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/ Personal Protective Equipment for General Industry

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## DEPARTMENT OF LABOR

### Occupational Safety and Health Administration

#### 29 CFR Part 1910

[Docket No. S-060]

RIN 1218-AA71

#### Personal Protective Equipment for General Industry

**AGENCY:** Occupational Safety and Health Administration; Labor.

**ACTION:** Final Rule.

**SUMMARY:** The Occupational Safety and Health Administration (OSHA) is revising portions of the general industry safety standards addressing personal protective equipment (PPE). The standards being revised include those containing general requirements for all PPE (1910.132) and standards that set design, selection, and use requirements for specific types of PPE (eye, face, head, foot and hand).

The Agency is updating the standards for PPE to be more consistent with the current consensus regarding good industry practices, as reflected by the latest editions of the pertinent American National Standards Institute (ANSI) standards. The revision will provide guidance for the selection and use of PPE as well as clearer requirements that are performance-oriented, where appropriate.

New paragraphs (d), (e), and (f) (containing requirements covering equipment selection, defective and damaged equipment, and training, respectively) have been added to 1910.132. Also, a new section (1910.138) has been added to this Subpart to address hazards to the hands. Non-mandatory appendices A and B have also been added to this Subpart to provide additional guidance to employers and employees with regard to PPE for eye, face, head, foot, and hand hazards.

**DATES:** This standard will become effective on July 5, 1994. The incorporation by reference of certain publications listed in the standards is approved by the Director of the **Federal Register** as of April 6, 1994.

**ADDRESS:** In compliance with 28 U.S.C. 2112(a), the Agency designates for receipt of petitions for review of the standard the Associate Solicitor for Occupational Safety and Health, Office of the Solicitor, Room S-4004, U.S. Department of Labor, 200 Constitution Ave. N.W., Washington, D.C. 20210.

**FOR FURTHER INFORMATION CONTACT:** Mr. James F. Foster, U.S. Department of Labor, Occupational Safety and Health Administration, Room N-3647, 200 Constitution Ave., N.W., Washington, D.C. 20210. Telephone: (202) 219-8151.

**SUPPLEMENTARY INFORMATION:** In this preamble, OSHA identifies sources of information submitted to the record by an exhibit number (Ex. 3). When applicable, comment numbers follow the exhibit in which they are contained (Ex. 3: 1). If more than one comment within an exhibit is cited, the comment numbers are separated by commas (Ex. 3: 1, 2, 3). The page number is also cited if other than page 1 (Ex. 3: 2, pg. 8). The transcript of the hearing is cited by the page number followed by identification of the hearing date (Tr. 80: 4/3). Exhibit and transcript citations are separated by semicolons (Ex. 3: Ex. 7; Tr. 80: 4/3).

## I. Background

The existing OSHA standards for personal protective equipment (PPE) are contained in Subpart I of OSHA's general industry standards. These standards were adopted in 1971 from established Federal standards and national consensus standards.

In developing a proposed revision of Subpart I, the Agency performed a comprehensive review of the PPE standards. This review revealed several limitations and concerns with respect to these standards. First, OSHA determined that many of the existing PPE standards were outdated since they reflected knowledge and practices regarding PPE as they existed in the late 1960's and early 1970's. This meant that employers were being required to explain how compliance with more recent editions of the pertinent consensus standards provides equivalent protection to that provided by the older editions in the OSHA standards.

Second, the Agency determined that there were certain gaps in coverage of the PPE standards, and that the standards set very restrictive design criteria which might limit the use of new technology. OSHA was concerned that restraints on innovation might also make it more difficult for employers either to increase acceptance of PPE, or to provide more protective PPE. Recognizing this situation, the Agency established a process under which OSHA has accepted, for example, on a case-by-case basis, the use of eye protection which, while not designed to meet the specifications in the existing standards, had been demonstrated to provide equivalent or superior worker protection. The Agency determined, however, that this process could not keep pace with the development of improved PPE. Consequently, OSHA was concerned that, unless the PPE standards were revised to be more performance-oriented, employers and product manufacturers might be discouraged from improving their equipment and from providing improved protection to workers.

Also, OSHA had obtained injury data and technical reports which showed that injuries were occurring to employees who were wearing PPE as well as to those employees who were not wearing PPE. This indicated that, in some cases, significant improvements in PPE design and acceptance might be needed.

