24)	Swinging	28(g)
Sanitation	265(h)	Tube and Coupler	28(c)
Stackers and Unstackers	265(c)(26)	Tube and Coupler, Mobile	29(d)
Standards Sources	265(a)(2),(j); 268	Tubular Welded Frame	28(d), 29(b)
Threshold Limits	265(c)(17)(i)	Tubular Welded Sectional Folding	29(c)
Traffic Control	265(c)(31)	Two-Point Suspension	28(g)
Tramways	265(c)(19)	Wheels	29(a)(4)
Trestles	265(c)(19)	Window-Jack	28(r)
Vehicles	265(c)(30)	Wood Pole	28(b)
Saws:		Work Levels	29(a)(3)
Band	213(i)	Work Platforms	29(a)
Band Resaws	213(i)	Working Loads	29(a)(2)
Barrel Stave Saws	214(c)	Scaffolds, Manual Mobile: (see also Work Platforms, Mobile Scaffolds)	29
Bolt Equalizer	214(b)	Sectional Rung Ladders	25(c)(3)(iv)
Circular	213(f); 243(a)(1)	Self-Feed Equalizer Saws	214(e)
Circular Resaws	213(e)	Semigantry Cranes: (see Gantry Cranes)	
Cracked	243(a)(4)	Separation Walls: (see also Distances From Hazards)	
Cylindrical Saws	214(c)	Ammonium Nitrate	109(i)(5)
Drag	213(r)		
Equalizer	214(b),(e)		
Forging Machines	218(j)(2)		
Heading Bolt	214(a),(c)		
Inspection	213(s)		
Radial	213(h)		

