Certification Page
Regular and Emergency Rules

1. General Information

a. Agency/Board Name *See attached list for references*
Department of Workforce Services - OSHA Division

b. Agency/Board Address	c. Agency/Board City	d. Agency/Board Zip Code
1510 E. Pershing Blvd - West Wing	Cheyenne	82002

e. Name of Contact Person	f. Contact Telephone Number
J.D. Danni	(307)-777-7700

g. Contact Email Address	h. Adoption Date:
jd.danni@wyo.gov	

i. Program(s) *See attached list for references*
Wyoming Occupational Health & Safety Rules 1910 General Industry Standards

2. Rule Type and Information

a. These rules are: ☐ **Emergency Rules** *(After completing all of Section 2, proceed to Section 5 below)* ☒ **Regular Rules**

b. Choose all that apply: ☐ **New Rules*** ☒ **Amended Rules** ☐ **Repealed Rules**

** "New" rules means the first set of regular rules to be promulgated by the Agency after the Legislature adopted a new statutory provision or significantly amended an existing statute.*

If "New," provide the Enrolled Act number and year enacted:

c. Provide the Chapter Number, and Short Title of Each Chapter being Created/Amended/Repealed *(if more than 5 chapters are being created/amended/repealed, please use the Additional Rule Information form and attach it to this certification)*

Chapter Number:	Short Title:
1	General (A)
9	Personal Protective Equipment (I)

d. ☒ The Statement of Reasons is attached to this certification.

e. If applicable, describe the emergency which requires promulgation of these rules without providing notice or an opportunity for a public hearing:

3. State Government Notice of Intended Rulemaking

a. Date on which the Notice of Intent containing all of the information required by W.S. 16-3-103(a) was filed with the **Secretary of State**: 05/01/13

b. Date on which the Notice of Intent and proposed rules in strike and underscore format were provided to the **Legislative Service Office**: 05/01/13

c. Date on which the Notice of Intent and proposed rules in strike and underscore format were provided to the **Attorney General**: 05/01/13

4. Public Notice of Intended Rulemaking

a. Notice was mailed 45 days in advance to all persons who made a timely request for advance notice. ■ Yes ☐ No ☐ N/A

b. A public hearing was held on the proposed rules. ■ Yes ☐ No

If "Yes:"	Date:	Time:	City:	Location:
	June 21, 2013	9:00 AM	Cheyenne	Cheyenne Business Center 1510 E. Pershing Blvd. Cheyenne, WY 82002

5. Final Filing of Rules

a. Date on which the Certification Page with original signatures and final rules were sent to the **Attorney General's Office for the Governor's signature**: 6-24-13

b. Date on which final rules were sent to the **Legislative Service Office:** 6-24-13

c. Date on which a PDF of the final rules was electronically sent to the **Secretary of State**: 6-24-13

6. Agency/Board Certification

The undersigned certifies that the foregoing information is correct.

Signature of Authorized Individual	David W Vaughan
Printed Name of Signatory	David W. Vaughan
Signatory Title	Wyoming OSHA Commission Chairman
Date of Signature	6-21-2013

7. Governor's Certification

I have reviewed these rules and determined that they:

1. Are within the scope of the statutory authority delegated to the adopting agency;
2. Appear to be within the scope of the legislative purpose of the statutory authority; and, if emergency rules,
3. Are necessary and that I concur in the finding that they are an emergency.

Therefore, I approve the same.

Governor's Signature	
Date of Signature	

Distribution List:

Attorney General

1. Statement of Reasons;
2. Original Certification Page;
3. Summary of Comments (regular rules);
4. Hard copy of rules: clean and strike/underscore; and
5. Memo to Governor documenting emergency (emergency rules).

LSO

1. Statement of Reasons;
2. Copy of Certification Page;
3. Summary of Comments (regular rules);
4. Hard copy of rules: clean and strike/underscore;
5. Electronic copy of rules: clean and strike/underscore; and
6. Memo to Governor documenting emergency (emergency rules).

SOS

1. PDF of clean copy of rules; and
2. Hard copy of Certification Page as delivered by the AG.

Statement of Reasons

The Department of Workforce Services, Workers' Safety –OSHA Division would like to modify and amend the 1910 General Industry and 1926 Construction Standards..

Amending and modifying the 1910 General Industry Standards and 1926 Construction Standard for its Head Protection: OSHA is updating the references in its standards to recognize the 2009 edition of the American National Standard for Industrial Head Protection, and is deleting the 1986 edition of that national consensus standard because it is out of date. OSHA also is including the construction industry in this rulemaking to ensure consistency among the Agency's standards. This neither reduces employee protection nor alters an employer's obligations under the existing standards and does not require an employer to update or replace its head protection solely as a result of this rule if the head protection currently in use meets the revised standards. However, this also provides employers with additional options for meeting the design-criteria requirements for head protection – options most employers are already using.

Summary of Comments for Proposed Updating OSHA Standards Based on National Consensus Standards; Head Protection

There were no written or oral comments for the 1910 General Industry Standards and 1926 Construction Standard for its Head Protection.

Subpart A - General

SUBPART A -- General

Authority: Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), 6-96 (62 FR 111), 3-2000 (65 FR 50017), or 5-2007 (72 FR 31159), as applicable.

Section 1910.6 also issued under 5 U.S.C. 553. Sections 1910.6, 1910.7, and 1910.8 also issued under 29 CFR Part 1911. Section 1910.7(f) also issued under 31 U.S.C. 9701, 29 U.S.C. 9a, 5 U.S.C. 553; Pub. L. 106-113 (113 Stat. 1501A-222); and OMB Circular A-25 (dated July 8, 1993) (58 FR 38142, July 15, 1993).

[58 FR 35308, June 30, 1993; 61 FR 5507, Feb. 13, 1996; 61 FR 9227, March 7, 1996;62 FR 29668, June 2, 1997; 62 FR 42666, Aug. 8, 1997; 62 FR 65203, Dec. 11, 1997; 63 FR 13338, March 19, 1998;63 FR 17093, April 8, 1998; 64 FR 13908, March 23, 1998; 65 FR 46818 , July 31, 2000; 70 FR 53929, Sept. 13, 2005; 71 FR 38086, July 5, 2006; 72 FR 7190, Feb. 14, 2007; 72 FR 40075, July 23, 2007; 72 FR 71068, Dec. 14, 2007; 73 FR 75583, Dec. 12, 2008; 74 FR 40447, August 11, 2009; 74 FR 46355, Sept. 9, 2009; 75 FR 12685, March 17, 2010; 76 FR 10515, Feb. 25, 2011; 76 FR 33606, June 8, 2011; 76 FR 75786, Dec. 5, 2011; 77 FR 17764, March 26, 2012; 77 FR 37598, June 22, 2012]

Sections 1910.16 and 1910.19 also issued under 29 CFR part 1911.

1910.1 Purpose and scope.

(a) The Occupational Health and Safety Commission is empowered by Section 27-11-105 (a)(viii), Wyoming Statutes, to devise, formulate, adopt and amend and repeal rules and regulations governing the health and safety of employees and employers covered by the Act.

(b) The purpose and scope of these rules and regulations is:

(1) To provide standards, rules and regulations to safeguard the life, limb and health of employees and employers.

(2) To provide the minimum requirements for compliance by each place of employment under the Act.

1910.2 Definitions.

As used in this part, unless the context clearly requires otherwise:

(a) "Act" means the State of Wyoming Occupational Health and Safety Act, as amended.

(b) "Administrator" means the Administrator of the State of Wyoming Occupational Health and Safety Division.

(c) "Approved" means sanctioned, endorsed, accredited, certified, or accepted as satisfactory by a duly constituted and nationally recognized authority or agency.

(d) "Authorized Person" means a person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the job site.

(e) "Commerce" means trade, traffic, commerce, transportation or communication between this state and any place outside thereof, or between points in this state but through a point outside thereof.

(f) "Commission" means the State of Wyoming Occupational Health and Safety Commission.

(g) "Competent Person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

(h) "Defect" means any characteristic or condition which tends to weaken or reduce the strength of the tool, object or structure of which it is a part.

(i) "Department" means the State of Wyoming Department of Workforce Services.

(j) "Employee means a person permitted to work by an employer in employment.

(k) "Employer" means an individual or organization including the state and all its political subdivisions which has in its employ one or more individuals performing services for it.

(l) "Employment" means all services for pay under a contract of hire.

(m) "Established Federal Standard" means any operative standard established by Public Law 91-596, the Williams-Steiger Act, which applies to all industry covered by the Act, in effect on or before April 28, 1971, or upon promulgation of these rules and regulations.

(n) "Hazard" means any occupational condition or circumstance which is likely to cause death, injury or illness.

(o) "Hazardous Substance" means a substance which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, is likely to cause occupational death, injury or illness.

(p) "National consensus standard" means any standard or modification thereof which:

(1) Has been adopted and promulgated by a nationally recognized standards-producing organization under procedures whereby it can be determined by the Secretary of Labor or by the Assistant Secretary of Labor that persons interested and affected by the scope or provisions of the standard have reached substantial agreement on its adoption;

(2) Was formulated in a manner which afforded an opportunity for diverse views to be considered; and

(3) Has been designated as such a standard by the Secretary or the Assistant Secretary, after consultation with other appropriate federal agencies.

(q) "Person" means an individual, governmental agency, partnership, association, corporation, business, trust, receiver, trustee, legal representative or successor to any of the foregoing.

(r) "Place of Employment" means plant, premises, or any other place where directed by the employer or about which an employee is permitted to work.

(s) "Qualified" means one who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project.

(t) "Safety factor" means the ratio of the ultimate breaking strength of a member or piece of material or equipment to the actual working stress or safer load when in use.

(u) "Secretary" means the Secretary of the U.S. Department of Labor.

(v) "Shall" means mandatory.

(w) "Should" means recommended.

(x) "Standard" means a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment.

(y) "Suitable" means that which fits, and has the qualities or qualifications to meet a given

purpose.

(z) "Toxic" means any substance (other than a radioactive substance) which has the capacity to produce personal injury or illness to man through ingestion, inhalation, or absorption through any body surface.

(aa) "Variances" means exception to promulgated standards, rules and regulations. As stated in the W.S. 27-11-111 - Variances; "Any person affected by this Act may request a variance to any standard, rule or regulation promulgated under this Act."

1910.3 Petitions for the issuance, amendment, or repeal of a standard.

(a) Any interested person may petition in writing the division or commission requesting the promulgation, amendment or repeal of any rules and regulations and may accompany his petition with relevant date, views and arguments. The division or commission may prescribe by rule the form of such petition and the procedure for their (its) submission, consideration and disposition. Upon submission of such a petition the commission, as soon as practicable, either shall deny the petition in writing (stating its reasons for denial) or initiate rulemaking proceedings in accordance with W.S. 9-4-103 Wyoming Statutes. The action of the commission in denying a petition shall be final and not subject to review.

1910.4 Amendments to this part.

(a) The commission shall have all of the authority under Section 26-11-105(a)(viii) of the Act, to devise, formulate, adopt, amend and repeal rules and regulations promulgated under the Act.

(b) In the event of conflict among any such standards, the commission shall take the action necessary to eliminate the conflict including the amendment or revocation of a rule or regulation, so as to assure the greatest protection of the health and safety of the employees and employers affected by the Act.

1910.5 Applicability of standards.

(a) These rules and regulations shall apply to all businesses, industries, employees, employers and persons or any other authorized person in places of employment governed by these rules and regulations.

(b) If a particular requirement contained herein is specifically applicable to a condition, practice, means, method, operation, or process, it shall prevail over any different general rule or regulation which might otherwise be applicable to the same condition, practice, means, method, operation or process.

(c) These rules and regulations shall apply, according to their terms, to any employment and place of employment in any industry covered by the Act. Specific industries liable to particular rules and regulations not herein contained are, in addition, subject to these rules and regulations.

1910.6 Incorporation by reference.

(a) The standards, rules and regulations of the U.S. Government and the State of Wyoming, and organizations which are not agencies of the U.S. Government or the State of Wyoming which are incorporated by reference in these rules and regulations, have the same force and effect as these rules and regulations. Only the mandatory provisions (i.e. provisions containing the word "shall" or other mandatory language) of standards incorporated by reference are adopted as standards under the Wyoming Occupational Safety and Health Act.

(b) Copies of the standards which are incorporated by reference may be examined at the office of the Occupational Health and Safety Division of the Department of Employment, 1510 E. Pershing Blvd., Cheyenne, WY 82002. Copies of such private standards may be obtained from the issuing organizations. The materials are available for purchase at the addresses of the private standards organizations listed in paragraph (e) of this section.

(c) Any changes in the standards incorporated by reference in this part and an official historic file of such changes are available for inspection at the office of the Occupational Health and Safety Division of the Department of Employment, Cheyenne, WY.

(d) The materials listed in paragraph (e) of this section are incorporated by reference in the corresponding sections noted as they exist on the date these rules and regulations became effective.

(e) Material available from private standards organizations

(1) The following material is available for purchase from the American Conference of Governmental Industrial Hygienists (ACGIH), 1014 Broadway, Cincinnati OH 45202:

(A) "Industrial Ventilation: A Manual of Recommended Practice" (22nd ed., 1995), incorporation by reference (IBR) approved for §1910.124(b)(4)(iii).

(B) Threshold Limit Values and Biological Exposure Indices for 1986-87 (1986), IBR approved for §1910.120, PEL definition.

(2) The following material is available for purchase from the American Society of Agricultural Engineers (ASAE), 2950 Niles Road, Post Office Box 229, St. Joseph, MI 49085:

(A) ASAE Emblem for Identifying Slow Moving Vehicles, ASAE S276.2 (1968), IBR approved for §1910.145(d)(10).

(B) [Reserved]

(3) The following material is available for purchase from the Agriculture Ammonia Institute-Rubber Manufacturers (AAI-RMA) Association, 1400 K St. NW, Washington DC 20005:

(A) AAI-RMA Specifications for Anhydrous Ammonia Hose, IBR approved for §1910.111(b)(8)(i).

(B) [Reserved]

(4) The following material is available for purchase from the American National Standards Institute (ANSI), 25 West 43rd Street, 4th Floor, New York, NY 10036;

(A) [Reserved]

(B) [Reserved]

(D) ANSI A11.1-65 (R 70) Practice for Industrial Lighting, IBR approved for §§1910.219(c)(5)(iii); 1910.261(a)(3)(i), (c)(10), and (k)(21); and 1910.265(c)(2).

(E) ANSI A11.1-65 Practice for Industrial Lighting, IBR approved for §§1910.262(c)(6) and 1910.265(d)(2)(i)(a).

(F) [Reserved]

(G) ANSI A13.1-56 Scheme for the Identification of Piping Systems, IBR approved for §§1910.253(d)(4)(ii); 1910.261(a)(3)(iii); 1910.262(c)(7).

(H) ANSI A14.1-68 Safety Code for Portable Wood Ladders, Supplemented by ANSI A14.1a-77, IBR approved for §1910.261(a)(3)(iv) and (c)(3)(i).

(I) ANSI A14.2-56 Safety Code for Portable Metal Ladders, Supplemented by ANSI A14.2a-77, IBR approved for §1910.261(a)(3)(v) and (c)(3)(i).

(J) ANSI A14.3-56 Safety Code for Fixed Ladders, IBR approved for §§1910.68(b)(4) and (12); 1910.179(c)(2); and 1910.261(a)(3)(vi) and (c)(3)(i).

(K) ANSI A17.1-65 Safety Code for Elevators, Dumbwaiters and Moving Walks, Including Supplements, A17.1a (1967); A17.1b (1968); A17.1c (1969); A17.1d (1970), IBR approved for §1910.261(a)(3)(vii), (g)(11)(i), and (l)(4).

(L) ANSI A17.2-60 Practice for the Inspection of Elevators, Including Supplements, A17.2a (1965), A17.2b (1967), IBR approved for §1910.261(a)(3)(viii).

(M) ANSI A90.1-69 Safety Standard for Manlifts, IBR approved for §1910.68(b)(3).

(N) ANSI A92.2-69 Standard for Vehicle Mounted Elevating and Rotating Work Platforms, IBR approved for §1910.67(b)(1), (2), (c)(3), and (4) and 1910.268(s)(1)(v).

(O) ANSI A120.1-70 Safety Code for Powered Platforms for Exterior Building

Maintenance, IBR approved for §1910.66 App. D(b) through (d).

(P) ANSI B7.1-70 Safety Code for the Use, Care and Protection of Abrasive Wheels, IBR approved for §§ 1910.215(b)(12) and 1910.218(j).

(Q) ANSI B15.1-53 (R 58) Safety Code for Mechanical Power Transmission Apparatus, IBR approved for §§1910.68(b)(4) and 1910.261(a)(3)(ix), (b)(1), (e)(3), (e)(9), (f)(4), (j)(5)(iv), (k)(12), and (l)(3).

(R) ANSI B20.1-57 Safety Code for Conveyors, Cableways, and Related Equipment, IBR approved for §§1910.218(j)(3); 1910.261 (a)(3)(x), (b)(1), (c)(15)(iv), (f)(4), and (j)(2); 1910.265(c)(18)(i).

(S) ANSI B30.2-43 (R 52) Safety Code for Cranes, Derricks, and Hoists, IBR approved for §1910.261(a)(3)(xi), (c)(2)(vi), and (c)(8)(i) and (iv).

(T) ANSI B30.2.0-67 Safety Code for Overhead and Gantry Cranes, IBR approved for §§1910.179(b)(2); 1910.261(a)(3)(xii), (c)(2)(v), and (c)(8)(i) and (iv).

(U) ANSI B30.5-68 Safety Code for Crawler, Locomotive, and Truck Cranes, IBR approved for §§1910.180(b)(2) and 1910.261(a)(3)(xiii).