Based on these concerns, OSHA developed a proposed revision to its PPE standards. The proposed revision was published in the **Federal Register** as a notice of proposed rulemaking (NPRM) on August 16, 1989 (54 FR 33832). OSHA proposed to revise the safety standards for eye and face protection (1910.133); head protection (1910.135); and foot protection (1910.136) by referencing the latest editions of the corresponding standards published by the American National Standards Institute (ANSI). The provisions of existing 1910.134 and 1910.137 (which cover respiratory protection and electrical protective devices, respectively) are the subjects of separate rulemaking actions and are not addressed by this rulemaking.

OSHA also proposed to revise the "general requirements" for PPE (1910.132) by adding provisions that: (1) require employers to select appropriate PPE based on the hazards present and to assure that employees who obtain their own PPE follow the employers' selection decisions; (2) prohibit the use of defective or damaged PPE; and (3) require that employees be trained in the proper use of their PPE.

The NPRM set a period, that ended on October 16, 1990, during which interested persons could comment on the proposal and request a hearing. OSHA received 129 comments in response to the proposal (Exhibit 3). The Agency also received several requests for an informal public hearing to discuss and clarify some of the requirements in the proposal, and to discuss and comment on issues and concerns raised as a result of the proposal. Accordingly, OSHA published a hearing notice on February 1, 1990 (55 FR 3412). The hearing notice requested testimony and supporting information on the following issues: (1) Marking of eye and face protection;

(2) Third party certification; (3) The use of photochromic lenses; (4) Training in the proper use of PPE; and (5) The need for additional regulation of PPE (such as gloves, chemical protective clothing, and bump caps). The hearing notice (55 FR 3412) also extended the comment period until March 20, 1990.

Hearings on the proposed standard were held in Washington, D.C., on April 3 and 4, 1990, with Administrative Law Judge Sheldon R. Lipson presiding. At the conclusion of the hearing, Judge Lipson set July 13, 1990, as the deadline for submission of post hearing comments and evidence, and September 11, 1990, as the deadline for submission of summations and briefs. On November 9, 1990, Judge Lipson certified the hearing record, including the hearing transcript and all written submissions to the docket.

The rulemaking record contains 173 comments, 577 pages of testimony, and 53 exhibits.

## II. Workplace Hazards Involved

OSHA has determined that workers involved in a wide range of occupations are exposed to a significant risk of death or injury from being struck by various objects in the workplace. OSHA's incident data indicate that a significant portion of all work related injuries and fatalities involve workers being struck in the eyes, head, face, hand, and or feet by foreign objects. For example, it has been estimated that as many as 2,500 eye injuries occur in the workplace every working day (Ex. 2: 9).

One study indicated that there were 333,272 reported occupational eye injuries for 1985 (Ex. 2: 8). Another study, pertaining to disabling injuries, estimated that there were 320,000 hand and finger injuries, 70,000 eye injuries, 70,000 head and face injuries, and 110,000 foot and toe injuries in 1987. These injuries constituted 31.7 percent of the estimated 1,800,000 total disabling work injuries for 1987 (Ex. 2: 15).

These examples indicate the degree of the hazard to which employees are exposed. OSHA reviewed many sources that described the type and number of injuries to employees (e.g. Ex. 2: 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22; Ex. 6: 2, 3, 4). While these sources differ as to the number and kind of injuries, they are consistent in pointing out the high incidence and severity of these accidents, and provide clear evidence of a significant risk to workers.

In particular, one data source reviewed by OSHA included the Bureau of Labor Statistics (BLS) Work Injury Reports (WIR) on eye, face, foot, head and hand injuries (Ex. 2: 11, 12, 13, 14; Ex. 6: 2). These reports, which examined only those cases where a worker was injured, identified two major factors: Personal protective equipment was not being worn the vast majority of the time; and, when some type of protective equipment was worn, it did not fully protect the worker. For example, one study (Ex. 6: 2) indicated that 70% of the workers experiencing hand injuries were not wearing gloves. Hand injuries to the remaining 30% of the workers who were wearing gloves were caused by the gloves being either inadequate, damaged, or the wrong type for the type of hazard present.

Based on the above-documented incidence of hand injury, OSHA has determined that employers and employees need more guidance regarding the selection of hand protection than is provided through the generic provisions of proposed 1910.132(d). Therefore, as discussed below, the Agency has provided performance-oriented provisions by adding 1910.138, "Hand protection" to the final rule.