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Systems Design	.94(d)(7)	Slubbers	.262(j)
Vapor Degreasing	.94(d)(12)	Spinning Mules	.262(g)
Ventilation	.94(d)(3),(7)	Standards Sources	.262(a)(2), .265(j)
Testing:		Staple Cullers	.262(ff)
Bulk Oxygen	.104(b)(8)(v)	Tanks, Open	.262(ii)
Cranes	.179(k), .180(e)	Tenter Frames	.262(t)
Derricks	.18(e)	Tumblers	.262(cc)
Fire Extinguishers:		Ventilation	.262(rr)
Portable	.157(d)(1),(4)	Warpers	.262(i)
Dry Chemical	.180(c)(1)	Workroom Ventilation	.262(rr)
Carbon Dioxide	.181(b)(1)	Worsted Drawing	.262(l)
Gaseous Hydrogen Systems	.103(b)(1)(vi)	Toe Protection: (see Foot Protection)	
Liquefied Hydrogen Systems	.103(c)(1)(vii)	Toeboards:	
Piping	.106(c)(7)	Cranes	.179(d)(3)
Powered Platforms	.86(e)	Definition	.21(a)(9)
Radiation Alarm	.96(f)(3)	Power Transmission Apparatus	.219(o)(5)
Safety Relief Valves	.167(b)(3), .168(b)(2)	Powered Platforms	.66(c)(10),(11)
Storage Tanks	.106(b)(7)	Walking-Working Surfaces	.23(a)(2),(3)(ii),(e)
Textiles:		Toilet Facilities: (see also Toilets)	.141(e)
Acid Carboys	.262(nn)	Construction	.141(c)(2),(3)
Bleaching	.262(p)	Labor Camps	.142(d)
Calenders	.262(ee)	Lavatories	.141(c)(2)
Caustics	.262(oo)	Minimum Numbers	.141(c)(1),(d)(2)
Clothing Folding Machines	.262(gg)	Seepage Pits	.143(a)(7),(b)(1),(d)
Color-Mixing Room	.262(kk)	Towels	.141(d)(3)(v)
Cotton Cards	.262(e)	Washing Facilities	.141(c)(1)(vii),(d)
Cotton Combers	.262(j)	Toilets, Nonwater Systems: (see also Nonwater Disposal Systems:	
Definitions	.262(b)	Toilet Facilities)	.143(a)(2)-(7)
Drawing Frames	.262(j)	Chemical	.143(a)(3),(c)
Drying Cans	.262(w)	Combustion	.143(a)(5),(e)
Drying Tumblers	.262(cc)	Portable	.143(a)(6),(g)
Dyeing Jugs	.262(u)	Privies	.143(a)(2),(b)
Dye Vats	.262(mm)	Recirculating	.143(a)(4),(f)
Extractors	.262(y)	Tongs, Upsetters	.218(h)(4)
First Aid	.262(pp)	Tooling	.217(d)(5)
Flat Work Ironers	.262(x)	Torch Valves, Welding	.252(d)(4)(i)
Folders, Overhead	.262(jj)	Towels	.141(d)(3)(v)
Folding Machines	.262(gg)	Towers, Scaffolds: (see Ladder Stands and Scaffolds: Scaffolds: Work Platforms, Mobile)	.29
Garnet Machines	.262(n)	Tractors: (see also Powered Industrial Trucks)	.178
Gill Boxes	.262(k)	Traffic Signs	.145(d)(8)
Hand Boiling Machines	.262(hh)	Trailers	.111(d)(7)
Kiers	.262(q)	Training Personnel	.96(i), .217(e)(3)
Lappers	.262(m)	Respirators	.134(b)(3),(e)(5)
Looms	.262(n)	Truck Operators	.178(i)
Mercerizing Ranges	.262(s)	Transmission Pipeline Welding	.252(g)(1)
Nip Guards	.262(dd)(1),(v),(z)	Construction Standards	.252(g)(1)(v)
Openers	.262(d)	Electric Shock	.252(g)(1)(iii)
Padders	.262(v)	Field Shop Operations	.252(g)(1)(ii)
Personal Protective Equipment	.262(qq)	Flammable Substances	.252(g)(1)(vi)
Pickers	.262(d)	Pressure Testing	.252(g)(1)(iv)
Power Transmission	.219(a)(3)	X-ray Inspection	.252(g)(1)(vii)
Printing Machines	.262(dd)	Transportation:	
Rings Frames	.262(j)	Blasting Agents	.109(g)(6)
Roll Bench	.262(ii)	Explosives	.109(d)
Rope Washers	.262(bb)	Fire Extinguishers	.109(d)(2)(ii)
Safety Requirements	.262(c)		
Sanforizing and Palmer Machines	.262(aa)		
Shearing Machines	.262(o)		
Slashers	.262(h)		