(V) ANSI B30.6-69 Safety Code for Derricks, IBR approved for §§1910.181(b)(2) and 1910.268(j)(4)(iv)(E) and (H).

(W) ANSI B31.1-55 Code for Pressure Piping, IBR approved for §1910.261(g)(18)(iii).

(X) ANSI B31.1-67, IBR approved for §1910.253(d)(1)(i)(A).

(Y) ANSI B31.1a-63 Addenda to ANSI B31.1 (1955), IBR approved for §1910.261(g)(18)(iii).

(Z) ANSI B31.1-67 and Addenda B31.1 (1969) Code for Pressure Piping, IBR approved for §§1910.103(b)(1)(iii)(b); 1910.104(b)(5)(ii); 1910.218(d)(4) and (e)(1)(iv); and 1910.261(a)(3)(xiv) and (g)(18)(iii).

(AA) ANSI B31.2-68 Fuel Gas Piping, IBR approved for §1910.261(g)(18)(iii).

(BB) ANSI B31.3-66 Petroleum Refinery Piping, IBR approved for §1910.103(b)(3)(v)(b).

(CC) ANSI B31.5-66 Addenda B31.5a (1968) Refrigeration Piping, IB approved for §§1910.103(b)(3)(v)(b) and 1910.111(b)(7)(iii).

(DD) ANSI B56.1-69 Safety Standard for Powered Industrial Trucks, IBR approved for

§§1910.178(a)(2) and (3) and 1910.261(a)(3)(xv), (b)(6), (m)(2), and (m)(5)(iii).

(EE) ANSI B57.1-65 Compressed Gas Cylinder Valve Outlet and Inlet Connections, IBR approved for §1910.253(b)(1)(iii).

(FF) [Reserved]

(GG) ANSI B175.1-1991, Safety Requirements for Gasoline-Powered Chain Saws 1910.266(e)(2)(i).

(HH) [Reserved]

(II) ANSI C33.2-56 Safety Standard for Transformer-Type Arc Welding Machines, IBR approved for §1910.254(b)(1).

(JJ) [Reserved]

(KK) ANSI H23.1-70 Seamless Copper Water Tube Specification, IBR approved for §1910.110(b)(8)(ii) and (13)(ii)(b)(1).

(LL) ANSI H38.7-69 Specification for Aluminum Alloy Seamless Pipe and Seamless Extruded Tube, IBR approved for §1910.110(b)(8)(i).

(MM) ANSI J6.4-71 Standard Specification for Rubber Insulating Blankets, IBR approved for §1910.268(f)(1) and (n)(11)(v).

(NN) ANSI J6.6-71 Standard Specification for Rubber Insulating Gloves, IBR approved for §1910.268(f)(1) and (n)(11)(iv).

(OO) ANSI K13.1-67 Identification of Gas Mask Canisters, IBR approved for §1910.261(a)(3)(xvi) and (h)(2)(iii).

(PP) ANSI K61.1-60 Safety Requirements for the Storage and Handling of Anhydrous Ammonia, IBR approved for §1910.111(b)(11)(i).

(QQ) ANSI K61.1-66 Safety Requirements for the Storage and Handling of Anhydrous Ammonia, IBR approved for §1910.111(b)(11)(i).

(RR) ANSI O1.1-54 (R 61) Safety Code for Woodworking Machinery, IBR approved for §1910.261(a)(3)(xvii), (e)(7), and (i)(2).

(SS) ANSI S1.4-71 (R 76) Specification for Sound Level Meters, IBR approved for §1910.95 Appendixes D and I.

(TT) ANSI S1.11-71 (R 76) Specification for Octave, Half-Octave and Third-Octave

Band Filter Sets, IBR approved for §1910.95 Appendix D.

(UU) ANSI S3.6-69 Specifications for Audiometers, IBR approved for §1910.95(h)(2) and (5)(ii) and Appendix D.

(VV) ANSI Z4.1-68 Requirements for Sanitation in Places of Employment, IBR approved for §1910.261(a)(3)(xviii) and (g)(15)(vi).

(WW) [Reserved]

(XX) ANSI Z9.1-51 Safety Code for Ventilation and Operation of Open Surface Tanks, IBR approved for 1910.261(a)(3)(xix), (g)(18)(v), and (h)(2)(i).

(YY) ANSI Z9.1-71 Practices for Ventilation and Operation of Open-Surface Tanks, IBR approved for §1910.124(b)(4)(iv).

(ZZ) ANSI Z9.2-60 Fundamentals Governing the Design and Operation of Local Exhaust Systems, IBR approved for §§1910.94(a)(4)(i) introductory text, (a)(6) introductory text, (b)(3)(ix), (b)(4)(i) and (ii), (c)(3)(i) introductory text, (c)(5)(iii)(b), and (c)(7)(iv)(a); 1910.261(a)(3)(xx), (g)(1)(i) and (iii), and (h)(2)(ii).

(AAA) ANSI Z9.2-79 Fundamentals Governing the Design and Operation of Local Exhaust Systems, IBR approved for §1910.124(b)(4)(i).

(BBB) ANSI Z21.30-64 Requirements for Gas Appliances and Gas Piping Installations, IBR approved for §1910.265(c)(15).

(CCC) ANSI Z24.22-57 Method of Measurement of Real-Ear Attenuation of Ear Protectors at Threshold, IBR approved for §1910.261(a)(3)(xxii).

(DDD) ANSI Z33.1-61 Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, IBR approved for §§1910.94(a)(4)(i); 1910.261(a)(3)(xxiii) and (f)(5); and 1910.265(c)(20)(i).

(EEE) ANSI Z33.1-66 Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, IBR approved for §1910.94(a)(2)(ii).

(FFF) ANSI Z35.1-68 Specifications for Accident Prevention Signs, IBR approved for §1910.261(a)(3)(xxiv) and (c)(16).

(GGG) ANSI Z41.1-67 Men's Safety Toe Footwear, IBR approved for §§1910.94(a)(5)(v); 1910.136(b)(2) and 1910.261(i)(4).

(HHH) ANSI Z41-91, Personal Protection-Protective Footwear, IBR approved for §1910.136(b)(1).

(III) ANSI Z41-1999, American National Standard for Personal Protection -- Protective Footwear; IBR approved for § 1910.136(b)(1)(ii). Copies of ANSI Z41-1999 are available for purchase only from the National Safety Council, P.O. Box 558, Itasca, IL 60143-0558;

(JJJ) ANSI Z41-1991, American National Standard for Personal Protection -- Protective Footwear; IBR approved for § 1910.136(b)(1)(iii). Copies of ANSI Z41-1991 are available for purchase only from the National Safety Council, P.O. Box 558, Itasca, IL 60143-0558;

(KKK) [Reserved]

(LLL) [Reserved]

(MMM) ANSI Z54.1-63 Safety Standard for Non-Medical X-Ray and Sealed Gamma Ray Sources, IBR approved for §1910.252(d)(1)(vii) and (2)(ii).

(NNN) ANSI Z87.1-68 Practice of Occupational and Educational Eye and Face Protection, IBR approved for §§1910.133(b)(2); 1910.252(b)(2)(ii)(I); and 1910.261(a)(3)(xxv), (d)(1)(ii), (f)(5), (g)(10), (g)(15)(v), (g)(18)(ii), and (i)(4).

(OOO) ANSI Z87.1-89, Practice for Occupational and Educational Eye and Face Protection, IBR approved for §1910.133(b)(1).

(PPP) ANSI Z87.1-2003, American National Standard Practice for Occupational and Educational Eye and Face Protection; IBR approved for §§ 1910.133(b)(1)(i) and 1910.252(b)(2)(ii)(I)(1). Copies of ANSI Z87.1-2003 are available for purchase only from the American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018-2187; or from the International Safety Equipment Association (ISEA), 1901 North Moore Street, Arlington, VA 22209-1762;

(QQQ) ANSI Z87.1-1989 (R-1998), American National Standard Practice for Occupational and Educational Eye and Face Protection; IBR approved for § 1910.133(b) (1)(ii). Copies of ANSI Z87.1-1989 (R-1998) are available for purchase only from the American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018-2187;

(RRR) ANSI Z87.1-1989, American National Standard Practice for Occupational and Educational Eye and Face Protection; IBR approved for § 1910.133(b)(1)(iii). Copies of ANSI Z87.1-1989 are available for purchase only from the American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018-2187;

(SSS) ANSI Z88.2-1969, Practices for Respiratory Protection; IBR approved for §§ 1910.94(c)(6)(iii)(a), 1910.134(c); and 1910.261(a)(3)(xxvi), (b)(2), (f)(5), (g)(15)(v), (h)(2)(iii), (h)(2)(iv), and (i)(4).

(TTT) American National Standards Institute (ANSI) Z89.1-2009, American National

Standard for Industrial Head Protection, approved January 26, 2009; IBR approved for Sec. 1910.135(b)(1)(i). Copies of ANSI Z89.1-2009 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetyequipment.org.

(UUU) American National Standards Institute (ANSI) Z89.1-2003, American National Standard for Industrial Head Protection; IBR approved for Sec. 1910.135(b)(1)(ii). Copies of ANSI Z89.1-2003 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetyequipment.org.

(VVV) American National Standards Institute (ANSI) Z89.1-1997, American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements; IBR approved for Sec. 1910.135(b)(1)(iii). Copies of ANSI Z89.1-1997 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetyequipment.org.

(WWW) ANSI Z41.1-1967 Men's Safety Toe Footwear; IBR approved for § 1910.261(i)(4).

(XXX) ANSI Z87.1-1968 Practice of Occupational and Educational Eye and Face Protection; IBR approved for § 1910.261(a)(3)(xxv), (d)(1)(ii), (f)(5), (g)(1), (g)(15)(v), (g)(18)(ii), and (i)(4).

(YYY) ANSI Z89.1-1969 Safety Requirements for Industrial Head Protection; IBR approved for § 1910.261(a)(3)(xxvii), (b)(2), (g)(15)(v), and (i)(4).

(ZZZ) ANSI Z89.2-1971 Safety Requirements for Industrial Protective Helmets for Electrical Workers, Class B; IBR approved for § 1910.268(i)(1).

(5) The following material is available for purchase from the American Petroleum Institute (API), 1220 L Street NW, Washington DC 20005:

(A) [Reserved]

(B) API 12B (May 1958) Specification for Bolted Production Tanks, 11th Ed., With Supplement No. 1, Mar. 1962, IBR approved for §1910.106(b)(1)(i)(a)(3).

(C) API 12D (Aug. 1957) Specification for Large Welded Production Tanks, 7th Ed., IBR approved for §1910.106(b)(1)(i)(a)(3).

(D) API 12F (Mar. 1961) Specification for Small Welded Production Tanks, 5th Ed., IBR approved for §1910.106(b)(1)(i)(a)(3).

(E) API 620, Fourth Ed. [1970] Including Appendix R, Recommended Rules for Design

and Construction of Large Welded Low Pressure Storage Tanks, IBR approved for §§1910.103(c)(1)(i)(a); 1910.106(b)(1)(iv)(b)(1); and 1910.111(d)(1)(ii) and (iii).

(F) API 650 (1966) Welded Steel Tanks for Oil Storage, 3rd Ed., IBR approved for §1910.106(b)(1)(iii)(a)(2).

(G) API 1104 (1968) Standard for Welding Pipelines and Related Facilities, IBR approved for §1910.252(d)(1)(v).

(H) API 2000 (1968) Venting Atmospheric and Low Pressure Storage Tanks, IBR approved for §1910.106(b)(2)(iv)(b)(1).

(I) API 2201 (1963) Welding or Hot Tapping on Equipment Containing Flammables, IBR approved for §1910.252(d)(1)(vi).

(6) The following material is available for purchase from the American Society of Mechanical Engineers (ASME), United Engineering Center, 345 East 47th Street, New York, NY 10017:

(A) ASME Boiler and Pressure Vessel Code, § VIII, 1949, 1950, 1952, 1956, 1959, and 1962 Ed., IBR approved for §§1910.110(b)(10)(iii) (Table H-26), (d)(2) (Table H-31); (e)(3)(i) (Table H-32), (h)(2) (Table H-34); and 1910.111(b)(2)(vi);

(B) ASME Code for Pressure Vessels, 1968 Ed., IBR approved for §§1910.106(i)(3)(i); 1910.110(g)(2)(iii)(b)(2); and 1910.217(b)(12);

(C) ASME Boiler and Pressure Vessel Code, § VIII, 1968, IBR approved for §§1910.103; 1910.104(b)(4)(ii); 1910.106(b)(1)(iv)(b)(2) and (i)(3)(ii); 1910.107; 1910.110(b)(11)(i)(b) and (iii)(a)(1); 1910.111(b)(2)(i), (ii), and (iv); and 1910.169(a)(2)(i) and (ii);

(D) ASME Boiler and Pressure Vessel Code, §VIII, Paragraph UG-84, 1968, IBR approved for §1910.104(b)(4)(ii) and (b)(5)(iii);

(E) ASME Boiler and Pressure Vessel Code, §VIII, Unfired Pressure Vessels, Including Addenda (1969), IBR approved for §§1910.261; 1910.262; 1910.263(i)(24)(ii);

(F) Code for Unfired Pressure Vessels for Petroleum Liquids and Gases of the API and the ASME, 1951 Ed., IBR approved for §1910.110(b)(3)(iii); and

(G) ASME B56.6-1992 (with addenda), Safety Standard for Rough Terrain Forklift Trucks, IBR approved for §1910.266(f)(4).

(7) Copies of the standards listed below in this paragraph (h) are available for purchase from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; Telephone: 610-832-9585; Fax: 610-832-9555; Email: seviceastm.org; Web site:

http://www.astm.org. Copies of historical standards or standards that ASTM does not have may be purchased from Information Handling Services, Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112; Telephone: 1-800-854-7179; Email: global@ihs.com; Web sites: http://global.ihs.com or http://www.store.ihs.com.

(A) ASTM A 47-68, Malleable Iron Castings, IBR approved for § 1910.111.

(B) ASTM A 53-69, Welded and Seamless Steel Pipe, IBR approved for § § 1910.110 and 1910.111.

(C) ASTM A 126-66, Gray Iron Casting for Valves, Flanges and Pipe Fitting, IBR approved for § 1910.111.

(D) ASTM A 391-65 (ANSI G61.1-1968), Alloy Steel Chain, IBR approved for § 1910.184.

(E) ASTM A 395-68, Ductile Iron for Use at Elevated Temperatures, IBR approved for § 1910.111.

(F) ASTM B 88-66A, Seamless Copper Water Tube, IBR approved for § 1910.252.

(G) ASTM B 88-69, Seamless Copper Water Tube, IBR approved for § 1910.110.

(H) ASTM B 117-64, Salt Spray (Fog) Test, IBR approved for § 1910.268.

(I) ASTM B 210-68, Aluminum-Alloy Drawn Seamless Tubes, IBR approved for § 1910.110.

(J) ASTM B 241-69, Standard Specifications for Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube, IBR approved for § 1910.110.

(K) ASTM D 5-65, Test for Penetration by Bituminous Materials, IBR approved for § 1910.106.

(L) ASTM D 56-70, Test for Flash Point by Tag Closed Tester, IBR approved for § 1910.106.

(M) ASTM D 56-05, Standard Test Method for Flash Point by Tag Closed Cup Tester, Approved May 1, 2005, IBR approved for Appendix B to § 1910.1200.

(N) ASTM D 86-62, Test for Distillation of Petroleum Products, IBR approved for § § 1910.106 and 1910.119.

(O) ASTM D 86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure, Approved April 1, 2007, IBR approved for Appendix B to § 1910.1200.

(O) ASTM D 88-56, Test for Saybolt Viscosity, IBR approved for § 1910.106.

(Q) ASTM D 93-71, Test for Flash Point by Pensky Martens, IBR approved for § 1910.106.

(R) ASTM D 93-08, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester, Approved Oct. 15, 2008, IBR approved for Appendix B to § 1910.1200.

(S) ASTM D 240-02 (Reapproved 2007), Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, Approved May 1, 2007, IBR approved for Appendix B to § 1910.1200.

(T) ASTM D 323-68, Standard Test Method of Test for Vapor Pressure of Petroleum Products (Reid Method), IBR approved for § 1910.106.

(U) ASTM D 445-65, Test for Viscosity of Transparent and Opaque Liquids, IBR approved for § 1910.106.

(V) ASTM D 1078-05, Standard Test Method for Distillation Range of Volatile Organic Liquids, Approved May 15, 2005, IBR approved for Appendix B to § 1910.1200.

(W) ASTM D 1692-68, Test for Flammability of Plastic Sheeting and Cellular Plastics, IBR approved for § 1910.103.

(X) ASTM D 2161-66, Conversion Tables for SUS, IBR approved for § 1910.106.

(Y) ASTM D 3278-96 (Reapproved 2004) E1, Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus, Approved November 1, 2004, IBR approved for Appendix B to § 1910.1200.

(Z) ASTM D 3828-07a, Standard Test Methods for Flash Point by Small Scale Closed Cup Tester, Approved July 15, 2007, IBR approved for Appendix B to § 1910.1200.

(AA) ASTM F-2412-2005, Standard Test Methods for Foot Protection, IBR approved for § 1910.136.

(BB) ASTM F-2413-2005, Standard Specification for Performance Requirements for Protective Footwear, IBR approved for § 1910.136.

(8) The following material is available for purchase from the American Welding Society (AWS), 550 NW, LeJeune Road, P.O. Box 351040, Miami FL 33135:

(A) [Reserved]

(B) [Reserved]

(C) AWS B3.0-41 Standard Qualification Procedure, IBR approved for §1910.67(c)(5)(i).

(D) AWS D1.0-1966 Code for Welding in Building Construction, IBR approved for §1910.27(b)(6).