The final rule addresses the problems identified in the BLS reports by allowing new innovative designs through the use of performance-oriented language, by providing information for selecting the proper protection, and by improving the protection afforded by the equipment.

OSHA believes that the revised standards will result in improvement in worker acceptance of wearing PPE by allowing better and more comfortable designs not presently permitted by the current standards, and by providing information on selecting the proper equipment for the job.

The Agency has determined that compliance with the final rule will result in a significant reduction in the risks to workers. As noted in the Regulatory Impact Analysis, discussed below, it is estimated that full compliance with the final rule will prevent 712,000 lost-workdays and 4 fatalities a year.

The Agency has also determined that the revised PPE requirements and criteria in the final rule provide a cost-effective means for reducing risks to workers. The Agency has determined that these provisions are reasonably necessary and appropriate to address the need for personal protective equipment.

### III. Summary and Explanation of the Final Rule

This section contains an analysis of the rulemaking record pertaining to certain issues raised in the NPRM, and to the provisions of the standard, both as proposed and as promulgated.

One general objection received during this rulemaking concerned the use of the phrase "employers shall ensure" in certain provisions of the proposed standard (e.g. Ex. 3: 46, 80, 94). The commenters expressed the view that, under the proposed language, employers would be held liable for violations of the standards, regardless of employee misconduct or other exculpatory considerations. The Agency had proposed the language in question to emphasize the employer's obligations for compliance with OSHA standards. The proposed language would not have affected an employer's ability to raise defenses to a citation.

In light of the objections, OSHA is revising the proposed language to remove the phrase "the employer shall ensure" wherever it appears. The employer's obligations for compliance with standards issued under the OSH Act are unaffected by this change.

Also, concern was expressed regarding the extent to which the proposed standard would allow employees to use PPE that satisfied the old ANSI standards which were being superseded by current editions through the proposal. In particular, some commenters (Ex. 3: 68, 69, 100) suggested that the Agency "grandfather" existing stocks of PPE (i.e., allow existing stocks of PPE to be depleted) as long as the PPE meets the ANSI standard in effect at the time of manufacture. Those commenters stated that, without grandfathering, employers would be required to bear the unreasonable expense and disruption of replacing millions of items of usable PPE.

The proposal simply required the affected PPE to comply with the then-current editions of the pertinent ANSI standards, without indicating how PPE produced and tested to satisfy the existing OSHA standards would be treated.

The Agency believes that virtually all of the PPE in question has been produced and tested to satisfy the ANSI editions referenced in either the proposed rule or in the final rule. Therefore, OSHA believes that, by and large, existing stocks of PPE would comply with the final rule. However, the Agency recognizes that some PPE that pre-dates the referenced ANSI standards might be unnecessarily excluded from use unless it was "grandfathered".

In particular, certain protective footwear that complied with the 1983 ANSI edition referenced by the proposal could be excluded from use because it was not produced and tested to satisfy the 1991 edition referenced by the final rule, unless the employer demonstrated that the footwear provided equivalent protection. OSHA believes that the differences between the 1983 and 1991 editions are so slight that it would be unreasonable to require employers to demonstrate equivalency. The Agency also believes that PPE satisfying the pertinent criteria of the pre-1989 ANSI Z87.1 standard for eye and face protection or the pre-1986 Z89.1 standard for head protection will adequately protect affected employees. Therefore, the Agency agrees that it is appropriate to allow continued use of PPE that was purchased prior to the effective date of the final rule and has revised the proposed rule accordingly.

In the final rule, as in the NPRM, OSHA has incorporated the pertinent ANSI standards by reference. The Agency has determined that it is unnecessary to adopt the text of the three ANSI standards, because their criteria are addressed to PPE manufacturers, not to employers who would be selecting PPE for use by their employees. OSHA believes that it is sufficient to require that employers ensure either that the PPE used by employees complies with the appropriate ANSI standard or that the PPE provides protection equivalent to that provided by PPE manufactured to the ANSI criteria.

1910.132 General Requirements.

Paragraphs (a), (b), and (c) of this section were not proposed for revision. Paragraph (a) requires that protective equipment be provided, used and maintained in sanitary and reliable condition, as necessary, to protect employees from workplace hazards.