Change 1

677

STANDARDS AND INTERPRETATIONS

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Markings	109(d)(2)(ii)	Tubular Welded Sectional Folding Scaffolds:	
Vehicles	109(d)(2)(3)	Bracing	29(c)(3)
Trapdoors	23(a)(5)	End Frames	29(c)(8)
Traps Air Receivers	189(b)(2)	Erection	29(c)(7)
Treads, Stairs	24(f)(k)	Sectional Folding Ladder Scaffolds	29(c)(5)
Treadles	217(b)(4)	Sectional Folding Stairway Scaffolds:	
Trestle Ladders, Portable:		folds	29(c)(4)
Metal	26(a)(4)	Stairways	29(c)(2)
Wood	25(c)(3)(v)	Turning Machines	213(o)
Trimming Presses	218(g)	Two-Point Suspension Scaffolds	28(g)
Trips, Two-Hand	217(b)(6)	Acid Solutions	28(g)(10)
Trolley Bumpers, Cranes	179(e)(3)	Blocks	28(g)(7)
Trolley Ladders, Portable	25(c)(5)	Employees, Maximum	28(g)(9)
Trolley Stops, Cranes	179(e)(1)	Guardrails	28(g)(5)
Truck Cranes: (see Crawler, Locomotive and Truck Cranes)	180	Hangers	28(g)(2)
Trucks	178(k)(m)	Hoisting Machines	28(g)(3)
Forklift	261(c)(1)	Platform	28(g)(12)
Hand	261(m)(1)	Roof Irons or Hooks	28(g)(4)
Highway	178(k)(m)	Ropes	28(g)(8)
Powered Industrial	178	Securing	28(g)(11)
Trucks, Powered Industrial: (see also Powered Industrial Trucks)	178	Size	28(g)(1)
Tube and Coupler Scaffolds	28(c)	Supports	28(g)(8)
Bearers	28(c)(9)	Suspension	28(g)(6)
Construction	28(c)(5)	Two-Section Rung Ladders	25(c)(3)(iii)
Heavy-Duty	28(c)(3)	Type F Powered Platforms	66(b)(5)(ii),(c)
Light-Duty	28(c)(1)	Access	66(c)(13)
Medium-Duty	28(c)(2)	Communications	66(c)(3)
Runners	28(c)(8)	Electrical Wiring	66(c)(22)
Tube and Coupler Scaffolds, Mobile	29(d)	Emergency Communications	66(c)(23)
Design	29(d)(1)	Emergency Operations:	
Erection	29(d)(3)	Electrical	66(c)(15)
Handrails	29(d)(4)	Manual	66(c)(16)
Loading	29(d)(5)	Flooring	66(c)(12)
Materials	29(d)(2)	Guardrails	66(c)(9),(11)
Tubing: (see Piping, Fittings and Tubing)		Hoisting Equipment	66(c)(17),(20)
Tubular Welded Frame Scaffolds	28(d)	Brakes	66(c)(19)
Accessories	28(d)(13)	Motors	66(c)(18)
Bracing	28(d)(3)	Load Railing Plate	66(c)(7)
Drawing and Specification		Roof Cars	66(c)
Requirements	28(d)(11)	Access	66(c)(4)
Erection Requirements	28(d)(12)	Movement	66(c)(2)
Frames	28(d)(5),(13)	Stability	66(c)(3)
Guardrails	28(d)(7)	Maintenance	66(c)(5)
Inspections	28(d)(14)	Ropes	66(c)(20)
Legs	28(d)(4)	Tags	66(c)(21)
Loads	28(d)(1),(8)	Toeboards	66(c)(10),(11)
Planking Spans	28(d)(10)	Vertical Movement	66(c)(14)
Securing	28(d)(9)	Working Platforms	66(c)(6)-(16)
Spacing	28(d)(2)	Type T Powered Platforms	66(b)(5)(iii),(d)
Uplifts	28(d)(6)	Communications	66(d)(7)
Tubular Welded Frame Scaffolds, Mobile	29(b)	Electrical Wiring	66(d)(6)
Bracing	29(b)(2)	Emergency Communications	66(d)(7)
Erection	29(b)(5)	Hoisting Equipment	66(d)(3),(5)
Panel Locking	29(b)(4)	Lifelines	66(d)(9)
Panel Spacing	29(b)(3)	Roof Cars	66(d)(1)
		Ropes	66(d)(5)
		Safety Belts	66(d)(8)
		Working Platforms	66(d)(2)