(E) AWS D2.0-69 Specifications for Welding Highway and Railway Bridges, IBR approved for §1910.67(c)(5)(iv).

(F) AWS D8.4-61 Recommended Practices for Automotive Welding Design, IBR approved for §1910.67(c)(5)(ii).

(G) AWS D10.9-69 Standard Qualification of Welding Procedures and Welders for Piping and Tubing, IBR approved for §1910.67(c)(5)(iii).

(9) The following material is available for purchase from the Department of Commerce:

(A) Commercial Standard, CS 202-56 (1961) "Industrial Lifts and Hinged Loading Ramps," IBR approved for §1910.30(a)(3).

(B) Publication "Model Performance Criteria for Structural Fire Fighters' Helmets," IBR approved for §1910.156(e)(5)(i).

(10) The following material is available for purchase from the Compressed Gas Association (CGA), 1235 Jefferson Davis Highway, Arlington, VA 22202:

(A) CGA C-6 (1968) Standards for Visual Inspection of Compressed Gas Cylinders, IBR approved for §1910.101(a).

(B) CGA C-8 (1962) Standard for Requalification of ICC-3HT Cylinders, IBR approved for §1910.101(a).

(C) CGA G-1-2003 Acetylene, IBR approved for § 1910.102(a). Copies of CGA Pamphlet G-1-2003 are available for purchase from the: Compressed Gas Association, Inc., 4221 Walney Road, 5th Floor, Chantilly, VA 20151; telephone: 703-788-2700; fax: 703-961-1831; e-mail: cga@cganet.com.

(D) CGA G-7.1 (1966) Commodity Specification, IBR approved for §1910.134(d)(1).

(E) CGA G-8.1 (1964) Standard for the Installation of Nitrous Oxide Systems at Consumer Sites, IBR approved for §1910.105.

(F) CGA P-1 (1965) Safe Handling of Compressed Gases, IBR approved for §1910.101(b).

(G) CGA P-3 (1963) Specifications, Properties, and Recommendations for Packaging, Transportation, Storage and Use of Ammonium Nitrate, IBR approved for §1910.109(i)(1)(ii)(b).

(H) CGA S-1.1 (1963) and 1965 Addenda. Safety Release Device Standards--Cylinders for Compressed Gases, IBR approved for §§1910.101(c); 1910.103(c)(1)(iv)(a)(2).

(I) CGA S-1.2 (1963) Safety Release Device Standards, Cargo and Portable Tanks for Compressed Gases, IBR approved for §§1910.101(c); 1910.103(c)(1)(iv)(a)(2).

(J) CGA S-1.3 (1959) Safety Release Device Standards-Compressed Gas Storage Containers, IBR approved or §§1910.103(c)(1)(iv)(a)(2); 1910.104(b)(6)(iii); and 1910.111(d)(4)(ii)(b).

(K) CGA 1957 Standard Hose Connection Standard, IBR approved for §1910.253(e)(4)(v) and (5)(iii).

(L) CGA and RMA (Rubber Manufacturer's Association) Specification for Rubber Welding Hose (1958), IBR approved for §1910.253(e)(5)(i).

(M) CGA 1958 Regulator Connection Standard, IBR approved for §1910.253(e)(4)(iv) and (6).

(11) The following material is available for purchase from the Crane Manufacturer's Association of America, Inc. (CMAA), 1 Thomas Circle NW, Washington DC 20005:

(A) CMAA Specification 1B61, Specifications for Electric Overhead Traveling Cranes, IBR approved for §1910.179(b)(6)(i).

(B) [Reserved]

(12) The following material is available for purchase from the General Services Administration:

(A) GSA Pub. GG-B-0067b, Air Compressed for Breathing Purposes, or Interim Federal Specifications, Apr. 1965, IBR approved for §1910.134(d)(4).

(B) [Reserved]

(13) The following material is available for purchase from the Department of Health and Human Services:

(A) Publication No. 76-120 (1975), List of Personal Hearing Protectors and Attenuation Data, IBR pproved for §1910.95 App. B.

(B) [Reserved]

(14) The following material is available for purchase from the Institute of Makers of Explosives (IME), 420 Lexington Avenue, New York, NY 10017:

(A) IME Pamphlet No. 17, 1960, Safety in the Handling and Use of Explosives, IBR approved for §§1910.261(a)(4)(iii) and (c)(14)(ii).

(B) [Reserved]

(15) The following material is available for purchase from the National Electrical Manufacturer's Association (NEMA):

(A) NEMA EW-1 (1962) Requirements for Electric Arc Welding Apparatus, IBR approved for §§1910.254(b)(1).

(B) [Reserved]

(16) The following material is available for purchase from the National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269; Telephone: 800-344-3555 or 617-770-3000; Fax: 1-800-593-6372 or 1-508-895-8301; Email: custserv@nfpa.org; Web site: http://www.nfpa.org.

(A) NFPA 30 (1969) Flammable and Combustible Liquids Code, IBR approved for §1910.178(f)(1).

(B) NFPA 32-1970 Standard for Dry Cleaning Plants, IBR approved for §1910.106(j)(6)(i).

(C) NFPA 33-1969 Standard for Spray Finishing Using Flammable and Combustible Material, IBR approved for § 1910.94(c)(2).

(D) NFPA 34-1966 Standard for Dip Tanks Containing Flammable or Combustible Liquids, IBR approved for §1910.124(b)(4)(iv).

(E) NFPA 34-1995 Standard for Dip Tanks Containing Flammable or Combustible Liquids, IBR approved for §1910.124(b)(4)(ii).

(F) NFPA 35-1970 Standard for the Manufacture of Organic Coatings, IBR approved for §1910.106(j)(6)(ii).

(G) NFPA 36-1967 Standard for Solvent Extraction Plants, IBR approved for §1910.106(j)(6)(iii)

(H) NFPA 37-1970 Standard for the Installation and Use of Stationary Combustion

Engines and Gas Turbines, IBR approved for §§1910.106(j)(6)(iv) and 1910.110(b)(20)(iv)(c) and (e)(11).

(I) NFPA 51B-1962 Standard for Fire Protection in Use of Cutting and Welding Processes, IBR approved for §1910.252(a)(1) introductory text.

(J) NFPA 54-1969 Standard for the Installation of Gas Appliances and Gas Piping, IBR approved for §1910.110(b)(20)(iv)(a).

(K) NFPA 54A-1969 Standard for the Installation of Gas Piping and Gas Equipment on Industrial Premises and Certain Other Premises, IBR approved for §1910.110(b)(20)(iv)(b).

(L) NFPA 58-1969 Standard for the Storage and Handling of Liquefied Petroleum Gases (ANSI Z106.1-1970), IBR approved for §§1910.110(b)(3)(iv) and (i)(3)(i) and (ii); and 1910.178(f)(2).

(M) NFPA 59-1968 Standard for the Storage and Handling of Liquefied Petroleum Gases at Utility Gas Plants, IBR approved for §§1910.110(b)(3)(iv) and (i)(2)(iv).

(N) NFPA 62-1967 Standard for the Prevention of Dust Explosions in the Production, Packaging, and Handling of Pulverized Sugar and Cocoa, IBR approved for §1910.263(k)(2)(i).

(O) NFPA 68-1954 Guide for Explosion Venting, IBR approved for §1910.94(a)(2)(iii).

(P) [Reserved]

(Q) NFPA 78-1968 Lightning Protection Code, IBR approved for §1910.109(i)(6)(ii).

(R) NFPA 80-1968 Standard for Fire Doors and Windows, IBR approved for §1910.106(d)(4)(i).

(S) NFPA 80-1970 Standard for the Installation of Fire Doors and Windows, IBR approved for § 1910.253(f)(6)(i)(I).

(T) NFPA 86A-1969 Standard for Oven and Furnaces Design, Location and Equipment, IBR approved for §§1910.107(j)(1) and (l)(3) and 1910.108(b)(2) and (d)(2).

(U) NFPA 91-1961 Standard for the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying (ANSI Z33.1-61), IBR approved for §1910.107(d)(1).

(V) NFPA 91-1969 Standards for Blower and Exhaust Systems, IBR approved for §1910.108(b)(1).

(W) NFPA 96-1970 Standard for the Installation of Equipment for the Removal of

Smoke and Grease Laden Vapors from Commercial Cooking Equipment, IBR approved for §1910.110(b)(20)(iv)(d).

(X) NFPA 101-1970 Code for Life Safety From Fire in Buildings and Structures, IBR approved for §1910.261(a)(4)(ii).

(Y) NFPA 101-2009, Life Safety Code, 2009 edition, IBR approved for §§ 1910.34, 1910.35, 1910.36, and 1910.37.

(Z) NFPA 203M-1970 Manual on Roof Coverings, IBR approved for §1910.109(i)(1)(iii)(c).

(AA) NFPA 251-1969 Standard Methods of Fire Tests of Building Construction and Materials, IBR approved for §§1910.106(d)(3)(ii) introductory text and (d)(4)(i).

(BB) NFPA 302-1968 Fire Protection Standard for Motor-Craft (Pleasure and Commercial), IBR approved for §1910.265(d)(2)(iv) introductory text.

(CC) NFPA 385-1966 Recommended Regulatory Standard for Tank Vehicles for Flammable and Combustible Liquids, IBR approved for §1910.106(g)(1)(i)(e)(1).

(DD) NFPA 496-1967 Standard for Purged Enclosures for Electrical Equipment in Hazardous Locations, IBR approved for §1910.103(c)(1)(ix)(e)(1).

(EE) NFPA 505-1969 Standard for Type Designations, Areas of Use, Maintenance, and Operation of Powered Industrial Trucks, IBR approved for §1910.110(e)(2)(iv).

(FF) NFPA 566-1965 Standard for the Installation of Bulk Oxygen Systems at Consumer Sites, IBR approved for §§1910.253(b)(4)(iv) and (c)(2)(v).

(GG) NFPA 656-1959 Code for the Prevention of Dust Ignition in Spice Grinding Plants, IBR approved for §1910.263(k)(2)(i).

(HH) NFPA 1971-1975 Protective Clothing for Structural Fire Fighting, IBR approved for § 1910.156(e)(3)(ii) introductory text.

(II) NFPA 51A (2001) Standard for Acetylene Cylinder Charging Plants, IBR approved for § 1910.102(b) and (c). Copies of NFPA 51A-2001 are available for purchase from the: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471; telephone: 1-800-344-35557; e-mail: custserv@nfpa.org.

(JJ) NFPA 51A (2006) Standard for Acetylene Cylinder Charging Plants, IBR approved for § 1910.102(b) and (c). Copies of NFPA 51A-2006 are available for purchase from the: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471; telephone: 1-800-344-35557; e-mail: custserv@nfpa.org.

(KK) NFPA 30B, Code for the Manufacture and Storage of Aerosol Products, 2007 Edition, Approved August 17, 2006, IBR approved for Appendix B to § 1910.1200.

(17) The following material is available for purchase from the National Food Plant Institute, 1700 K St. NW., Washington, DC 20006:

(A) Definition and Test Procedures for Ammonium Nitrate Fertilizer (Nov. 1964), IBR approved for § 1910.109 Table H-22, Footnote 3.

(B) [Reserved]

(18) The following material is available for purchase from the National Institute for Occupational Safety and Health (NIOSH):

(A) Registry of Toxic Effects of Chemical Substances, 1978, IBR approved for §1910.20(c)(13)(i) and Appendix B.

(B) Development of Criteria for Fire Fighters Gloves; Vol. II, Part II; Test Methods, 1976, IBR approved for §1910.156(e)(4)(i) introductory text.

(C) NIOSH Recommendations for Occupational Safety and Health Standards (Sept. 1987), IBR approved for §1910.120 PEL definition.

(19) The following material is available for purchase from the Public Health Service:

(A) U.S. Pharmacopeia, IBR approved for §1910.134(d)(1).

(B) Publication No. 934 (1962), Food Service Sanitation Ordinance and Code, Part V of the Food Service Sanitation Manual, IBR approved for §1910.142(i)(1).

(20) The following material is available for purchase from the Society of Automotive Engineers (SAE), 485 Lexington Avenue, New York, NY 10017:

(A) SAE J185, June 1988, Recommended Practice for Access Systems for Off-Road Machines, IBR approved for §1910.266(f)(5)(i).

(B) SAE J231, January 1981, Minimum Performance Criteria for Falling Object Protective Structure (FOPS), IBR approved for §1910.266(f)(3)(ii).

(C) SAE J386, June 1985, Operator Restraint Systems for Off-Road Work Machines, IBR approved for § 1910.266(d)(3)(iv).

(D) SAE J397, April 1988, Deflection Limiting Volume-ROPS/FOPS Laboratory Evaluation, IBR approved for §1910.266(f)(3)(iv).

(E) SAE 765 (1961) SAE Recommended Practice: Crane Loading Stability Test Code, IBR approved for § 1910.180(c)(1)(iii) and (e)(2)(iii)(a).

(F) SAE J1040, April 1988, Performance Criteria for Rollover Protective Structures (ROPS) for Construction, Earthmoving, Forestry and Mining Machines, IBR approved for §1910.266(f)(3)(ii).

(21) The following material is available for purchase from the Fertilizer Institute, 1015 18th Street NW, Washington, DC 20036:

(A) Standard M-1 (1953, 1955, 1957, 1960, 1961, 1963, 1965, 1966, 1967, 1968), Superseded by ANSI K61.1-1972, IBR approved for §1910.111(b)(1)(i) and (iii).

(B) [Reserved]

(22) The following material is available for purchase from Underwriters Laboratories (UL), 207 East Ohio Street, Chicago, IL 60611:

(A) UL 58-61 Steel Underground Tanks for Flammable and Combustible Liquids, 5th Ed., IBR approved for §1910.106(b)(1)(iii)(a)(1).

(B) UL 80-63 Steel Inside Tanks for Oil-Burner Fuel, IBR approved for § 1910.106(b)(1)(iii)(a)(1).

(C) UL 142-68 Steel Above Ground Tanks for Flammable and Combustible Liquids, IBR approved for § 1910.106(b)(1)(iii)(a)(1).

(23) The following material is available for purchase from the: International Code Council, Chicago District Office, 4051 W. Flossmoor Rd., Country Club Hills, IL 60478;

(A) IFC-2009, International Fire Code, copyright 2009, IBR approved for § § 1910.34, 1910.35, 1910.36, and 1910.37.

(B) [Reserved]

(24) The following material is available for purchase from the: International Code Council, Chicago District Office, 4051 W. Flossmoor Rd., Country Club Hills, IL 60478; *telephone:* 708-799-2300, x3-3801; *facsimile:* 001-708-799-4981; *e-mail: order@iccsafe.org*.

(A) IFC-2009, International Fire Code, copyright 2009, IBR approved for § § 1910.34, 1910.35, 1910.36, and 1910.37.

(B) [Reserved]

(25)

(A) The following materials are available for purchase from the International Standards Organization (ISO) through ANSI, 25 West 43rd Street, Fourth Floor, New York, NY 10036-7417; Telephone: 212-642-4980; Fax: 212-302-1286; Email: info@ansi.org; Web site: http://www.ansi.org.

(B) Documents not available in the ANSI store may be purchased from:

(a) Document Center Inc., 111 Industrial Road, Suite 9, Belmont, 94002; Telephone: 650-591-7600; Fax: 650-591-7617; Email: center.com">info@document-center.com; Web site: www.document-center.com.

(b) DECO--Document Engineering Co., Inc., 15210 Stagg Street, Van Nuys, CA 91405; Telephone: 800-645-7732 or 818-782-1010; Fax: 818-782-2374; Email: doceng@doceng.com; Web site: www.doceng.com

(c) Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112; Telephone: 1-800-854-7179 or 303-397-7956; Fax: 303-397-2740; Email: global@ihs.com; Web sites: http://global.ihs.com or http://www.store.ihs.com;

(d) ILI Infodisk, Inc., 610 Winters Avenue, Paramus, NJ 07652; Telephone: 201-986-1131; Fax: 201-986-7886; Email: sales@ili-info.com; Web site: www.ili-info.com.

(e) Techstreet, a business of Thomson Reuters, 3916 Ranchero Drive, Ann Arbor, MI 48108; Telephone: 800-699-9277 or 734-780-8000; Fax: 734-780-2046; Email: techstreet.service@thomsonreuters.com; Web site: www.Techstreet.com.

(C) ISO 10156:1996 (E), Gases and Gas Mixtures--Determination of Fire Potential and Oxidizing Ability for the Selection of Cylinder Valve Outlets, Second Edition, Feb. 15, 1996, IBR approved for Appendix B to § 1910.1200.

(D) ISO 10156-2:2005 (E), Gas cylinders--Gases and Gas Mixtures--Part 2: Determination of Oxidizing Ability of Toxic and Corrosive Gases and Gas Mixtures, First Edition, Aug. 1, 2005, IBR approved for Appendix B to § 1910.1200.

(E) ISO 13943:2000 (E/F), Fire Safety--Vocabulary, First Edition, April, 15, 2000, IBR approved for Appendix B to § 1910.1200.

(26)

(A) The following document is available for purchase from United Nations Publications, Customer Service, c/o National Book Network, 15200 NBN Way, PO Box 190, Blue Ridge Summit, PA 17214; telephone: 1-888-254-4286; fax: 1-800-338-4550; email: unpublications@nbnbooks.com. Other distributors of United Nations Publications include:

(a) Bernan, 15200 NBN Way, Blue Ridge Summit, PA 17214; telephone: 1-800-865-3457; fax: 1-800-865-3450; email: customercare@bernan; Web site: http://www.bernan.com; and

(b) Renouf Publishing Co. Ltd., 812 Proctor Avenue, Ogdensburg, NY13669-2205; telephone: 1-888-551-7470; Fax: 1-888-551-7471; email: orders@renoufbooks.com; Web site: http://www.renoufbooks.com.