Paragraph (b) requires that, where employees provide their own equipment, the employer assure the adequacy, including the proper maintenance and sanitation, of such equipment.

Paragraph (c) requires that all personal protective equipment be of safe design and construction for the work to be performed.

Paragraph (d): Selection.

OSHA proposed to add a new paragraph, (d), to 1910.132 to address the selection of PPE. OSHA proposed to require employers to select the PPE for their employees based on an assessment of the hazards in the workplace, and the hazards which employees are likely to encounter. Because OSHA is aware that some employees obtain their own PPE, the Agency also proposed that employers be required to inform their employees of the selection decisions and to have their employees follow those decisions when obtaining PPE.

OSHA believes that a hazard assessment is an important element of a PPE program because it produces the information needed to select the appropriate PPE for the hazards present or likely to be present at particular workplaces. The Agency believes that the employer will be capable of determining and evaluating the hazards of a particular workplace. Paragraph (d) of the final rule is a performance-oriented provision which simply requires employers to use their awareness of workplace hazards to enable them to select the appropriate PPE for the work being performed. Paragraph (d) clearly indicates that the employer is accountable both for the quality of the hazard assessment and for the adequacy of the PPE selected.

Proposed paragraph (d), which was substantively identical to the final rule, has been revised for the sake of clarity. The Agency has also added a note which references Non-mandatory Appendix B of 1910.132. That Appendix provides an example of procedures that satisfy the hazard assessment requirement.

Most rulemaking participants supported the proposed requirement (e.g. Ex. 3: 90, 91, 102). However, some commenters stated that the proposed paragraph did not clearly indicate if employers would be required to document the hazard assessment. For example, a commenter from S.C. Johnson & Son, Inc. (Ex. 3: 1) suggested that OSHA clarify documentation requirements of the workplace assessment. In addition, a commenter from Union Carbide (Ex. 3: 68, pp. 1-2) stated:

\* \* \* OSHA should clarify that the hazard assessment referred to there need not be in writing.

OSHA can best determine whether the employer conducted an adequate hazard assessment by inspecting the areas where PPE is required. It should not be necessary for employers to prepare and retain a formal written hazard assessment.

OSHA believes that some form of record is needed to provide OSHA compliance officers and affected employees with appropriate assurance that the required hazard assessment has been performed. The Agency agrees with the commenter that it is not "necessary for employers to prepare and retain a formal written hazard assessment." Given the performance-oriented nature of this rulemaking, OSHA has determined that the generation and review of extensive documentation would be unnecessarily burdensome.

The Agency has addressed such situations in other rulemakings by requiring employers to verify their compliance with a requirement through a written certification. For example, OSHA has required certification of training in the permit-required confined space standard, 1910.146(g)(4); the control of hazardous energy (lockout/tagout) standard, 1910.147(c)(7)(iv); in the Telecommunications standard, 1910.268(c); and (as discussed below) in 1910.132(f)(4) of this final rule. The Agency has found that a written certification is a reasonable means by which to establish accountability for compliance.

Therefore, the Agency has determined that employers can adequately verify compliance with 1910.132(d) of the final rule through a written certification which 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. This requirement has been added to the final rule as paragraph (d)(2).

The Paperwork Reduction Act (PRA) (44 U.S.C. Chapter 35) sets limits on the efforts of federal agencies to collect "information". The definition of "information" in the OMB regulations implementing the PRA (5 CFR 1320.7(j)) specifies that "Information does not generally include \* \* \* certifications \* \* \* provided that they entail no burden other than that necessary to identify the respondent, the date, the respondent's address, and the nature of the instrument." OSHA has determined that the certification required by paragraph (d)(2) constitutes a "certification" for the purposes of the PRA. Therefore, that certification would not be subject to the requirements of the Paperwork Reduction Act or of the implementing regulations (5 CFR part 1320).

Another concern raised during this rulemaking, related to the selection process, was the subject of proper fit of PPE. A commenter (Ex. 7:10) has stated that, in the past, males constituted the majority of the workforce and PPE was sized accordingly. As more and more females have entered the workforce, they often have had to choose between wearing PPE that was sized to fit males, and not wearing PPE at all. This was particularly common with foot protection. As a result, female workers frequently either have used PPE which did not adequately protect them, or have simply stopped using PPE because of improper fit and subsequent discomfort. Based on concern for the safety of female employees, the commenter suggested that OSHA require PPE to fit properly.