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
U		Room Intakes107(d)(11)	
U-Guards	.219(m)(3)	Standards Sources	.99
Upsetters	.218(h)	Storage Rooms	.106(d)(4)(iv)
Dies Changing	.218(h)(5)	Tanks, Open Surface	.94(d)
Lockouts	.218(h)(2)	Textiles	.262(rr)
Manual Controls	.218(h)(3)	Venting, Tanks:	
Supporting Foundations	.218(h)(1)	Aboveground	.106(b)(2)(iv)-(vi)
Tongs	.218(h)(4)	Inside	.106(b)(4)(ii)
		Portable	.106(d)(2)(ii)
		Underground	.106(b)(3)(iv)
		Vents: (see Venting)	
		Vermin Control	.141(a)(5)
V		W	
Valves: (see also Piping, Valves, and Fittings)		Walking-Working Surfaces:	
Air Receivers	.169(b)(3)	Aisles	.22(b)
Cylinders	.169(c)(6)	Covers	.22(c)
Liquefied Petroleum Gases	.110(b)(7)	Definitions	.21
Non-DOT Containers	.110(d)(3)	Fixed Industrial Stairs	.24
Vapor Degreasing Tanks	.94(d)(12)	Floor Loading	.22(d)
Vaporizers:		Floor Openings Guard	.23
Liquefied Petroleum Gases	.110(b)(11)	General Requirements	.22
Liquid Hydrogen	.103(c)(1)(viii)	Guardrails	.22(c)
Liquid Oxygen	.104(b)(7)	Housekeeping	.22(a)
Veneer Machinery	.30(c)	Ladders:	
Cutters	.213(q)(s)(13)	Fixed	.27
Ventilation	.94, 107(d)	Portable:	
Abrasive Blasting	.94(a)	Metal	.26
Asbestos	.93a(c)(1)(ii)	Wood	.25
Bakeries	.263(c)(7)	Stands	.29
Bulk Oxygen Systems	.104(b)(3)(xii)	Passageways	.22(b)
Bulk Plants	.106(f)(2)(iii)	Scaffolding Safety	.28
Confined Spaces	.255(e)(4)(ii),(f)	Scaffolds (Towers)	.29
Dip Tanks	.108(b)	Stairs, Fixed Industrial	.24
Drying	.108(b)(2)	Standards Sources	.31
Vapor Area	.108(b)(1)	Wall Openings Guarding	.23
Effective Dates	.98	Working Surfaces	.30
Electrostatic Spraying	.107(i),107(r)(9)	Wall Cranes: (see Gantry Cranes)	
Grinding Polishing and Buffing	.94(b)	Wall Openings (Holes)	.23(b)
Laundries	.262(c)(4)(ii), (d)(1)(ii)	Warehouses:	
Open Surface Tanks	.94(d)(3)	Ammonium Nitrate	.109(i)(4)
Powder Coatings	.107(l)(2)	Flammable Liquids	.106(d)(5)(v)
Processing Buildings	.106(h)(3)(iii)	Warning Devices and Signs: (see also Signs and Tags)	
Sawmills	.265(c)(7)	Cranes	.179(i)
Spray Finishing	.94(c)(5)	Ionizing Radiation	.96(f)
Spraying Operations	.94(c),107(d)	Manlifts	.68(c)(7)
Access Doors	.107(d)(10)	Nonionizing Radiation	.97(a)(3)
Air Exhausts	.107(d)(9)	Washing Facilities	.141(d), .142(f)
Belts	.107(d)(6)	Waste Disposal	.141(a)(4)
Clearances	.107(d)(8)	Asbestos	.93a(h)(2)
Conformance	.107(d)(1)	Bulk Plants	.106(f)(7)
Discharge Clearances	.107(d)(8)	Containers	.141(g)(3)
Drying Spaces	.107(d)(12)	Dip Tanks	.108(f)(2)
Electric Motors	.107(d)(5)	Ionizing Radiation	.96(k)
Exhaust Duct System	.107(d)(3)(7)	Labor Camps	.142(e),(h)
Fan-Rotating Element	.107(d)(4)	Nonwater	.143
Independent Exhaust	.107(d)(3)		