(B) UN ST/SG/AC.10/Rev.4, The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth Revised Edition, 2003, IBR approved for Appendix B to § 1910.1200.

[39 FR 23502, June 27, 1974, as amended at 49 FR 5321, Feb. 10, 1984; 61 FR 9227, March 7, 1996; 64 FR 13908, March 23, 1999; 70 FR 53929, Sept. 13, 2005; 72 FR 7190, Feb. 14, 2007; 72 FR 71068, Dec. 14, 2007; 74 FR 40447, August 11, 2009; 74 FR 46355, Sept. 9, 2009; 76 FR 33606, June 8, 2011; 76 FR 75786, Dec. 5, 2011; 77 FR 17764, March 26, 2012]

1910.7 Definition and requirements for a nationally recognized testing laboratory. CPL 2-2.49

(a) Application. This section shall apply only when the term "nationally recognized testing laboratory" is used in other sections of this part.

(b) Laboratory requirements. The term "nationally recognized testing laboratory" (NRTL) means an organization which is recognized by OSHA in accordance with Appendix A of this section and which tests for safety, and lists or labels or accepts, equipment or materials and which meets all of the following criteria:

(1) For each specified item of equipment or material to be listed, labeled or accepted, the NRTL has the capability (including proper testing equipment and facilities, trained staff, written testing procedures, and calibration and quality control programs) to perform:

(i) Testing and examining of equipment and materials for workplace safety purposes to determine conformance with appropriate test standards; or

(ii) Experimental testing and examining of equipment and materials for workplace safety purposes to determine conformance with appropriate test standards or performance in a specified manner.

(2) The NRTL shall provide, to the extent needed for the particular equipment or materials listed, labeled, or accepted, the following controls or services:

(i) Implements control procedures for identifying the listed and labeled equipment or materials;

(ii) Inspects the run of production of such items at factories for product evaluation purposes to assure conformance with the test standards; and

(iii) Conducts field inspections to monitor and to assure the proper use of its identifying mark or labels on products;

(3) The NRTL is completely independent of employers subject to the tested equipment requirements, and of any manufacturers or vendors of equipment or materials being tested for these purposes; and,

(4) The NRTL maintains effective procedures for:

(i) Producing creditable findings or reports that are objective and without bias; and

(ii) Handling complaints and disputes under a fair and reasonable system.

(c) Test standards. An "appropriate test standard" referred to in 1910.7(b)(1) (i) and (ii) is a document which specifies the safety requirements for specific equipment or class of equipment and is:

(1) Recognized in the United States as a safety standard providing an adequate level of safety, and

(2) Compatible with and maintained current with periodic revisions of applicable national codes and installation standards, and

(3) Developed by a standards developing organization under a method providing for input and consideration of views of industry groups, experts, users, consumers, governmental authorities, and others having broad experience in the safety field involved, or

(4) In lieu of paragraphs (c) (1), (2), and (3), the standard is currently designated as an American National Standards Institute (ANSI) safety-designated product standard or an American Society for Testing and Materials (ASTM) test standard used for evaluation of products or materials.

(d) Alternative test standard. If a testing laboratory desires to use a test standard other than one allowed under paragraph (c) of this section, then the Assistant Secretary of Labor shall evaluate the proposed standard to determine that it provides an adequate level of safety before it is used.

(e) Implementation. A testing organization desiring recognition by OSHA as an NRTL shall request that OSHA evaluate its testing and control programs against the requirements in this section for any equipment or material it may specify. The recognition procedure shall be conducted in accordance with Appendix A to this section. Persons desiring such recognition should contact the Federal OSHA Office, 1999 Broadway, Suite 1690, Denver, CO 80202-5716

1910.7 App A OSHA Recognition for Nationally Recognized Testing Laboratories.

Testing Laboratories

INTRODUCTION

This Appendix provides requirements and criteria which OSHA will use to evaluate and recognize a Nationally Recognized Testing Laboratory (NRTL). This process will include the evaluation of the product evaluation and control programs being operated by the NRTL, as well as the NRTL's testing facilities being used in its program. In the evaluation of the NRTLs, OSHA will use either consensus-based standards currently in use nationally, or other standards or criteria which may be considered appropriate. This Appendix implements the definition of NRTL in 29 CFR 1910.7 which sets out the criteria that a laboratory must meet to be recognized by OSHA (initially and on a continuing basis). The Appendix is broader in scope, providing procedures for renewal, expansion and revocation of OSHA recognition. Except as otherwise provided, the burden is on the applicant to establish by a preponderance of the evidence that it is entitled to recognition as an NRTL. If further detailing of these requirements and criteria will assist the NRTLs or OSHA in this activity, this detailing will be done through appropriate OSHA Program Directives.

I. Procedures for Initial OSHA Recognition

A. Applications.

1. Eligibility.a. Any testing agency or organization considering itself to meet the definition of nationally recognized testing laboratory as specified in 1910.7 may apply for OSHA recognition as an NRTL.

b. However, in determining eligibility for a foreign-based testing agency or organization OSHA shall take into consideration the policy of the foreign government regarding both the acceptance in that country of testing data, equipment acceptances, and listings, and labeling, which are provided through nationally recognized testing laboratories recognized by the Assistant Secretary, and the accessibility to government recognition or a similar system in that country by U.S.-based safety-related testing agencies, whether recognized by the assistant secretary or not, if such recognition or a similar system is required by that country.

2. Content of application.

a. The applicant shall provide sufficient information and detail demonstrating that it meets the requirements set forth in 1910.7, in order for an informed decision concerning recognition to be made by the Assistant Secretary.

b. The applicant also shall identify the scope of the NRTL-related

activity for which the applicant wishes to be recognized. This will include identifying the testing methods it will use to test or judge the specific equipment and materials for which recognition is being requested, unless such test methods are already specified in the test standard. If requested to do so by OSHA, the applicant shall provide documentation of the efficacy of these testing methods.

c. The applicant may include whatever enclosures, attachments, or exhibits the applicant deems appropriate. The application need not be submitted on a Federal form.

3. Filing office location. The application shall be filed with: NRTL Recognition Program, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC 20210.

4. Amendments and withdrawals.

a. An application may be revised by an applicant at any time prior to the completion of activity under paragraph I.B.4. of this Appendix.

b. An application may be withdrawn by an applicant, without prejudice, at any time prior to the final decision by the Assistant Secretary in paragraph I.B.7.c. of this Appendix.

B. Review and Decision Process; Issuance or Renewal.

1. Acceptance and on-site review.

a. Applications submitted by eligible testing agencies will be accepted by OSHA, and their receipt acknowledged in writing. After receipt of an application, OSHA may request additional information if it believes information relevant to the requirements for recognition has been omitted.

b. OSHA shall, as necessary, conduct an on-site review of the testing facilities of the applicant, as well as the applicants administrative and technical practices, and, if necessary, review any additional documentation underlying the application.

c. These on-site reviews will be conducted by qualified individuals technically expert in these matters, including, as appropriate, non-Federal consultants/contractors acceptable to OSHA. The protocol for each review will be based on appropriate national consensus standards or international guides, with such additions, changes, or deletions as may be considered necessary and appropriate in each case by OSHA. A written report shall be made of each on-site review and a copy shall be provided to the applicant.

2. Positive finding by staff. If, after review of the application, and additional information, and the on-site review report, the applicant appears to have met the requirements for recognition. a written recommendation shall be submitted by the responsible OSHA personnel to the Assistant Secretary that the application be approved, accompanied by a supporting explanation.

3. Negative finding by staff.

a. Notification to applicant. If, after review of the application, any additional information and the on-site review report, the applicant does not appear to have met the requirements for recognition, the responsible OSHA personnel shall notify the applicant in writing, listing the specific requirements of 1910.7 and this Appendix which the applicant has not met, and allow a reasonable period for response.

b. Revision of application.

(i) After receipt of a notification of negative finding (i.e., for intended disapproval of the application), and within the response period provided, the applicant may:

(a) Submit a revised application for further review, which could result in a positive finding by the responsible OSHA personnel pursuant to subsection I.B.2. of this Appendix; or

(b) Request that the original application be submitted to the Assistant Secretary with an attached statement of reasons, supplied by the applicant of why the application should be approved.

(ii) This procedure for applicant notification and potential revision shall be used only once during each recognition process.

4. Preliminary finding by Assistant Secretary.

a. The Assistant Secretary, or a special designee for this purpose, will make a preliminary finding as to whether the applicant has or has not met the requirements for recognition, based on the completed application file, the written staff recommendation, and the statement of reasons supplied by the applicant if there remains a staff recommendation of disapproval.

b. Notification of this preliminary finding will be sent to the applicant and subsequently published In the FEDERAL REGISTER.

c. This preliminary finding shall not be considered an official decision by the Assistant Secretary or OSHA, and does not confer any change in status or any interim or temporary recognition for the applicant.

5. Public review and comment period

a. The FEDERAL REGISTER notice of preliminary finding will provide a period of not less than 60 calendar days for written comments on the applicants fulfillment of the requirements for recognition. The application, supporting documents, staff recommendation,

statement of applicants reasons, and any comments received, will be available for public inspection in the OSHA Docket Office.

b. Any member of the public, including the applicant. may supply detailed reasons and evidence supporting or challenging the sufficiency of the applicant's having met the requirements of the definition in 29 CFR 1910.7 and this Appendix. Submission of pertinent documents and exhibits shall be made in writing by the close of the comment period.

6. Action after public comment.

a. Final decision by Assistant Secretary. Where the public review and comment record supports the Assistant Secretary's preliminary finding concerning the application, i.e., absent any serious objections or substantive claims contrary to the preliminary finding having been received in writing from the public during the comment period, the Assistant Secretary will proceed to final written decision on the application. The reasons supporting this decision shall be derived from the evidence available as a result of the full application, the supporting documentation, the staff finding, and the written comments and evidence presented during the public review and comment period.

b. Public announcement. A copy of the Assistant Secretary's final decision will be provided to the applicant. Subsequently, a notification of the final decision shall be published in the FEDERAL REGISTER. The publication date will be the effective date of the recognition.

c. Review of final decision. There will be no further review activity available within the Department of Labor from the final decision of the Assistant Secretary.

7. Action after public objection.

a. Review of negative information. At the discretion of the Assistant Secretary or his designee, OSHA may authorize Federal or contract personnel to initiate a special review of any information provided in the public comment record which appears to require resolution, before a final decision can be made.

b. Supplementation of record. The contents and results of special reviews will be made part of this record by the Assistant Secretary by either:

(i) Reopening the written comment period for public comments on these reviews; or

(ii) Convening an informal hearing to accept public comments on these reviews, conducted under applicable OSHA procedures for similar hearings.

c. Final decision by the Assistant Secretary. The Assistant Secretary shall issue a decision as to whether it has been demonstrated, based on a preponderance of the

evidence, that the applicant meets the requirements for recognition. The reasons supporting this decision shall be derived from the evidence available as a result of the full application, the supporting documentation, the staff finding, the comments and evidence presented during the public review and comment period, and written to transcribed evidence received during any subsequent reopening of the written comment period of informal public hearing held.

d. Public announcement. A copy of the Assistant Secretary's final decision will be provided to the applicant, and a notification will be published in the FEDERAL REGISTER subsequently announcing the decision.

e. Review of final decision. There will be no further review activity available within the Department of Labor from the final decision of the Assistant Secretary.

C. Terms and conditions of recognition. The following terms and conditions shall be part of every recognition:

1. Letter of recognition. The recognition by OSHA of any NRTL will be evidenced by a letter of recognition from OSHA. The letter will provide the specific details of the scope of the OSHA recognition, including the specific equipment or materials for which OSHA recognition has been granted, as well as any specific conditions imposed by OSHA.

2. Period of recognition. The recognition by OSHA of each NRTL will be valid for five years, unless terminated before the expiration of the period. The dates of the period of recognition will be stated in the recognition letter.

3. Constancy in operations. The recognized NRTL shall continue to satisfy all the requirements or limitations in the letter of recognition during the period of recognition.

4. Accurate publicity. The OSHA-recognized NRTL shall not engage in or permit others to engage in misrepresentation of the scope or conditions of its recognition.

5. Temporary Recognition of Certain NRTLs.

a. Notwithstanding all other requirements and provisions of 1910.7 and this Appendix, the following two organizations are recognized temporarily as nationally recognized testing laboratories by the Assistant Secretary for a period of
five years beginning June 13, 1988 and ending on July 13, 1993:

(i) Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, Illinois 60062.

(ii) Factory Mutual Research Corporation, 1151 Boston-Providence Turnpike, Norwood, Massachusetts 02062.

b. At the end of the five-year period, the two temporarily recognized

laboratories shall apply for renewal of OSHA recognition utilizing the following procedures established for renewal of OSHA recognition.

II. Supplementary Procedures.

A. Test standard changes. A recognized NRTL may change a testing standard or elements incorporated in the standard such as testing methods or pass-fail criteria by notifying the Assistant Secretary of the change, certifying that the revised standard will be at least as effective as the prior standard, and providing the supporting data upon which its conclusions are based. The NRTL need not inform the Assistant Secretary of minor deviations from a test standard - such as the use of new instrumentation that is more accurate or sensitive than originally called for in the standard. The NRTL also need not inform the Assistant Secretary of its adoption of revisions to third-party testing standards meeting the requirements of 1910.7(c)(4), if such revisions have been developed by the standards developing organization or of its adoption of revisions to other third-party test standards which the developing organization has submitted to OSHA. If, upon review, the Assistant Secretary or his designee determines that the proposed revised standard is not "substantially equivalent" to the previous version with regard to the level of safety obtained, OSHA will not accept the proposed testing standard by the recognized NRTL, and will initiate discontinuance of that aspect of OSHA-recognized activity by the NRTL by modification of the official letter of recognition. OSHA will publicly announce this action and the NRTL will be required to communicate this OSHA decision directly to affected manufacturers.

B. Expansion of current recognition

1. Eligibility. A recognized NRTL may apply to OSHA for an expansion of its current recognition to cover other categories
of NRTL testing in addition to those included in the current recognition.

2. Procedure.

a. The application for expansion will be acted upon and processed by OSHA in accordance with subsection I.B. of this Appendix.

b. In that process, OSHA may decide not to conduct an on-site review, where the substantive scope of the request to expand recognition is closely related to the current area of recognition.

c. The expiration date for each expansion of recognition shall coincide with the expiration date of the current
basic recognition period.

C. Renewal of OSHA recognition

1. Eligibility. A recognized NRTL may renew its recognition by filing a renewal request at the address in paragraph I.A.3. of this Appendix not less than nine months, nor more than one year, before the expiration date of its current recognition.

2. Procedure.

a. The renewal request will be processed in accordance with subsection I.B. of this Appendix.

b. In that process, OSHA may determine not to conduct the on-site reviews in I.B.1.a. where appropriate.

c. When a recognized NRTL has filed a timely and sufficient renewal request, its current recognition will not expire until a final decision has been made by OSHA on the request.

d. After the first renewal has been granted to the NRTL, the NRTL shall apply for a continuation of its recognition status every five years by submitting a renewal request. In lieu of submitting a renewal request after the initial renewal, the NRTL may certify its continuing compliance with the terms of its letter of recognition and 29 CFR 1910.7.

3. Alternative procedure. After the initial recognition and before the expiration thereof, OSHA may (for good cause) determine that there is a sufficient basis to dispense with the renewal requirement for a given laboratory and will so notify the laboratory of such a determination in writing. In lieu of submitting a renewal request, any laboratory so notified shall certify its continuing compliance with the terms of its letter of recognition and 29 CFR 1910.7.

D. Voluntary termination of recognition. At any time, a recognized NRTL may voluntarily terminate its recognition, either in its entirety or with respect to any area covered in its recognition, by giving written notice to OSHA. The written notice shall state the date as of which the termination is to take effect. The Assistant Secretary shall inform the public of any voluntary termination by FEDERAL REGISTER notice.

E. Revocation of recognition by OSHA.

1. Potential causes. If an NRTL either has failed to continue to substantially satisfy the requirements of 1910.7 or this Appendix, or has not been reasonably performing the NRTL testing requirements encompassed within its letter of recognition, or has materially misrepresented itself in its applications or misrepresented the scope or conditions of its recognition, the Assistant

Secretary may revoke the recognition of a recognized NRTL, in whole or in part. OSHA may initiate revocation procedures on the basis of information provided by any interested person.

2. Procedure.

a. Before proposing to revoke recognition, the Agency will notify the recognized NRTL in writing, giving it the opportunity to rebut or correct the alleged deficiencies which would form the basis of the proposed revocation, within a reasonable period.

b. If the alleged deficiencies are not corrected or reconciled within a reasonable period, OSHA will propose, in writing to the recognized NRTL, to revoke recognition. If deemed appropriate, no other announcement need be made by OSHA.

c. The revocation shall be effective in 60 days unless within that period the recognized NRTL corrects the deficiencies or requests a hearing in writing.

d. If a hearing is requested, it shall be held before an administrative law judge of the Department of Labor pursuant to the rules specified in 29 CFR Part 1905, Subpart C.

e. The parties shall be OSHA and the recognized NRTL. The Assistant Secretary may allow other interested persons to participate in these hearings if such participation would contribute to the resolution of issues germane to the proceeding and not cause undue delay.

f. The burden of proof shall be on OSHA to demonstrate by a preponderance of the evidence that the recognition should be revoked because the NRTL is not meeting the requirements for recognition, has not been reasonably performing the product testing functions as required by 1910.7, this Appendix A, or the letter of recognition, or has materially misrepresented itself in its applications or publicity.