OSHA agrees with this comment. Since females constitute a larger percentage of the workforce than ever before, it is imperative that they (as well as male employees) be provided with PPE that fits properly. Therefore, OSHA is revising 1910.132 (d) to add proper fit as a criterion for PPE selection.

Paragraph (e): Defective and damaged equipment.

OSHA proposed to add a new paragraph, (e), to 1910.132 that stated:

Defective or damaged personal protective equipment shall not be used.

This paragraph is based, in part, on existing 1910.133 (a)(2)(vii), which states that eye protectors should be kept clean and in good repair. Under the proposed paragraph, the existing requirement was to be strengthened and extended to cover all PPE, not just eye protectors.

Some commenters (e.g. Ex. 3: 1, 41) stated that proposed paragraph (e) should only cover visually observable defects or damage. For example, a commenter from Johnson Wax (Ex. 3: 1) stated:

We urge OSHA to limit the scope of this section to "visible" defects or damage in PPE.

OSHA certainly agrees that visibly damaged or defective PPE must not be used. However, there are other methods (such as performance tests to ensure continued integrity) that the employer could use to assure that the PPE used by employees is repaired or replaced as necessary for the protection of each affected employee. Also, employees can often determine if the protectiveness of the PPE has been compromised when they are handling the PPE prior to or while donning it. Accordingly, OSHA believes it would be inappropriate to narrow this provision to cover only visible defects or damage. Therefore, the Agency is promulgating paragraph 1910.132 (e) as proposed.

Paragraph (f): Training.

Proposed paragraph (f) required employers to train employees in the proper use of their PPE. This proposed provision was based on OSHA's recognition that, as documented by the Bureau of Labor Statistics Work Injury Reports (Ex. 2: 11, 12, 13, 14), a significant number of the employees who sustain work-related injuries have not been trained in the proper use of PPE.

Some commenters (Ex. 3: 64, 117, 119) stated that PPE training, while necessary for respirators and other complex PPE, is not necessary for relatively simple equipment such as safety shoes and eye protectors. In particular, the American Trucking Association (ATA) (Ex. 3: 64) stated:

Requiring training and record-keeping for all PPE would severely burden motor carriers in terms of time and the related costs.

As an alternative, the ATA suggested that OSHA set non-mandatory appendices for the guidance of employers.

Other commenters (Ex. 3: 84, 104, 121) suggested that the employer be required to train employees only for use of the PPE that is required by the employer to provide protection against hazards identified for the particular workplace. The Texas Chemical Council (Ex. 3: 121) stated:

Requiring the employer to train employees on equipment they provide creates an unnecessary and inappropriate burden on the employer.

Several commenters (Ex. 3: 75, 83, 90, 106, 126) supported the training requirement, as proposed. Du Pont (Ex. 3: 90, pg. 2) remarked:

Du Pont's position is that proper employee training is fundamental to an effective PPE program. We also agree with the flexibility this proposed section provides employers.

Some commenters (e.g. Ex. 3: 100, 104) suggested that OSHA revise the proposed paragraph (f) to indicate that training need only be provided when PPE is first provided to employees. For example, Union Electric (Ex. 3: 100) said:

Company suggests adding "at the time it is initially issued." The proposal, as written, could imply that employees must be periodically retrained in the proper use of their equipment. This certainly is unnecessary for such items as safety glasses, footwear and headgear, which usually are worn routinely on the job. Respirators already have a periodic training requirement.

Also, several commenters (Ex. 3: 46, 64, 102, 117) expressed concern that proposed 1910.132(f) would require employers to operate formal training programs. For example, Monsanto (Ex. 3: 102, pg. 2) stated that OSHA should revise proposed paragraph (f) to indicate clearly that the training required need not be formal classroom training.

In addition, McDonnell Douglas (Ex. 3: 129) inquired:

In regard to training all employees in the proper use of all PPE, what would qualify as "training"? The term "training" could range from awareness type information to competency training of the employee.

OSHA should define the term "training" or be specific in individual standards.

Some commenters (Ex. 3: 36, 81, 119) stated that proposed paragraph (f) should be revised to require "instruction" rather than "training". The Motor Vehicle Manufacturers Association (MVMA) (Ex. 3: 81, pg. 2) said:

Training is too elaborate a term for the degree of explanation required with PPE. More sophisticated PPE such as respirators or hearing protection, which require detailed training, is already provided for by certain OSHA standards. MVMA recommends that subparagraph (f) be retitled "Instruction" and the term "training" be changed to "instructed".