Change 1

679

STANDARDS AND INTERPRETATIONS

SUBJECT INDEX FOR VOLUME I

GENERAL INDUSTRY STANDARDS AND INTERPRETATIONS

Subject term	Section No.	Subject term	Section No.
Processing Plants	.106(h)(8)(iii)	Grounding	.252(c)(3)(vi)
Radiation	.96(k)	Holder, Movable	.252(c)(3)(v)
Service Stations	.106(g)(7)	Safety Chains	.252(c)(3)(ii)
Spraying	.107(g)(3)	Switch Guards	.252(c)(3)(iv)
Water Gels	.109(h)	Wharves:	
Water Spray Extinguishers:		Bulk Plants	.106(f)(4)
Dip Tanks	.108(g)(2)	Chemical Plants	.106(i)(2)
Water Supply:		Distilleries	.106(i)(2)
Fire Department Connections ..	.158(c)(4);	Explosives	.109(f)
Fire Extinguishers	.159(a),(b)	Refineries	.106(i)(2)
Class I Service	.158(c)	Winch Heads:	
Class II Service	.158(c)(1)	Derricks	.181(i)(5)
Class III Service	.158(c)(2)	Wind Indicators	.179(b)(4)
Labor Camps	.142(c)	Windlass Machines	.214(j)
Nonpotable Water	.141(b)(2)	Window-Jack Scaffolds	.28(r)
Potable Water	.141(b)(1)	Guardrails	.28(r)(3)
Weather Protection Manlifts	.68(b)(15)	Use	.28(r)(1),(2)
Welding: (see also Acetylene		Wood Heel Turning Machines	.213(o)
Generators; Arc Welding; Flash		Wood Ladders, Portable: (see also Lad-	
Welding Equipment; Resistance		ders, Portable Wood)	.25
Welding Equipment; Welding		Wood Pole Scaffolds	.28(b)
Containers; Welding Machines,		Bracing	.28(b)(8)-(10)
Portable)	.252	Erection	.28(b)(16)
Beryllium	.252(f)(8)	Guardrails	.28(b)(15)
Cadmium	.252(f)(1)(v),(9)	Ledgers	.28(b)(7)
Cleaning Compounds	.252(f)(11)	Planking	.28(b)(11)-(14)
Concentrations, Maximum Allow-		Platforms	.28(b)(11)-(14)
able	.252(f)(1)(iv)	Reinforcement	.28(b)(6)
Containers	.252(d)(3)	Securing	.28(b)(4)
Contamination	.252(f)(1)(i)	Splicing	.28(b)(2)
Definitions	.251	Toeboards	.28(b)(15)
Exhaust Hoods	.252(f)(3)	Wood Shapers	.213(m)
Fire Protection	.252(d)(2)(i),(ii),	Wooden Guards	.219(o)(2)
	(xv)	Woodworking Machinery	.213
First Aid Equipment	.252(f)(13)	Band Saws and Resaws	.213(i)
Fluorine Compounds	.252(f)(1)(v),(5)	Boring Machines	.213(l)
Hazards	.252(c)(5)	Circular Resaws	.213(e)
Labels	.252(f)(1)(v)	Construction	.213(a)
Ladders, Fixed	.27(b)(6)	Controls	.213(b)
Lead	.252(f)(7)	Crosscut Table Saws	.213(d)
Liquefied Petroleum Gases	.110(b)(4)	Definitions	.211(a)
Mercury	.252(f)(10)	Drag Saws	.213(r)
Piping Systems, Mechanical	.252(g)(2)	Effective Dates	.220
Personnel Protection	.252(e)	Glue Spreaders, Roll-Type	.213(r)
Precautions	.252(c)(6),(d)(2)	Hand-Fed Crosscut Table Saws ..	.213(d)
Prohibited Areas	.252(d)(2)(vi)	Hand-Fed Ripaws	.213(c), .214(d)
Screens	.252(f)(1)(iii)	Inspection	.213(a)
Spot and Seam	.252(c)(2)	Jointers	.213(j)
Stainless Steels	.252(f)(12)	Maintenance	.213(s)
Standards Sources	.253	Matching Machines	.213(n)
Supervisory Responsibility	.252(d)(2)(xiv)	Molding Machines	.213(n)
Transmission Pipelines	.252(g)(1)	Mortising Machines	.213(l)
Ventilation	.252(f)(1)(ii),	Planing Machines	.213(n)
	(f)(2)-(4)	Profile Lathes	.213(o)
Zinc	.252(f)(6)	Radial Saws	.213(h)
Welding Machines, Portable	.252(c)(3)	Ripsaws	.213(c), .214(d)
Clevis	.252(c)(3)(iii)	Sanding Machines	.213(p)
Counterbalance	.252(c)(3)(i)	Self-Fed Circular Saws	.213(f)