3. Final decision.

a. After the hearing, the Administrative Law Judge shall issue a decision stating the reasons based on the record as to whether it has been demonstrated, based on a preponderance of evidence, that the applicant does not continue to meet the requirements for its current recognition.

b. Upon issuance of the decision, any party to the hearing may file exceptions within 20 days pursuant to 29 CFR 1905.28. If no exceptions are filed, this decision is the final decision of the Assistant Secretary. If objections are filed, the Administrative Law Judge shall forward the decision, exceptions and record to the Assistant Secretary for the final decision on the proposed revocation.

. The Assistant Secretary will review the record, the decision by the Administrative Law Judge, and the exceptions filed. Based on this, the Assistant Secretary shall issue the final decision as to whether it has been demonstrated, by a preponderance of evidence, that the

recognized NRTL has not continued to meet the requirements for OSHA recognition. If the Assistant Secretary finds that the NRTL does not meet the NRTL recognition requirements, the recognition will be revoked.

4. Public announcement. A copy of the Assistant Secretary's final decision will be provided to the applicant, and a notification will be published in the FEDERAL REGISTER announcing the decision, and the availability of the complete record of this proceeding at OSHA. The effective date of any revocation will be the date the final decision copy is sent to the NRTL.

5. Review of final decision. There will be no further review activity available within the Department of Labor from the final decision of the Assistant Secretary.

1910.9 Compliance duties owed to each employee.

(a) *Personal protective equipment*. Standards in this part requiring the employer to provide personal protective equipment (PPE), including respirators and other types of PPE, because of hazards to employees impose a separate compliance duty with respect to each employee covered by the requirement. The employer must provide PPE to each employee required to use the PPE, and each failure to provide PPE to an employee may be considered a separate violation.

(b) *Training*. Standards in this part requiring training on hazards and related matters, such as standards requiring that employees receive training or that the employer train employees, provide training to employees, or institute or implement a training program, impose a separate compliance duty with respect to each employee covered by the requirement. The employer must train each affected employee in the manner required by the standard, and each failure to train an employee may be considered a separate violation.

[53 FR 12120, Apr. 12, 1988; 53 FR 16838, May 11, 1988, as amended at 54 FR 24333, June 7, 1989] [FR 73 75583, Dec. 12, 2008]

Subpart A - General

SUBPART A -- General

Authority: Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), 6-96 (62 FR 111), 3-2000 (65 FR 50017), or 5-2007 (72 FR 31159), as applicable.

Section 1910.6 also issued under 5 U.S.C. 553. Sections 1910.6, 1910.7, and 1910.8 also issued under 29 CFR Part 1911. Section 1910.7(f) also issued under 31 U.S.C. 9701, 29 U.S.C. 9a, 5 U.S.C. 553; Pub. L. 106-113 (113 Stat. 1501A-222); and OMB Circular A-25 (dated July 8, 1993) (58 FR 38142, July 15, 1993).

[58 FR 35308, June 30, 1993; 61 FR 5507, Feb. 13, 1996; 61 FR 9227, March 7, 1996;62 FR 29668, June 2, 1997; 62 FR 42666, Aug. 8, 1997; 62 FR 65203, Dec. 11, 1997; 63 FR 13338, March 19, 1998;63 FR 17093, April 8, 1998; 64 FR 13908, March 23, 1998; 65 FR 46818 , July 31, 2000; 70 FR 53929, Sept. 13, 2005; 71 FR 38086, July 5, 2006; 72 FR 7190, Feb. 14, 2007; 72 FR 40075, July 23, 2007; 72 FR 71068, Dec. 14, 2007; 73 FR 75583, Dec. 12, 2008; 74 FR 40447, August 11, 2009; 74 FR 46355, Sept. 9, 2009; 75 FR 12685, March 17, 2010; 76 FR 10515, Feb. 25, 2011; 76 FR 33606, June 8, 2011; 76 FR 75786, Dec. 5, 2011; 77 FR 17764, March 26, 2012; 77 FR 37598, June 22, 2012]

Sections 1910.16 and 1910.19 also issued under 29 CFR part 1911.

1910.1 Purpose and scope.

(a) The Occupational Health and Safety Commission is empowered by Section 27-11-105 (a)(viii), Wyoming Statutes, to devise, formulate, adopt and amend and repeal rules and regulations governing the health and safety of employees and employers covered by the Act.

(b) The purpose and scope of these rules and regulations is:

(III) ANSI Z41-1999, American National Standard for Personal Protection -- Protective Footwear; IBR approved for § 1910.136(b)(1)(ii). Copies of ANSI Z41-1999 are available for purchase only from the National Safety Council, P.O. Box 558, Itasca, IL 60143-0558;

(JJJ) ANSI Z41-1991, American National Standard for Personal Protection -- Protective Footwear; IBR approved for § 1910.136(b)(1)(iii). Copies of ANSI Z41-1991 are available for purchase only from the National Safety Council, P.O. Box 558, Itasca, IL 60143-0558;

(KKK) [Reserved]

(LLL) [Reserved]

(MMM) ANSI Z54.1-63 Safety Standard for Non-Medical X-Ray and Sealed Gamma Ray Sources, IBR approved for §1910.252(d)(1)(vii) and (2)(ii).

(NNN) ANSI Z87.1-68 Practice of Occupational and Educational Eye and Face Protection, IBR approved for §§1910.133(b)(2); 1910.252(b)(2)(ii)(I); and 1910.261(a)(3)(xxv), (d)(1)(ii), (f)(5), (g)(10), (g)(15)(v), (g)(18)(ii), and (i)(4).

(OOO) ANSI Z87.1-89, Practice for Occupational and Educational Eye and Face Protection, IBR approved for §1910.133(b)(1).

(PPP) ANSI Z87.1-2003, American National Standard Practice for Occupational and Educational Eye and Face Protection; IBR approved for §§ 1910.133(b)(1)(i) and 1910.252(b)(2)(ii)(I)(1). Copies of ANSI Z87.1-2003 are available for purchase only from the American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018-2187; or from the International Safety Equipment Association (ISEA), 1901 North Moore Street, Arlington, VA 22209-1762;

(QQQ) ANSI Z87.1-1989 (R-1998), American National Standard Practice for Occupational and Educational Eye and Face Protection; IBR approved for § 1910.133(b) (1)(ii). Copies of ANSI Z87.1-1989 (R-1998) are available for purchase only from the American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018-2187;

(RRR) ANSI Z87.1-1989, American National Standard Practice for Occupational and Educational Eye and Face Protection; IBR approved for § 1910.133(b)(1)(iii). Copies of ANSI Z87.1-1989 are available for purchase only from the American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018-2187;

(SSS) ANSI Z88.2-1969, Practices for Respiratory Protection; IBR approved for §§ 1910.94(c)(6)(iii)(a), 1910.134(c); and 1910.261(a)(3)(xxvi), (b)(2), (f)(5), (g)(15)(v), (h)(2)(iii), (h)(2)(iv), and (i)(4).

(TTT) ~~ANSI Z89.1-2003, American National Standard for Industrial Head Protection;~~

~~IBR approved for § 1910.135(b)(1)(i). Copies of ANSI Z89.1-2003 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762;~~ American National Standards Institute (ANSI) Z89.1-2009, American National Standard for Industrial Head Protection, approved January 26, 2009; IBR approved for Sec. 1910.135(b)(1)(i). Copies of ANSI Z89.1-2009 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetyequipment.org.

(UUU) ~~ANSI Z89.1-1997, American National Standard for Industrial Head Protection; IBR approved for § 1910.135(b)(1)(ii). Copies of ANSI Z89.1-1997 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762;~~ American National Standards Institute (ANSI) Z89.1-2003, American National Standard for Industrial Head Protection; IBR approved for Sec. 1910.135(b)(1)(ii). Copies of ANSI Z89.1-2003 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetyequipment.org.

(VVV) ~~ANSI Z89.1-1986, American National Standard for Personnel Protection -- Protective Headwear for Industrial Workers -- Requirements; IBR approved for § 1910.135(b)(1)(iii).~~ American National Standards Institute (ANSI) Z89.1-1997, American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements; IBR approved for Sec. 1910.135(b)(1)(iii). Copies of ANSI Z89.1-1997 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetyequipment.org.

(WWW) ANSI Z41.1-1967 Men's Safety Toe Footwear; IBR approved for § 1910.261(i)(4).

(XXX) ANSI Z87.1-1968 Practice of Occupational and Educational Eye and Face Protection; IBR approved for § 1910.261(a)(3)(xxv), (d)(1)(ii), (f)(5), (g)(1), (g)(15)(v), (g)(18)(ii), and (i)(4).

(YYY) ANSI Z89.1-1969 Safety Requirements for Industrial Head Protection; IBR approved for § 1910.261(a)(3)(xxvii), (b)(2), (g)(15)(v), and (i)(4).

(ZZZ) ANSI Z89.2-1971 Safety Requirements for Industrial Protective Helmets for Electrical Workers, Class B; IBR approved for § 1910.268(i)(1).

(5) The following material is available for purchase from the American Petroleum Institute (API), 1220 L Street NW, Washington DC 20005:

(A) [Reserved]

Subpart I - Personal Protective Equipment

SUBPART I -- Personal Protective Equipment

AUTHORITY: Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, and 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), 6-96 (62 FR 111), 3-2000 (65 FR 50017), 5-2002 (67 FR 65008), 5-2007 (72 FR 31160), or 4-2010 (75 FR 55355), as applicable, and 29 CFR Part 1911.

Sections 1910.132, 1910.134, and 1910.138 of 29 CFR also issued under 29 CFR 1911.
Sections 1910.133, 1910.135, and 1910.136 of 29 CFR also issued under 29 CFR 1911 and 5 U.S.C. 553.

[58 FR 35309, June 30, 1993; 59 FR 4435, Jan. 31, 1994; 59 FR 16360, April 6, 1994; 61 FR 9227, March 7, 1996; 61 FR 19547, May 2, 1996; 64 FR 1152, Jan. 8, 1998; 68 FR 75780, Dec. 31, 2003; 69 FR 46993, August 4, 2004; 71 FR 16672, April 3, 2006; 71 FR 50187, August 24, 2006; 72 FR 64428, Nov. 15, 2007; 73 FR 75584, Dec. 12, 2008; 74 FR 46356, Sept. 9, 2009; 76 FR 33606, June 8, 2011; 77 FR 46949, Aug. 7, 2012]

1910.132 General requirements.

(a) Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact. STD 1-1.13 STD 1-6.1 STEP

(b) Employee-owned equipment. Where employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including proper maintenance, and

sanitation of such equipment.

(c) Design. All personal protective equipment shall be of safe design and construction for the work to be performed.

(d) Hazard assessment and equipment selection.

(1) The employer shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, the employer shall:

(i) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;

(ii) Communicate selection decisions to each affected employee; and,

(iii) Select PPE that properly fits each affected employee.

Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

(2) The employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

(e) Defective and damaged equipment. Defective or damaged personal protective equipment shall not be used.

(f) Training.

(1) The employer shall provide training to each employee who is required by this section to use PPE. Each such employee shall be trained to know at least the following:

(i) When PPE is necessary;

(ii) What PPE is necessary;

(iii) How to properly don, doff, adjust, and wear PPE;

(iv) The limitations of the PPE; and,

(v) The proper care, maintenance, useful life and disposal of the PPE.

(2) Each affected employee shall demonstrate an understanding of the training specified in paragraph (f)(1) of this section, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

(3) When the employer has reason to believe that any affected employee who has already been trained does not have the understanding and skill required by paragraph (f)(2) of this section, the employer shall retrain each such employee. Circumstances where retraining is required include, but are not limited to, situations where:

(i) Changes in the workplace render previous training obsolete; or

(ii) Changes in the types of PPE to be used render previous training obsolete; or

(iii) Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill.

(g) Paragraphs (d) and (f) of this section apply only to 1910.133, 1910.135, 1910.136, and 1910.138. Paragraphs (d) and (f) of this section do not apply to 1910.134 and 1910.137.

(h) Payment for protective equipment.

(1) Except as provided by paragraphs (h)(2) through (h)(6) of this section, the protective equipment, including personal protective equipment (PPE), used to comply with this part, shall be provided by the employer at no cost to employees.

(2) The employer is not required to pay for non-specialty safety-toe protective footwear (including steel-toe shoes or steel-toe boots) and non-specialty prescription safety eyewear, provided that the employer permits such items to be worn off the job-site.

(3) When the employer provides metatarsal guards and allows the employee, at his or her request, to use shoes or boots with built-in metatarsal protection, the employer is not required to reimburse the employee for the shoes or boots.

(4) The employer is not required to pay for:

(i) The logging boots required by 29 CFR 1910.266(d)(1)(v);

(ii) Everyday clothing, such as long-sleeve shirts, long pants, street shoes, and normal work boots; or

(iii) Ordinary clothing, skin creams, or other items, used solely for

protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen.

(5) The employer must pay for replacement PPE, except when the employee has lost or intentionally damaged the PPE.

(6) Where an employee provides adequate protective equipment he or she owns pursuant to paragraph (b) of this section, the employer may allow the employee to use it and is not required to reimburse the employee for that equipment. The employer shall not require an employee to provide or pay for his or her own PPE, unless the PPE is excepted by paragraphs (h)(2) through (h)(5) of this section.

(7) This paragraph (h) shall become effective on February 13, 2008. Employers must implement the PPE payment requirements no later than May 15, 2008.

Note to Sec. 1910.132(h): When the provisions of another OSHA standard specify whether or not the employer must pay for specific equipment, the payment provisions of that standard shall prevail.

1910.133 Eye and face protection.

(a) General requirements.

(1) The employer shall ensure that each affected employee uses appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

(2) The employer shall ensure that each affected employee uses eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors (e.g. clip-on or slide-on side shields) meeting the pertinent requirements of this section are acceptable.

(3) The employer shall ensure that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards wears eye protection that incorporates the prescription in its design, or wears eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.

(4) Eye and face PPE shall be distinctly marked to facilitate identification of the manufacturer.

(5) The employer shall ensure that each affected employee uses equipment with filter lenses that have a shade number appropriate for the work being performed for protection from injurious light radiation. The following is a listing of appropriate shade numbers for various

operations.

Filter Lenses for Protection Against Radiant Energy

Operations	Electrode Size 1/32 in.	Arc Current	Minimum(*) Protective Shade
Shielded metal arc welding	Less than 3	Less than 60 ...	7
	3-5	60-160	8
	5-8	160-250	10
	More than 8	250-550	11
Gas metal arc welding and flux cored arc welding		less than 60 ...	7
		60-160	10
		160-250	10
		250-500	10
Gas Tungsten arc welding		less than 50 ...	8
		50-150	8
		150-500	10
Air carbon Arc cutting	(Light)	less than 500 ..	10
	(Heavy)	500-1000	11
Plasma arc welding		less than 20 ...	6
		20-100	8
		100-400	10
		400-800	11
Plasma arc cutting	(light)(**)	less than 300 ..	8
	(medium)(**)	300-400	9
	(heavy)(**)	400-800	10
Torch brazing		.....	3
Torch soldering		.....	2
Carbon arc welding		.....	14

Filter Lenses for Protection Against Radiant Energy

Operations	Plate thickness-inches	Plate thickness-mm	Minimum(*) Protective Shade
Gas Welding:			
Light	Under 1/8	Under 3.2	4
Medium	1/8 to 1/2	3.2 to 12.7	5
Heavy	Over 1/2	Over 12.7	6
Oxygen cutting:			
Light	Under 1	Under 25	3
Medium	1 to 6	25 to 150	4
Heavy	Over 6	Over 150	5

Footnote(*) As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation.

Footnote(**) These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

(b) Criteria for protective eye and face devices.

(1) Protective eye and face protection devices must comply with any of the following consensus standards:

(i) ANSI Z87.1-2003, "American National Standard Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference in Sec. 1910.6;

(ii) ANSI Z87.1-1989 (R-1998), "American National Standard Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference in Sec. 1910.6; or

(iii) ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference in Sec. 1910.6.

(2) Protective eye and face protection devices that the employer demonstrates are at least as effective as protective eye and face protection devices that are constructed in accordance with one of the above consensus standards will be deemed to be in compliance with the requirements of this section.

1910.134 Respiratory Protection. This section applies to General Industry (part 1910), Shipyards (part 1915), Marine Terminals (part 1917), Long shoring (part 1918), and Construction (part 1926).

(a) Permissible practice.

(1) In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.

(2) Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program, which shall include the requirements outlined in paragraph (c) of this section. The program shall cover each employee required by this section to use a respirator.

(b) Definitions. The following definitions are important terms used in the respiratory protection standard in this section.

"**Air-purifying respirator**" means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

"**Assigned protection factor (APF)**"means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section.

"**Atmosphere-supplying respirator**" means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

"**Canister or cartridge**" means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

"**Demand respirator**" means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

"**Emergency situation**" means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

"**Employee exposure**" means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

"**End-of-service-life indicator (ESLI)**" means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

"**Escape-only respirator**" means a respirator intended to be used only for emergency exit.

"**Filter or air purifying element**" means a component used in respirators to remove solid or liquid aerosols from the inspired air.

"**Filtering facepiece (dust mask**)" means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

"**Fit factor**" means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

"**Fit test**" means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

"**Helmet**" means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

"**High efficiency particulate air (HEPA) filter**" means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

"**Hood**" means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

"**Immediately dangerous to life or health (IDLH)**" means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

"**Interior structural firefighting**" means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR 1910.155)

"**Loose-fitting facepiece**" means a respiratory inlet covering that is designed to form a partial seal with the face.

"**Maximum use concentration (MUC)**" means the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

"**Negative pressure respirator (tight fitting)**" means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

"**Oxygen deficient atmosphere means**" an atmosphere with an oxygen content below 19.5% by volume.