Some public hearing participants testified in support of the proposed 1910.132(f) performance-oriented approach to training. For example, the Chemical Manufacturers Association (CMA) testified (Tr. 159: 4/3):

\* \* \* CMA agrees that training is an essential element of an effective personal protective equipment program. We believe, however, that OSHA should continue to address training with performance-oriented provisions, not with HAZWOPER-type training requirements. Not only are additional requirements not necessary, they would be over-burdensome.

In addition, many commenters (e.g., Ex. 3: 36, 41, 50, 60, 73, 86, 98, 116, 128) suggested that OSHA revise proposed 1910.132(f) to provide more detailed guidance regarding what constitutes adequate training. For example, CSX Transportation (Ex. 3: 116) remarked:

A description of the performance requirements for a PPE training program should be included under 1910.132(f), since training is the responsibility of the employer.

Other commenters (Ex. 3: 123 and 128) emphasized that "personal" training is important to a successful training program. For example, the Food & Allied Services Trades (Ex. 3: 128, pg. 6) stated:

It is imperative that this training be conducted by "live" personnel who will be available to answer questions that workers may have. Simply showing a twenty minute video tape shall not constitute adequate training.

Also, commenters (Ex. 3: 36, 73) suggested that OSHA require training in the "use and care" of PPE. For example, the Edison Electric Institute (EEI) (Ex. 3: 73, pg. 2) said:

To further enhance the protection provided by the standard, EEI recommends amending proposed 1910.132(f) to require employees to be trained not only in the use of their equipment, but also in its care.

Further, some commenters (Ex. 3: 41, 59, 128) suggested that OSHA require training in the "use and limitations" of PPE. The Food & Allied Services Trades (Ex. 3: 128) stated that training in the limitations of PPE is needed "to prevent accidents from occurring due to overconfidence in the protective ability of certain types of equipment."

Other commenters (Ex. 3: 60, 107-D) suggested that employees be trained regarding PPE limitations and precautions. The American Optometric Association (Ex. 3: 60) remarked:

We do not believe that Section 1910.132(f) on training requirements goes far enough to ensure that any limitations or precautions provided by the manufacturer of the protector are transmitted to the user and care is taken to see that such limitations are strictly observed. In addition, we do not believe that appendix B Non-Mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection adequately addresses this area. There is no guarantee that the training provided employees in the use of eye and face protectors will uniformly cover the limitations and precautions relating to the use of protectors unless specific requirements for this training are given. We strongly urge that language making this a mandatory part of training be included in the regulation.

Some other commenters (Ex. 3: 74, 88) suggested that training include information provided by PPE manufacturers. For example, CF Industries, Inc. (CF) (Ex. 3: 74) objected to the proposed replacement of existing 1910.133(a)(5) (which requires employers to pass on to employees any information received from manufacturers regarding the limitations and precautions to be considered when using eye and face protection) by proposed 1910.132(f). The commenter stated: "CF believes that the proposed section is too broad. Various pieces of personal protective equipment can be used for the same purpose, but have very different limitations."

Also, two commenters from the State of Connecticut (Ex. 3: 50, 51) stated that "the final rule for 1910.132(f) should lean towards being more specific" and that proposed paragraph (f) should be revised to provide that "Employees shall be trained in the proper use, maintenance, care, warning labels and limitations of their personal protective equipment."

Other commenters (Ex. 3: 70, 86, 97) stated that proposed 1910.132(f) should be revised to incorporate the specific training requirements of existing 1910.120, the standard for Hazardous Waste Operations and Emergency Response (HAZWOPER). For example, the Emergency Response Management & Training Corporation (Ex. 3: 97) stated:

As it [proposed 1910.132(f)] is currently written there are no specifications as to the quality or quantity of training an employee will receive on the proper use and limitations of personal protective equipment. The inclusion of specific knowledge requirements and competency demonstration may assist in the goal of improving worker safety in hazardous environments. 29 CFR 1910.120 and NFPA 472-1989 (Standard for Professional Competence of Responders to Hazardous Materials Incidents) are two examples of this type.