"**Physician or other licensed health care professional (PLHCP)**" means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

"**Positive pressure respirator**" means a respirator in which the pressure inside the

respiratory inlet covering exceeds the ambient air pressure outside the respirator.

"**Powered air-purifying respirator (PAPR)**" means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

"**Pressure demand respirator**" means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

"**Qualitative fit test (QLFT)**" means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

"**Quantitative fit test (QNFT)**" means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

"**Respiratory inlet covering**" means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

"**Self-contained breathing apparatus (SCBA)**" means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

"**Service life means**" the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

"**Supplied-air respirator (SAR) or airline respirator**" means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

"**This section**" means this respiratory protection standard.

"**Tight-fitting facepiece**" means a respiratory inlet covering that forms a complete seal with the face.

"**User seal check**" means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

(c) Respiratory protection program. This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. The Small Entity Compliance Guide contains criteria for the selection of a program administrator and a sample program that meets the requirements of this paragraph. Copies of the Small Entity Compliance Guide will be available on or about April 8, 1998 from the Occupational Safety and Health Administration's Office of Publications, Room N 3101, 200 Constitution Avenue, NW, Washington, DC, 20210 (202-219-4667).

(1) In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

(i) Procedures for selecting respirators for use in the workplace;

(ii) Medical evaluations of employees required to use respirators;

(iii) Fit testing procedures for tight-fitting respirators;

(iv) Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

(v) Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

(vi) Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

(vii) Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

(viii) Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

(ix) Procedures for regularly evaluating the effectiveness of the program.

(2) Where respirator use is not required:

(i) An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer shall provide the respirator users with the information contained in Appendix D to this section ("Information for Employees Using Respirators When Not Required Under the Standard"); and

(ii) In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

(3) The employer shall designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

(4) The employer shall provide respirators, training, and medical evaluations at no cost to the employee.

(d) Selection of respirators. This paragraph requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The paragraph also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

(1) General requirements.

(i) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

(ii) The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

(iii) The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

(iv) The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

(2) Respirators for IDLH atmospheres.

(i) The employer shall provide the following respirators for employee use in IDLH atmospheres:

(A) A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

(B) A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

(ii) Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

(iii) All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be

maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

(3) Respirators for atmospheres that are not IDLH.

(i) The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

(A) Assigned Protection Factors (APFs) Employers must use the assigned protection factors listed in Table 1 to select a respirator that meets or exceeds the required level of employee protection. When using a combination respirator (e.g., airline respirators with an air-purifying filter), employers must ensure that the assigned protection factor is appropriate to the mode of operation in which the respirator is being used.

Table 1. -- Assigned Protection Factors[5]

Type of respirator[1], [2]	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	[3]10	50	.....	.....
2. Powered Air-Purifying Respirator (PAPR)	.....	50	1,000	[4]25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	.....	10	50	.....	.....
• Continuous flow mode	.....	50	1,000	[4]25/1,000	25
• Pressure-demand or other positive-pressure mode	.....	50	1,000	.....	.....
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	.....	10	50	50	.....
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	.....	10,000	10,000	.....

Notes:

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be

treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

(B) Maximum Use Concentration (MUC)

(1) The employer must select a respirator for employee use that maintains the employee's exposure to the hazardous substance, when measured outside the respirator, at or below the MUC.

(2) Employers must not apply MUCs to conditions that are immediately dangerous to life or health (IDLH); instead, they must use respirators listed for IDLH conditions in paragraph (d)(2) of this standard.

(3) When the calculated MUC exceeds the IDLH level for a hazardous substance, or the performance limits of the cartridge or canister, then employers must set the maximum MUC at that lower limit.

(ii) The respirator selected shall be appropriate for the chemical state and physical form of the contaminant.

(iii) For protection against gases and vapors, the employer shall provide:

(A) An atmosphere-supplying respirator, or

(B) An air-purifying respirator, provided that:

(1) The respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or

(2) If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

(iv) For protection against particulates, the employer shall provide:

(A) An atmosphere-supplying respirator; or

(B) An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

(C) For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

TABLE I. -- Assigned Protection Factors [Reserved]

TABLE II

Altitude (ft.)	Oxygen deficient Atmospheres (% 0_2) for which the employer atmosphere-may rely on supplying respirators
Less than 3,0013,001-4,0004,001-5,0005,001-6,0006,001-7,0007,001-8,000[1]	16.0-19.516.4-19.517.1-19.517.8-19.518.5-19.519.3-19.5

[1]Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

(e) Medical evaluation. Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

(1) General. The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

(2) Medical evaluation procedures.

(i) The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

(ii) The medical evaluation shall obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of this section.

(3) Follow-up medical examination.

(i) The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.

(ii) The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

(4) Administration of the medical questionnaire and examinations.

(i) The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

(ii) The employer shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

(5) Supplemental information for the PLHCP.

(i) The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

(A) The type and weight of the respirator to be used by the employee;

(B) The duration and frequency of respirator use (including use for rescue and escape);

(C) The expected physical work effort;

(D) Additional protective clothing and equipment to be worn; and

(E) Temperature and humidity extremes that may be encountered.

(ii) Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

(iii) The employer shall provide the PLHCP with a copy of the written respiratory protection program and a copy of this section.

Note to Paragraph (e)(5)(iii): When the employer replaces a PLHCP, the employer must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically reevaluated solely because a new PLHCP has been selected.

(6) Medical determination. In determining the employee's ability to use a respirator, the employer shall:

(i) Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

(A) Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;

(B) The need, if any, for follow-up medical evaluations; and

(C) A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

(ii) If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

(7) Additional medical evaluations. At a minimum, the employer shall provide additional medical evaluations that comply with the requirements of this section if:

(i) An employee reports medical signs or symptoms that are related to ability to use a respirator;

(ii) A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;

(iii) Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or

(iv) A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

(f) Fit testing. This paragraph requires that, before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This paragraph specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

(1) The employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.

(2) The employer shall ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

(3) The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

(4) If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

(5) The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of this section.

(6) QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.

(7) If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

(8) Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

(i) Qualitative fit testing of these respirators shall be accomplished by

temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.

(ii) Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

(iii) Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

(g) Use of respirators. This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

(1) Facepiece seal protection.

(i) The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

(A) Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(B) Any condition that interferes with the face-to-facepiece seal or valve function.

(ii) If an employee wears corrective glasses or goggles or other personal protective equipment, the employer shall ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

(iii) For all tight-fitting respirators, the employer shall ensure that employees perform a user seal check each time they put on the respirator using the procedures in Appendix B-1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in Appendix B-1 of this section.

(2) Continuing respirator effectiveness.

(i) Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

(ii) The employer shall ensure that employees leave the respirator use area:

(A) To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or

(B) If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or

(C) To replace the respirator or the filter, cartridge, or canister elements.

(iii) If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

(3) Procedures for IDLH atmospheres. For all IDLH atmospheres, the employer shall ensure that:

(i) One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

(ii) Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

(iii) The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

(iv) The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

(v) The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;

(vi) Employee(s) located outside the IDLH atmospheres are equipped with:

(A) Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either

(B) Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or

(C) Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

(4) Procedures for interior structural firefighting. In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, the employer shall ensure that:

(i) At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;

(ii) At least two employees are located outside the IDLH atmosphere; and

(iii) All employees engaged in interior structural firefighting use SCBAs.

Note 1 to paragraph (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

Note 2 to paragraph (g): Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

(h) Maintenance and care of respirators. This paragraph requires the employer to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

(1) Cleaning and disinfecting. The employer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer shall ensure that respirators are cleaned and disinfected using the procedures in Appendix B-2 of this section, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

(i) Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

(ii) Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;

(iii) Respirators maintained for emergency use shall be cleaned and disinfected after each use; and

(iv) Respirators used in fit testing and training shall be cleaned and disinfected after each use.

(2) Storage. The employer shall ensure that respirators are stored as follows:

(i) All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

(ii) In addition to the requirements of paragraph (h)(2)(i) of this section, emergency respirators shall be:

(A) Kept accessible to the work area;

(B) Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

(C) Stored in accordance with any applicable manufacturer instructions.

(3) Inspection.

(i) The employer shall ensure that respirators are inspected as follows:

(A) All respirators used in routine situations shall be inspected before each use and during cleaning;

(B) All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and

(C) Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

(ii) The employer shall ensure that respirator inspections include the following:

(A) A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

(B) A check of elastomeric parts for pliability and signs of deterioration.

(iii) In addition to the requirements of paragraphs (h)(3)(i) and (ii) of this section, self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The employer shall determine that the regulator and warning devices function properly.

(iv) For respirators maintained for emergency use, the employer shall:

(A) Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and

(B) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

(4) Repairs. The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

(i) Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;

(ii) Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

(iii) Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

(i) Breathing air quality and use. This paragraph requires the employer to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

(1) The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

(i) Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

(ii) Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

(A) Oxygen content (v/v) of 19.5-23.5%;

(B) Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

(C) Carbon monoxide (CO) content of 10 ppm or less;

(D) Carbon dioxide content of 1,000 ppm or less; and

(E) Lack of noticeable odor.

(2) The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

(3) The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

(4) The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(i) Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 180);

(ii) Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

(iii) The moisture content in the cylinder does not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

(5) The employer shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

(i) Prevent entry of contaminated air into the air-supply system;

(ii) Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;

(iii) Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

(iv) Have a tag containing the most recent change date and the signature of the

person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

(6) For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

(7) For oil-lubricated compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

(8) The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

(9) The employer shall use only the respirator manufacturer's NIOSH-approved breathing-gas containers, marked and maintained in accordance with the Quality Assurance provisions of the NIOSH approval for the SCBA as issued in accordance with the NIOSH respirator-certification standard at 42 CFR part 84.

(j) Identification of filters, cartridges, and canisters. The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

(k) Training and information. This paragraph requires the employer to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary. This paragraph also requires the employer to provide the basic information on respirators in Appendix D of this section to employees who wear respirators when not required by this section or by the employer to do so.

(1) The employer shall ensure that each employee can demonstrate knowledge of at least the following:

(i) Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

(ii) What the limitations and capabilities of the respirator are;

(iii) How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

(iv) How to inspect, put on and remove, use, and check the seals of the respirator;

(v) What the procedures are for maintenance and storage of the respirator;

(vi) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

(vii) The general requirements of this section.

(2) The training shall be conducted in a manner that is understandable to the employee.

(3) The employer shall provide the training prior to requiring the employee to use a respirator in the workplace.

(4) An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.

(5) Retraining shall be administered annually, and when the following situations occur:

(i) Changes in the workplace or the type of respirator render previous training obsolete;

(ii) Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or

(iii) Any other situation arises in which retraining appears necessary to ensure safe respirator use.

(6) The basic advisory information on respirators, as presented in Appendix D of this section, shall be provided by the employer in any written or oral format, to employees who wear respirators when such use is not required by this section or by the employer.

(l) Program evaluation. This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(1) The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(2) The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

(i) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(ii) Appropriate respirator selection for the hazards to which the employee is exposed;

(iii) Proper respirator use under the workplace conditions the employee encounters; and

(iv) Proper respirator maintenance.

(m) Recordkeeping. This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

(1) Medical evaluation. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

(2) Fit testing.

(i) The employer shall establish a record of the qualitative and quantitative fit tests administered to an employee including:

(A) The name or identification of the employee tested;

(B) Type of fit test performed;

(C) Specific make, model, style, and size of respirator tested;

(D) Date of test; and

(E) The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

(ii) Fit test records shall be retained for respirator users until the next fit test is administered.

(3) A written copy of the current respirator program shall be retained by the employer.

(4) Written materials required to be retained under this paragraph shall be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.

(n) Effective date. Paragraphs (d)(3)(i)(A) and (d)(3)(i)(B) of this section become effective November 22, 2006.

(o) Appendices.

Compliance with Appendix A, Appendix B-1, Appendix B-2, Appendix C, and Appendix D of this section are mandatory.

Appendix A to Sec. 1910.134: Fit Testing Procedures (Mandatory)

Part I. OSHA-Accepted Fit Test Protocols

A. Fit Testing Procedures -- General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If

the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

(a) Position of the mask on the nose

(b) Room for eye protection

(c) Room to talk

(d) Position of mask on face and cheeks

7. The following criteria shall be used to help determine the adequacy of the respirator fit:

(a) Chin properly placed;

(b) Adequate strap tension, not overly tightened;

(c) Fit across nose bridge;

(d) Respirator of proper size to span distance from nose to chin;

(e) Tendency of respirator to slip;

(f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises. (a) Employers must perform the following test exercises for all fit testing methods prescribed in this appendix, except for the CNP quantitative fit testing protocol and the CNP REDON quantitative fit testing protocol. For these two protocols, employers must ensure that the test subjects (***i.e.***, employees) perform the exercise procedure specified in Part I.C.4(b) of this appendix for the CNP quantitative fit testing protocol, or the exercise procedure described in Part I.C.5(b) of this appendix for the CNP REDON quantitative fit-testing protocol. For the remaining fit testing methods, employers must ensure that employees perform the test exercises in the appropriate test environment in the following manner:

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.

(8) Normal breathing. Same as exercise (1).

(b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

(a) Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

(1) Three 1 liter glass jars with metal lids are required.

(2) Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C (77 deg. F) shall be used for the solutions.

(3) The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.

(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.

(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.

(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two

seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(b) Isoamyl Acetate Fit Test

(1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(9) If the subject passes the test, the efficiency of the test procedure shall be

demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

(2) The test enclosure shall have a 3/4-inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet

taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Saccharin solution aerosol fit test procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure described in 3. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.

(6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.

(11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

(12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. BitrexTM (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The BitrexTM (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste Threshold Screening. The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts #14 and #15 combined, is adequate.

(2) The test enclosure shall have a \3/4\ inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

(7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste

during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

(11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

(14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Bitrex Solution Aerosol Fit Test Procedure.

(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure as that described in 4. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.

(6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex..

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit

test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

(11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

(a) General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

(b) Sensitivity Screening Check. The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

(c) Irritant Smoke Fit Test Procedure

(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

(2) The test subject shall be instructed to keep his/her eyes closed.

(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.

(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

(5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

(7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

(8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

1. General

(a) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit Testing Protocol

(a) Apparatus.

(1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.

(2) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

(3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.

(4) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

(5) The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.

(6) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least 1/4 inch.

(7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.

(8) The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.

(9) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

(10) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

(11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate or P100 series filter) before release.

(12) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(13) The limitations of instrument detection shall be taken into account when

determining the fit factor.

(14) Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

(b) Procedural Requirements.

(1) When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.

(2) The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

(3) A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.

(4) Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.

(5) A stable test agent concentration shall be obtained prior to the actual start of testing.

(6) Respirator restraining straps shall not be over-tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.

(7) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested.

(8) Calculation of fit factors.

(i) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

(ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

(iii) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

(A) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that

calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(B) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(C) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

(D) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation:

$$\text{Overall Fit Factor} = \frac{\text{Number of exercises}}{1/ff_1 + 1/ff_2 + 1/ff_3 + 1/ff_4 + 1/ff_5 + 1/ff_6 + 1/ff_7 + 1/ff_8}$$

Where ff1, ff2, ff3, etc. are the fit factors for exercises 1, 2, 3, etc.

(9) The test subject shall not be permitted to wear a half mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator unless a minimum fit factor of 500 is obtained.

(10) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount TM) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Portacount Fit Test Requirements.

(1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of

preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.

(3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.

(5) Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

(6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

(7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

(b) Portacount Test Instrument.

(1) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

(2) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

(3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Controlled negative pressure (CNP) quantitative fit testing protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a

method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Occupational Health Dynamics of Birmingham, Alabama also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) CNP Fit Test Requirements.

(1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.

(2) The CNP system defaults selected for test pressure shall be set at -- 1.5 mm of water (-0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests (Note: CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow inter-test comparison of the respirator fit.)

(3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.

(4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.

(5) The employer must train the test subject to hold his or her breath for at least 10 seconds.

(6) The test subject must don the test respirator without any assistance from the test administrator who is conducting the CNP fit test. The respirator must not be adjusted once the fit-test exercises begin. Any adjustment voids the test, and the test subject must repeat the fit test.

(7) The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.

(b) CNP Test Exercises.

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.

(4) Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(6) Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.

(7) Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(8) Normal Breathing. The test subject shall remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.

(c) CNP Test Instrument.

(1) The test instrument must have an effective audio-warning device, or a visual-warning device in the form of a screen tracing, that indicates when the test subject fails to hold his or her breath during the test. The test must be terminated and restarted from the beginning when the test subject fails to hold his or her breath during the test. The test subject then may be refitted and retested.

(2) A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

5. Controlled negative pressure (CNP) REDON quantitative fit testing protocol.

(a) When administering this protocol to test subjects, employers must comply with the requirements specified in paragraphs (a) and (c) of Part I.C.4 of this appendix ("Controlled negative pressure (CNP) quantitative fit testing protocol"), as well as use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in paragraph (b) of Part I.C.4 of this appendix.

(b) Employers must ensure that each test subject being fit tested using this protocol follows the exercise and measurement procedures, including the order of administration, described below in Table A-1 of this appendix.

Table A-1. -- CNP REDON Quantitative Fit Testing Protocol

Exercises[1]	Exercise procedure	Measurement procedure
Facing Forward	Stand and breathe normally, without talking, for 30 seconds.	Face forward, while holding breath for 10 seconds.
Bending Over	Bend at the waist, as if going to touch his or her toes, for 30 seconds.	Face parallel to the floor, while holding breath for 10 seconds
Head Shaking	For about three seconds, shake head back and forth vigorously several times while shouting.	Face forward, while holding breath for 10 seconds.
REDON 1	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask.	Face forward, while holding breath for 10 seconds.
REDON 2	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask again.	Face forward, while holding breath for 10 seconds.

[1] Exercises are listed in the order in which they are to be administered.

(c) After completing the test exercises, the test administrator must question each test subject regarding the comfort of the respirator. When a test subject states that the respirator is unacceptable, the employer must ensure that the test administrator repeats the protocol using another respirator model.

(d) Employers must determine the overall fit factor for each test subject by calculating the harmonic mean of the fit testing exercises as

$$\text{Overall Fit Factor} = \frac{N}{\left[1/FF_1 + 1/FF_2 + \ldots\ 1/FF_N\right]}$$

follows: Where:N = The number of exercises;FF1 = The fit factor for the first exercise;FF2 = The fit factor for the second exercise; andFFN = The fit factor for the nth exercise.

Part II. New Fit Test Protocols

A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or

2. An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

Appendix B-1 to Sec. 1910.134: User Seal Check Procedures (Mandatory)

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and/or Negative Pressure Checks

A. Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by

covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

Appendix B-2 to Sec. 1910.134: Respirator Cleaning Procedures (Mandatory)

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed here in Appendix B-2. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in Appendix B-2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

I. Procedures for Cleaning Respirators

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43 deg. C [110 deg. F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F); or,

2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F); or,

3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum),

preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

Appendix C to Sec. 1910.134: OSHA Respirator Medical Evaluation Questionnaire (Mandatory)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date:_____

2. Your name:_____

3. Your age (to nearest year):_____

4. Sex (circle one): Male/Female

5. Your height: _____ ft. _____ in.

6. Your weight: _____ lbs.

7. Your job title:_____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____

9. The best time to phone you at this number: _____

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No

11. Check the type of respirator you will use (you can check more than one category):
a. _____ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
b. _____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes/No

If "yes," what type(s):_____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you ever had any of the following conditions?

a. Seizures: Yes/No

b. Diabetes (sugar disease): Yes/No

c. Allergic reactions that interfere with your breathing: Yes/No

d. Claustrophobia (fear of closed-in places): Yes/No

e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?

a. Asbestosis: Yes/No

b. Asthma: Yes/No

c. Chronic bronchitis: Yes/No

d. Emphysema: Yes/No

e. Pneumonia: Yes/No

f. Tuberculosis: Yes/No

g. Silicosis: Yes/No

h. Pneumothorax (collapsed lung): Yes/No

i. Lung cancer: Yes/No

j. Broken ribs: Yes/No

k. Any chest injuries or surgeries: Yes/No

l. Any other lung problem that you've been told about: Yes/No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?

a. Shortness of breath: Yes/No

b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No

c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No

d. Have to stop for breath when walking at your own pace on level ground: Yes/No

e. Shortness of breath when washing or dressing yourself: Yes/No

f. Shortness of breath that interferes with your job: Yes/No

g. Coughing that produces phlegm (thick sputum): Yes/No

h. Coughing that wakes you early in the morning: Yes/No

i. Coughing that occurs mostly when you are lying down: Yes/No

j. Coughing up blood in the last month: Yes/No

k. Wheezing: Yes/No

l. Wheezing that interferes with your job: Yes/No

m. Chest pain when you breathe deeply: Yes/No

n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you ever had any of the following cardiovascular or heart problems?

a. Heart attack: Yes/No

b. Stroke: Yes/No

c. Angina: Yes/No

d. Heart failure: Yes/No

e. Swelling in your legs or feet (not caused by walking): Yes/No

f. Heart arrhythmia (heart beating irregularly): Yes/No

g. High blood pressure: Yes/No

h. Any other heart problem that you've been told about: Yes/No

6. Have you ever had any of the following cardiovascular or heart symptoms?

a. Frequent pain or tightness in your chest: Yes/No

b. Pain or tightness in your chest during physical activity: Yes/No

c. Pain or tightness in your chest that interferes with your job: Yes/No

d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No

e. Heartburn or indigestion that is not related to eating: Yes/ No

f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you currently take medication for any of the following problems?

a. Breathing or lung problems: Yes/No

b. Heart trouble: Yes/No

c. Blood pressure: Yes/No

d. Seizures (fits): Yes/No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)

a. Eye irritation: Yes/No

b. Skin allergies or rashes: Yes/No

c. Anxiety: Yes/No

d. General weakness or fatigue: Yes/No

e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): Yes/No

11. Do you currently have any of the following vision problems?

a. Wear contact lenses: Yes/No

b. Wear glasses: Yes/No

c. Color blind: Yes/No

d. Any other eye or vision problem: Yes/No

12. Have you ever had an injury to your ears, including a broken ear drum: Yes/No

13. Do you currently have any of the following hearing problems?

a. Difficulty hearing: Yes/No

b. Wear a hearing aid: Yes/No

c. Any other hearing or ear problem: Yes/No

14. Have you ever had a back injury: Yes/No

15. Do you currently have any of the following musculoskeletal problems?

a. Weakness in any of your arms, hands, legs, or feet: Yes/No

b. Back pain: Yes/No

c. Difficulty fully moving your arms and legs: Yes/No

d. Pain or stiffness when you lean forward or backward at the waist: Yes/No

e. Difficulty fully moving your head up or down: Yes/No

f. Difficulty fully moving your head side to side: Yes/No

g. Difficulty bending at your knees: Yes/No

h. Difficulty squatting to the ground: Yes/No

i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No

j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne

chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No

If "yes," name the chemicals if you know them:_____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:

a. Asbestos: Yes/No

b. Silica (e.g., in sandblasting): Yes/No

c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No

d. Beryllium: Yes/No

e. Aluminum: Yes/No

f. Coal (for example, mining): Yes/No

g. Iron: Yes/No

h. Tin: Yes/No

i. Dusty environments: Yes/No

j. Any other hazardous exposures: Yes/No

If "yes," describe these exposures:_____

4. List any second jobs or side businesses you have:_____

5. List your previous occupations:_____

6. List your current and previous hobbies:_____

7. Have you been in the military services? Yes/No

If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes/No

8. Have you ever worked on a HAZMAT team? Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If "yes," name the medications if you know them:_____

10. Will you be using any of the following items with your respirator(s)?

a. HEPA Filters: Yes/No

b. Canisters (for example, gas masks): Yes/No

c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:

a. Escape only (no rescue): Yes/No

b. Emergency rescue only: Yes/No

c. Less than 5 hours per week: Yes/No

d. Less than 2 hours per day: Yes/No

e. 2 to 4 hours per day: Yes/No

f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:

a. Light (less than 200 kcal per hour): Yes/No
If "yes," how long does this period last during the average

shift:_____hrs._____mins.

Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.

b. Moderate (200 to 350 kcal per hour): Yes/No
If "yes," how long does this period last during the average

shift:_____hrs._____mins.

Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade

about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

c. Heavy (above 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average

shift:_____hrs._____mins.

Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If "yes,"describe this protective clothing and/or equipment:_____

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

_____

_____

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

_____

_____

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance:_____

Estimated maximum exposure level per shift:_____

Duration of exposure per shift_____

Name of the second toxic substance:_____

Estimated maximum exposure level per shift:_____

Duration of exposure per shift:_____

Name of the third toxic substance:_____

Estimated maximum exposure level per shift:_____

Duration of exposure per shift:_____

The name of any other toxic substances that you'll be exposed to while using your respirator:
_____

_____

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

_____

Appendix D to Sec. 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your

respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

1910.135 Head protection.

(a) General requirements.

(1) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.

(2) The employer shall ensure that a protective helmet designed to reduce electrical shock hazard be worn is worn by each such affected employee when near exposed electrical conductors which could contact the head.

(b) Criteria for head protection.

(1) Head protection must comply with any of the following consensus standards:

(i) American National Standards Institute (ANSI) Z89.1-2009, "American National Standard for Industrial Head Protection," incorporated by reference in Sec. 1910.6;

(ii) American National Standards Institute (ANSI) Z89.1-2003, "American National Standard for Industrial Head Protection," incorporated by reference in Sec. 1910.6; or

(iii) American National Standards Institute (ANSI) Z89.1-1997, "American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements," incorporated by reference in Sec. 1910.6.

(2) Head protection devices that the employer demonstrates are at least as effective as head protection devices that are constructed in accordance with one of the above consensus standards will be deemed to be in compliance with the requirements of this section.

1910.136 Foot protection.

(a) General requirements. The employer shall ensure that each affected employee uses protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where such employee's feet are exposed to electrical hazards.

(b) Criteria for protective footwear.

(1) Protective footwear must comply with any of the following consensus standards:

(i) ASTM F-2412-2005, "Standard Test Methods for Foot Protection," and ASTM F-2413-2005, "Standard Specification for Performance Requirements for Protective Footwear," which are incorporated by reference in Sec. 1910.6;

(ii) ANSI Z41-1999, "American National Standard for Personal Protection--Protective Footwear," which is incorporated by reference in Sec. 1910.6; or

(iii) ANSI Z41-1991, "American National Standard for Personal Protection--Protective Footwear," which is incorporated by reference in Sec. 1910.6.

(2) Protective footwear that the employer demonstrates is at least as effective as protective footwear that is constructed in accordance with one of the above consensus standards will be deemed to be in compliance with the requirements of this section.

1910.137 Electrical protective equipment.

(a) Design requirements. Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber shall meet the following requirements:

(1) Manufacture and marking.

(i) Blankets, gloves, and sleeves shall be produced by a seamless process.

(ii) Each item shall be clearly marked as follows:

(A) Class 0 equipment shall be marked Class 0.

(B) Class 1 equipment shall be marked Class 1.

(C) Class 2 equipment shall be marked Class 2.

(D) Class 3 equipment shall be marked Class 3.

(E) Class 4 equipment shall be marked Class 4.

(F) Non-ozone-resistant equipment other than matting shall be marked Type I.

(G) Ozone-resistant equipment other than matting shall be marked

Type II.

(H) Other relevant markings, such as the manufacturer's identification and the size of the equipment, may also be provided.

(iii) Markings shall be nonconducting and shall be applied in such a manner as not to impair the insulating qualities of the equipment.

(iv) Markings on gloves shall be confined to the cuff portion of the glove.

(2) Electrical requirements.

(i) Equipment shall be capable of withstanding the a-c proof-test voltage specified in Table I-2 or the d-c proof-test voltage specified in Table I-3.

(A) The proof test shall reliably indicate that the equipment can withstand the voltage involved.

(B) The test voltage shall be applied continuously for 3 minutes for equipment other than matting and shall be applied continuously for 1 minute for matting.

(C) Gloves shall also be capable of withstanding the a-c proof-test voltage specified in Table I-2 after a 16-hour water soak. (See the note following paragraph (a)(3)(ii)(B) of this section.)

(ii) When the a-c proof test is used on gloves, the 60-hertz proof-test current may not exceed the values specified in Table I-2 at any time during the test period.

(A) If the a-c proof test is made at a frequency other than 60 hertz, the permissible proof-test current shall be computed from the direct ratio of the frequencies.

(B) For the test, gloves (right side out) shall be filled with tap water and immersed in water to a depth that is in accordance with Table I-4. Water shall be added to or removed from the glove, as necessary, so that the water level is the same inside and outside the glove.

(C) After the 16-hour water soak specified in paragraph (a)(2)(i)(C) of this section, the 60-hertz proof-test current may exceed the values given in Table I-2 by not more than 2 milliamperes.

(iii) Equipment that has been subjected to a minimum breakdown voltage test may not be used for electrical protection. (See the note following paragraph (a)(3)(ii)(B) of this section.)

(iv) Material used for Type II insulating equipment shall be capable of withstanding an ozone test, with no visible effects. The ozone test shall reliably indicate that the material will resist ozone exposure in actual use. Any visible signs of ozone deterioration of the material, such as checking, cracking, breaks, or pitting, is evidence of failure to meet the requirements for ozone-resistant material. (See the note following paragraph (a)(3)(ii)(B) of this section.)

(3) Workmanship and finish.

(i) Equipment shall be free of harmful physical irregularities that can be detected by the tests or inspections required under this section.

(ii) Surface irregularities that may be present on all rubber goods because of imperfections on forms or molds or because of inherent difficulties in the manufacturing process and that may appear as indentations, protuberances, or imbedded foreign material are acceptable under the following conditions:

(A) The indentation or protuberance blends into a smooth slope when the material is stretched.

(B) Foreign material remains in place when the insulating material is folded and stretches with the insulating material surrounding it.

Note: Rubber insulating equipment meeting the following national consensus standards is deemed to be in compliance with paragraph (a) of this section:

American Society for Testing and Materials (ASTM) D 120-87, Specification for Rubber Insulating Gloves.
ASTM D 178-93 (or D 178-88), Specification for Rubber Insulating Matting.
ASTM D 1048-93 (or D 1048-88a), Specification for Rubber Insulating Blankets.
ASTM D 1049-93 (or D 1049-88), Specification for Rubber Insulating Covers.
ASTM D 1050-90, Specification for Rubber Insulating Line Hose.
ASTM D 1051-87, Specification for Rubber Insulating Sleeves.
These standards contain specifications for conducting the various tests required in paragraph (a) of this section. For example, the a-c and d-c proof tests, the breakdown test, the water soak procedure, and the ozone test mentioned in this paragraph are described in detail in the ASTM standards.

(b) In-service care and use.

(1) Electrical protective equipment shall be maintained in a safe, reliable condition.

(2) The following specific requirements apply to insulating blankets, covers, line hose, gloves, and sleeves made of rubber:

(i) Maximum use voltages shall conform to those listed in Table I-5.

(ii) Insulating equipment shall be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves shall be given an air test, along with the inspection.

(iii) Insulating equipment with any of the following defects may not be used:

(A) A hole, tear, puncture, or cut;

(B) Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks);

(C) An embedded foreign object;

(D) Any of the following texture changes: swelling, softening, hardening, or becoming sticky or inelastic.

(E) Any other defect that damages the insulating properties.

(iv) Insulating equipment found to have other defects that might affect its insulating properties shall be removed from service and returned for testing under paragraphs (b)(2)(viii) and (b)(2)(ix) of this section.

(v) Insulating equipment shall be cleaned as needed to remove foreign substances.

(vi) Insulating equipment shall be stored in such a location and in such a manner as to protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions.

(vii) Protector gloves shall be worn over insulating gloves, except as follows:

(A) Protector gloves need not be used with Class 0 gloves, under limited-use conditions, where small equipment and parts manipulation necessitate unusually high finger dexterity.

Note: Extra care is needed in the visual examination of the glove and in the avoidance of handling sharp objects.

(B) Any other class of glove may be used for similar work without protector gloves if the employer can demonstrate that the possibility of physical damage to the gloves

is small and if the class of glove is one class higher than that required for the voltage involved. Insulating gloves that have been used without protector gloves may not be used at a higher voltage until they have been tested under the provisions of paragraphs (b) (2) (viii) and (b) (2) (ix) of this section.

(viii) Electrical protective equipment shall be subjected to periodic electrical tests. Test voltages and the maximum intervals between tests shall be in accordance with Table I-5 and Table I-6.

(ix) The test method used under paragraphs (b)(2)(viii) and (b)(2)(xi) of this section shall reliably indicate whether the insulating equipment can withstand the voltages involved.

Note: Standard electrical test methods considered as meeting this requirement are given in the following national consensus standards:
American Society for Testing and Materials (ASTM) D 120-87, Specification for Rubber Insulating Gloves.
ASTM D 1048-93, Specification for Rubber Insulating Blankets.
ASTM D 1049-93, Specification for Rubber Insulating Covers.
ASTM D 1050-90, Specification for Rubber Insulating Line Hose.
ASTM D 1051-87, Specification for Rubber Insulating Sleeves.
ASTM F 478-92, Specification for In-Service Care of Insulating Line Hose and Covers.
ASTM F 479-93, Specification for In-Service Care of Insulating Blankets.
ASTM F 496-93b, Specification for In-Service Care of Insulating Gloves and Sleeves.

(x) Insulating equipment failing to pass inspections or electrical tests may not be used by employees, except as follows:

(A) Rubber insulating line hose may be used in shorter lengths with the defective portion cut off.

(B) Rubber insulating blankets may be repaired using a compatible patch that results in physical and electrical properties equal to those of the blanket.

(C) Rubber insulating blankets may be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area may not be smaller than 22 inches by 22 inches (560 mm by 560 mm) for Class 1, 2, 3, and 4 blankets.

(D) Rubber insulating gloves and sleeves with minor physical defects, such as small cuts, tears, or punctures, may be repaired by the application of a compatible patch. Also, rubber insulating gloves and sleeves with minor surface blemishes may be repaired with a compatible liquid compound. The patched area shall have electrical and physical properties equal to those of the surrounding material. Repairs to gloves are permitted only in the area between the wrist

and the reinforced edge of the opening.

(xi) Repaired insulating equipment shall be retested before it may be used by employees.

(xii) The employer shall certify that equipment has been tested in accordance with the requirements of paragraphs (b)(2)(viii), (b)(2)(ix), and (b)(2)(xi) of this section. The certification shall identify the equipment that passed the test and the date it was tested.

Note: Marking of equipment and entering the results of the tests and the dates of testing onto logs are two acceptable means of meeting this requirement.

Table I-2. - A-C Proof-Test Requirements

Class of equipment	Proof-test voltage rms V	Maximum proof-test current, mA (gloves only)			
		267-mm (10.5-in) glove	356-mm (14-in) glove	406-mm (16-in) glove	457-mm (18-in) glove
0	5,000	8	12	14	16
1	10,000	.....	14	16	18
2	20,000	.....	16	18	20
3	30,000	.....	18	20	22
4	40,000	.....	.....	22	24

Table I-3. - D-C Proof-Test Requirements

Class of equipment	Proof-test voltage
0	20,000
1	40,000
2	50,000
3	60,000
4	70,000

Note: The d-c voltages listed in this table are not appropriate for proof testing rubber insulating line hose or covers. For this equipment, d-c proof tests shall use a voltage high enough to indicate that the equipment can be safely used at the voltages listed in Table I-4. See ASTM D 1050-90 and ASTM D 1049-88 for further information on proof tests for rubber insulating line hose and covers.