Based on the concerns expressed regarding what constitutes adequate training, OSHA requested testimony in Issue 4 of the hearing notice (54 FR 3414, February 1, 1990) on the need for additional training requirements. In particular, Issue 4 indicated that OSHA was considering the promulgation of more specific training requirements, including provisions similar to those in existing 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER). The Agency also solicited input regarding what training is needed; how training can be evaluated; when retraining is necessary; how much time is required for training; what recordkeeping is necessary for training activities; and what impacts (i.e., costs and benefits) the training requirements would have.

With respect to Issue 4, several commenters (Ex. 7: 3, 8, 11, 20, 29, 38) stated that the training requirements should be more detailed. For example, the General Electric Company (Ex. 7: 3, pg. 2) said:

Protective equipment training needs to include:

1. Where and how personnel can get the equipment, 2. A system for identifying the correct equipment for an application \* \* \* procedures and operating manuals should include specifics on protective equipment types, needs and objectives, 3. Equipment should be shown to individuals prior to using each for the first time \* \* \* let them touch and try the items on, the more senses you allow one to use during training the better the person will recall what he/she learned, 4. Persons should not be considered competent in protective equipment items until they do a practical test \* \* \* are able to properly put on the item, explain what protection it provides, etc.

Also, Boeing (Ex. 7: 38) remarked:

Boeing supports the position that additional detail be included in 1910.132 regarding training objectives and methods. Training should be based on the complexity of the protective equipment requirements. For certain protective equipment (e.g. safety spectacles) training requirements should be minimal or nonexistent.

In addition, OSHA received testimony in favor of more specific training requirements at the public hearing. For example, the National Institute for Occupational Safety and Health (NIOSH) testified (Tr. 23-24: 4/3) that the key elements of a successful training program are:

- 1) Sensitizing the workers to the need for such protectors and inviting their participation in developing a suitable plan for affecting PPE use.
- 2) Clearly defining the written goals of the PPE program in terms of the target behaviors sought (e.g., appropriate footwear/eyewear/headwear to be worn, in what areas, what kinds of care required).
- 3) Explicit rewards or recognition to be given contingent on the workers displaying actions that conform to the aforementioned positive acts, including knowledge of results or other forms of feedback.
- 4) Each PPE program should have some basis for evaluation (numbers of workers using/not using specified PPE) so that modifications could be made should the efforts fall short of the stated goals.

Also, the International Chemical Workers Union testified (Tr. 16: 4/4):

Who is responsible for training employees in the proper use and limitations of personal protective equipment? It is the employer's responsibility to carry out this training but it is not being done \* \* \* Every worker should be able to determine that the glove being provided to them by their employer is the right one for the chemicals which they handle.

Another hearing participant, the National Environmental Training Association (NETA), testified (Tr. 272: 4/4) that "the proposal in 132(f) is not performance-oriented, it's too vague and nonspecific." NETA also testified (Tr. 285: 4/4):

The National Environmental Testing Association feels that if OSHA seriously considers training to be important in protecting worker safety \* \* \* then the language at 29 CFR 1910.132(f) will have to be more specific. Unless training is based on measurable objectives as OSHA has pointed out in the U.S. Department of Labor publication OSHA 2254 (Training Requirements in OSHA Standards and Training Guidelines) then it can only be effective by coincidence.

Many Issue 4 commenters (e.g. Ex. 7: 2, 13, 15, 21, 22) stated that OSHA should not promulgate more detailed training requirements. Those commenters expressed the belief that performance-oriented proposed 1910.132(f) allowed employers in general industry the flexibility to implement training programs as needed. For example, Amoco Corporation (Ex. 7: 21, pg.2) stated:

We agree that employees should be trained in the proper use of their personal protective equipment, since the equipment may not provide adequate protection if used improperly. We feel, however, that training programs are best left to each employer to develop on an individualized, site-specific basis. Manufacturers often provide information on their particular products upon which an instructional program can be based. Employers do need an effective formal training session when the use of new or significantly different equipment is instituted. This requirement helps ensure that time is actually dedicated to this purpose, and emphasizes the importance of proper use to the employee. Training guidance would be helpful, especially to small businesses, but we feel strongly that such guidance should be of a non-mandatory nature.

In addition, the Department of the Air Force (Ex. 7: 25) stated that it "supports locally devised training, rather than an OSHA legislated program training requirement, as both cost efficient and effective."