1 The water level is given as the clearance from the cuff of the glove to the water line, with a tolerance of 13 mm. (0.5 in.).

2 If atmospheric conditions make the specified clearances impractical, the clearances may be increased by a maximum of 25 mm. (1 in.).

Table I-4. - Glove Tests - Water Level(1)(2)

Class of glove	AC proof test		DC proof test	
	mm.	in.	mm.	in.
0	38	1.5	38	1.5
1	38	1.5	51	2.0
2	64	2.5	76	3.0
3	89	3.5	102	4.0
4	127	5.0	153	6.0

Footnote(1) The water level is given as the clearance from the cuff of the glove to the water line, with a tolerance of + or - 13 mm. (+ or - 0.5 in.).

Footnote(2) If atmospheric conditions make the specified clearances impractical, the clearances may be increased by a maximum of 25 mm. (1 in.).

Table I-5. - Rubber Insulating Equipment Voltage Requirements

Class of equipment	Maximum use voltage(1) a - c - rms	Retest voltage(2) a - c - rms	Retest voltage(2) d - c - avg
0	1,000	5,000	20,000
1	7,500	10,000	40,000
2	17,000	20,000	50,000
3	26,500	30,000	60,000
4	36,000	40,000	70,000

Footnote(1) The maximum use voltage is the a-c voltage (rms) classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design voltage:

[1] If there is no multiphase exposure in a system area and if the voltage exposure is limited to the phase-to-ground potential, or

[2] If the electrical equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wye circuit is removed.

Footnote(2) The proof-test voltage shall be applied continuously for at least 1 minute, but no more than 3 minutes.

Table I-6. - Rubber Insulating Equipment Test Intervals

Type of equipment	When to test
Rubber insulating line hose	Upon indication that insulating value is suspect.
Rubber insulating covers	Upon indication that insulating value is suspect.
Rubber insulating blankets	Before first issue and every 12 months thereafter(1).
Rubber insulating gloves	Before first issue and every 6 months thereafter(1).
Rubber insulating sleeves	Before first issue and every 12 months thereafter(1).

Footnote(1) If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.

1910.138 Hand protection.

(a) General requirements. Employers shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

(b) Selection. Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

Appendix A to Subpart I-References for further information (Non-mandatory)

The documents in Appendix A provide information which may be helpful in understanding and implementing the standards in Subpart I.

1. Bureau of Labor Statistics (BLS). ``Accidents Involving Eye Injuries." Report 597, Washington, D.C.: BLS, 1980.

2. Bureau of Labor Statistics (BLS). ``Accidents Involving Face Injuries." Report 604, Washington, D.C.: BLS, 1980.

3. Bureau of Labor Statistics (BLS). ``Accidents Involving Head Injuries." Report 605, Washington, D.C.: BLS, 1980.

4. Bureau of Labor Statistics (BLS). ``Accidents Involving Foot Injuries." Report 626, Washington, D.C.: BLS, 1981.

5. National Safety Council. ``Accident Facts", Annual edition, Chicago, IL: 1981.

6. Bureau of Labor Statistics (BLS). ``Occupational Injuries and Illnesses in the United States by Industry," Annual edition, Washington, D.C.: BLS.

7. National Society to Prevent Blindness. ``A Guide for Controlling Eye Injuries in Industry," Chicago, Il: 1982.

Appendix B to Subpart I-Non-mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection

This Appendix is intended to provide compliance assistance for employers and employees in implementing requirements for a hazard assessment and the selection of personal protective equipment.

1. Controlling hazards. PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing practices.

2. Assessment and selection. It is necessary to consider certain general guidelines for assessing the foot, head, eye and face, and hand hazard situations that exist in an occupational or educational operation or process, and to match the protective devices to the particular hazard. It should be the responsibility of the safety officer to exercise common sense and appropriate expertise to accomplish these tasks.

3. Assessment guidelines. In order to assess the need for PPE the following steps should be taken:

a. Survey. Conduct a walk-through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and co-workers. Consideration should be given to the basic hazard categories:

(a) Impact

(b) Penetration

(c) Compression (roll-over)

(d) Chemical

(e) Heat

(f) Harmful dust

(g) Light (optical) radiation

b. Sources. During the walk-through survey the safety officer should observe: (a) sources of motion; i.e., machinery or processes where any movement of tools, machine elements or particles could exist, or movement of personnel that could result in collision with stationary objects; (b) sources of high temperatures that could result in burns, eye injury or ignition of protective equipment, etc.; (c) types of chemical exposures; (d) sources of harmful dust; (e) sources of light radiation, i.e., welding, brazing, cutting, furnaces, heat treating, high intensity lights, etc.; (f) sources of falling objects or potential for dropping objects; (g) sources of sharp objects which might pierce the feet or cut the hands; (h) sources of rolling or pinching objects which could crush the feet; (i) layout of workplace and location of co-workers; and (j) any electrical hazards. In addition, injury/accident data should be reviewed to help identify problem areas.

c. Organize data. Following the walk-through survey, it is necessary to organize the data and information for use in the assessment of hazards. The objective is to prepare for an analysis of the hazards in the environment to enable proper selection of protective equipment.

d. Analyze data. Having gathered and organized data on a workplace, an estimate of the potential for injuries should be made. Each of the basic hazards (paragraph 3.a.) should be reviewed and a determination made as to the type, level of risk, and seriousness of potential injury from each of the hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.

4. Selection guidelines. After completion of the procedures in paragraph 3, the general procedure for selection of protective equipment is to: a) Become familiar with the potential hazards and the type of protective equipment that is available, and what it can do; i.e., splash protection, impact protection, etc.; b) compare the hazards associated with the environment; i.e., impact velocities, masses, projectile shape, radiation intensities, with the capabilities of the available protective equipment; c) select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; and d) fit the user with the protective device and give instructions on care and use of the PPE. It is very important that end users be made aware of all warning labels for and limitations of their PPE.

5. Fitting the device. Careful consideration must be given to comfort and fit. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

6. Devices with adjustable features. Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face. In addition, proper fitting of helmets is important to ensure that it will not fall off during work operations. In some cases a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard). Where manufacturer's instructions are available, they should be followed carefully.
7. Reassessment of hazards. It is the responsibility of the safety officer to reassess the workplace hazard situation as necessary, by identifying and evaluating new equipment and processes, reviewing accident records, and reevaluating the suitability of previously selected PPE.

8. Selection chart guidelines for eye and face protection. Some occupations (not a complete list) for which eye protection should be routinely considered are: carpenters, electricians, machinists, mechanics and repairers, millwrights, plumbers and pipe fitters, sheet metal workers and tinsmiths, assemblers, sanders, grinding machine operators, lathe and milling machine operators, sawyers, welders, laborers, chemical process operators and handlers, and timber cutting and logging workers. The following chart provides general guidance for the proper selection of eye and face protection to protect against hazards associated with the listed hazard ``source'' operations.

Eye and Face Protection Selection Chart

Source	Assessment of Hazard	Protection
IMPACT - Chipping, grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding.	Flying fragments, objects, large chips, particles sand, dirt, etc. ..	Spectacles with side protection, goggles, face shields. See notes (1), (3), (5), (6), (10). For severe exposure, use faceshield.
HEAT-Furnace operations, pouring, casting, hot dipping, and welding.	Hot sparks	Faceshields, goggles, spectacles with side protection. For severe exposure use faceshield. See notes (1), (2), (3).
	Splash from molten metals.....	Faceshields worn over goggles. See notes (1), (2), (3).
	High temperature exposure.....	Screen face shields, reflective face

		shields. See notes (1), (2), (3).
CHEMICALS-Acid and chemicals handling, degreasing plating.	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3),(11).
	Irritating mists ..	Special-purpose goggles.
DUST - Woodworking, buffing, general dusty conditions.	Nuisance dust	Goggles, eyecup and cover types. See note (8).
LIGHT and/or RADIATION - Welding: Electric arc	Optical radiation .	Welding helmets or welding shields. Typical shades: 10-14. See notes (9), (12).
Welding: Gas	Optical radiation .	Welding goggles or welding face shield. Typical shades: gas welding 4-8, cutting 3-6, brazing 3-4. See note (9).
Cutting, Torch brazing, Torch soldering	Optical radiation ..	Spectacles or welding face-shield. Typical shades, 1.5-3. See notes (3), (9).
Glare	Poor vision	Spectacles with shaded or special-purpose lenses, as suitable. See notes (9), (10).

Notes to Eye and Face Protection Selection Chart:

(1) Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest level of each of the hazards should be provided. Protective devices do not provide unlimited protection.

(2) Operations involving heat may also involve light radiation. As required by the standard, protection from both hazards must be provided.

(3) Faceshields should only be worn over primary eye protection (spectacles or goggles).

(4) As required by the standard, filter lenses must meet the requirements for shade designations in 1910.133(a)(5). Tinted and shaded lenses are not filter lenses unless they are marked or identified as such.

(5) As required by the standard, persons whose vision requires the use of prescription (Rx) lenses must wear either protective devices

fitted with prescription (Rx) lenses or protective devices designed to be worn over regular prescription (Rx) eyewear.
(6) Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment. It should be recognized that dusty and/or chemical environments may represent an additional hazard to contact lens wearers.
(7) Caution should be exercised in the use of metal frame protective devices in electrical hazard areas.
(8) Atmospheric conditions and the restricted ventilation of the protector can cause lenses to fog. Frequent cleansing may be necessary.
(9) Welding helmets or faceshields should be used only over primary eye protection (spectacles or goggles).
(10) Non-sideshield spectacles are available for frontal protection only, but are not acceptable eye protection for the sources and operations listed for "impact."
(11) Ventilation should be adequate, but well protected from splash entry. Eye and face protection should be designed and used so that it provides both adequate ventilation and protects the wearer from splash entry.
(12) Protection from light radiation is directly related to filter lens density. See note (4) . Select the darkest shade that allows task performance.

9. Selection guidelines for head protection. All head protection (helmets) is designed to provide protection from impact and penetration hazards caused by falling objects. Head protection is also available which provides protection from electric shock and burn. When selecting head protection, knowledge of potential electrical hazards is important. Class A helmets, in addition to impact and penetration resistance, provide electrical protection from low-voltage conductors (they are proof tested to 2,200 volts). Class B helmets, in addition to impact and penetration resistance, provide electrical protection from high-voltage conductors (they are proof tested to 20,000 volts). Class C helmets provide impact and penetration resistance (they are usually made of aluminum which conducts electricity), and should not be used around electrical hazards.

Where falling object hazards are present, helmets must be worn. Some examples include: working below other workers who are using tools and materials which could fall; working around or under conveyor belts which are carrying parts or materials; working below machinery or processes which might cause material or objects to fall; and working on exposed energized conductors.

Some examples of occupations for which head protection should be routinely considered are: carpenters, electricians, linemen, mechanics and repairers, plumbers and pipe fitters, assemblers, packers, wrappers, sawyers, welders, laborers, freight handlers, timber cutting and logging, stock handlers, and warehouse laborers.

Beginning with the ANSI Z89.1-1997 standard, ANSI updated the classification system for protective helmets. Prior revisions used type classifications to distinguish between caps and full brimmed hats. Beginning in 1997, Type I designated helmets designed to reduce the force of impact resulting from a blow only to the top of the head, while Type II designated helmets designed to

reduce the force of impact resulting from a blow to the top or sides of the head. Accordingly, if a hazard assessment indicates that lateral impact to the head is foreseeable, employers must select Type II helmets for their employees. To improve comprehension and usefulness, the 1997 revision also redesignated the electrical-protective classifications for helmets as follows: "Class G--General"; helmets designed to reduce the danger of contact with low-voltage conductors; "Class E--Electrical"; helmets designed to reduce the danger of contact with conductors at higher voltage levels; and "Class C--Conductive"; helmets that provide no protection against contact with electrical hazards.

10. Selection guidelines for foot protection. Safety shoes and boots which meet the ANSI Z41-1991 Standard provide both impact and compression protection. Where necessary, safety shoes can be obtained which provide puncture protection. In some work situations, metatarsal protection should be provided, and in other special situations electrical conductive or insulating safety shoes would be appropriate.

Safety shoes or boots with impact protection would be required for carrying or handling materials such as packages, objects, parts or heavy tools, which could be dropped; and, for other activities where objects might fall onto the feet. Safety shoes or boots with compression protection would be required for work activities involving skid trucks (manual material handling carts) around bulk rolls (such as paper rolls) and around heavy pipes, all of which could potentially roll over an employee's feet. Safety shoes or boots with puncture protection would be required where sharp objects such as nails, wire, tacks, screws, large staples, scrap metal etc., could be stepped on by employees causing a foot injury.

Some occupations (not a complete list) for which foot protection should be routinely considered are: shipping and receiving clerks, stock clerks, carpenters, electricians, machinists, mechanics and repairers, plumbers and pipe fitters, structural metal workers, assemblers, drywall installers and lathers, packers, wrappers, craters, punch and stamping press operators, sawyers, welders, laborers, freight handlers, gardeners and grounds-keepers, timber cutting and logging workers, stock handlers and warehouse laborers.

11. Selection guidelines for hand protection. Gloves are often relied upon to prevent cuts, abrasions, burns, and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. OSHA is unaware of any gloves that provide protection against all potential hand hazards, and commonly available glove materials provide only limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn, and whether it can be reused.

It is also important to know the performance characteristics of gloves relative to the specific hazard anticipated; e.g., chemical hazards, cut hazards, flame hazards, etc. These performance characteristics should be assessed by using standard test procedures. Before purchasing gloves, the employer should request documentation from the manufacturer that the gloves meet the appropriate test standard(s) for the hazard(s) anticipated.

Other factors to be considered for glove selection in general include:

(A) As long as the performance characteristics are acceptable, in certain circumstances, it may be more cost effective to regularly change cheaper gloves than to reuse more expensive types; and,

(B) The work activities of the employee should be studied to determine the degree of dexterity required, the duration, frequency, and degree of exposure of the hazard, and the physical stresses that will be applied.

With respect to selection of gloves for protection against chemical hazards:

(A) The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and /or to pass through the skin and cause systemic effects;

(B) Generally, any ``chemical resistant'' glove can be used for dry powders;

(C) For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time, since it is possible for solvents to carry active ingredients through polymeric materials; and,

(D) Employees must be able to remove the gloves in such a manner as to prevent skin contamination.

12. Cleaning and maintenance. It is important that all PPE be kept clean and properly maintained. Cleaning is particularly important for eye and face protection where dirty or fogged lenses could impair vision.

For the purposes of compliance with 1910.132 (a) and (b), PPE should be inspected, cleaned, and maintained at regular intervals so that the PPE provides the requisite protection.

It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

Subpart I - Personal Protective Equipment

SUBPART I -- Personal Protective Equipment

AUTHORITY: Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, and 657); Secretary of Labor's Order No. 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), 6-96 (62 FR 111), 3-2000 (65 FR 50017), 5-2002 (67 FR 65008), 5-2007 (72 FR 31160), or 4-2010 (75 FR 55355), as applicable, and 29 CFR Part 1911.

Sections 1910.132, 1910.134, and 1910.138 of 29 CFR also issued under 29 CFR 1911.
Sections 1910.133, 1910.135, and 1910.136 of 29 CFR also issued under 29 CFR 1911 and 5 U.S.C. 553.

[58 FR 35309, June 30, 1993; 59 FR 4435, Jan. 31, 1994; 59 FR 16360, April 6, 1994; 61 FR 9227, March 7, 1996; 61 FR 19547, May 2, 1996; 64 FR 1152, Jan. 8, 1998; 68 FR 75780, Dec. 31, 2003; 69 FR 46993, August 4, 2004; 71 FR 16672, April 3, 2006; 71 FR 50187, August 24, 2006; 72 FR 64428, Nov. 15, 2007; 73 FR 75584, Dec. 12, 2008; 74 FR 46356, Sept. 9, 2009; 76 FR 33606, June 8, 2011; 77 FR 46949, Aug. 7, 2012]

1910.132 General requirements.

(a) Application. Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact. STD 1-1.13 STD 1-6.1 STEP

(b) Employee-owned equipment. Where employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including proper maintenance, and

respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

1910.135 Head protection.

(a) General requirements.

(1) The employer shall ensure that each affected employee wears a protective helmet when working in areas where there is a potential for injury to the head from falling objects.

(2) The employer shall ensure that a protective helmet designed to reduce electrical shock hazard be worn is worn by each such affected employee when near exposed electrical conductors which could contact the head.

(b) Criteria for ~~protective helmets~~. head protection.

(1) Head protection must comply with any of the following consensus standards:

(i) ~~ANSI Z89.1-2003, "American National Standard for Industrial Head Protection," which is incorporated by reference in Sec. 1910.6;~~ American National Standards Institute (ANSI) Z89.1-2009, "American National Standard for Industrial Head Protection," incorporated by reference in Sec. 1910.6;

(ii) ~~ANSI Z89.1-1997, "American National Standard for Industrial Head Protection," which is incorporated by reference in Sec. 1910.6; or~~ American National Standards Institute (ANSI) Z89.1-2003, "American National Standard for Industrial Head Protection," incorporated by reference in Sec. 1910.6; or

(iii) ~~ANSI Z89.1-1986, "American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements," which is incorporated by reference in Sec. 1910.6.~~ American National Standards Institute (ANSI) Z89.1-1997, "American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements," incorporated by reference in Sec. 1910.6.

(2) Head protection devices that the employer demonstrates are at least as effective as head protection devices that are constructed in accordance with one of the above consensus standards will be deemed to be in compliance with the requirements of this section.

1910.136 Foot protection.