Also, several Issue 4 commenters (Ex. 7: 19, 31, 35) stated that proposed 1910.132(f) should not incorporate the HAZWOPER training requirements, because 1) general industry PPE was used in a broader class of work environments than HAZWOPER-mandated PPE, and 2) the PPE covered by proposed 1910.132(f) (e.g., eye and face protection, head protection and foot protection) was much less complex than that covered by HAZWOPER. For example, the American Petroleum Institute (API) (Ex. 7: 35) stated:

Suggestions that would treat Subpart I in a manner similar to paragraph 1910.120 are without justification. There is no relationship between the training requirements of paragraph 1910.120 (which are directly responsive to the enabling legislation dealing with hazardous waste sites) and the use of PPE in the controlled environment of a more typical place of employment.

In addition, the National Solid Waste Management Association (NSWMA) stated (Ex. 7: 19, pg. 2-3):

While NSWMA supports the concept of a structure for training of employees in the use of PPE, we find the use of the Part 1910.120 training requirements for Hazardous Waste Operations and Emergency Response as a model for general industry to be without any justification.

The Section 1910.120 rule was intended to provide specific safety criteria to cover a specific industry segment. There are other industries with equivalent or higher risks where the use of this section as a model would be appropriate.

NSWMA suggests that OSHA instead consider a training requirement more closely aligned with the concepts of its Hazard Communication Standard, wherein the complexity of the program required for compliance would be directly related to the hazards present. Such a program would require a survey of hazards, establishment of specifications for PPE to control those hazards, training for employees and documentation of the training, and availability of PPE information to employees \* \* \* In the low-risk example, having donning and doffing procedures formalized provides no useful function. What is critical is communicating the need for employees to understand the hazards and the need to utilize PPE on a consistent basis.

Based on the rulemaking record, OSHA agrees with commenters that employers need more specific guidance regarding how to train employees who use PPE. In particular, the Agency has determined that employees need training which enables them to know, at least: 1) when PPE is necessary; 2) what PPE is necessary; 3) how to properly don, doff, adjust, and wear PPE; 4) the limitations of the PPE; and 5) the proper care, maintenance, useful life and disposal of the PPE.

Accordingly, OSHA has revised proposed paragraph (f) so that paragraph (f)(1) of the final rule reads as follows:

The employer shall provide training, including retraining where appropriate, 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.

The National Environmental Training Association (NETA) and other rulemaking participants asserted that in order to have a successful training program, employers should set measurable training objectives and have their employees demonstrate that they have reached those objectives. For example, NETA testified (Tr. 272-286: 4/4) that in order for training to be successful, clear and measurable objectives must be set, and employees must demonstrate that the training objectives have been reached, by showing that they understand the information provided and that they can use the PPE properly.

OSHA agrees with these remarks and has stated in one of its own publications (OSHA 2254-1988):

\* \* \* in order for the training to be as successful as possible, clear and measurable objectives should be thought out before the training begins. For an objective to be effective, it should identify as precisely as possible what the individuals will do to demonstrate that they have learned, or that the objective has been reached. They should also describe the important conditions under which the individual will demonstrate competence and define what constitutes acceptable performance.

Therefore, paragraph (f)(2) of the final rule requires that each affected employee demonstrate an understanding of the training specified in paragraph (f)(1), and the ability to use the PPE properly, before being allowed to perform work requiring the use of PPE.

Paragraph (f)(3) of the final rule requires retraining when changes in workplace conditions or changes in the types of PPE to be used render previous training obsolete, and when inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the understanding or skill required by paragraph (f)(2). This provision, which did not appear in the proposed rule, indicates clearly that employers have an ongoing responsibility to maintain employee proficiency in the use and care of their PPE.

OSHA received many comments regarding how employers would indicate their compliance with the proposed training requirement. Some commenters (e.g., Ex. 3: 41, 90) noted a statement in the NPRM (54 FR at 33841) that "the proposal contains no recordkeeping requirements." Those commenters agreed with that approach, expressing the belief that detailed recordkeeping would impose an unreasonable burden, and requested "clarification" that no recordkeeping for training would be required.

Further, Detroit Edison (Ex. 3: 62), referring to proposed paragraph (f), noted, "Documented proof of training is required by other regulation. Is documentation required? OSHA should present a clearer picture of this requirement or delete it."

In addition, United Technologies (Ex. 3: 96) inquired, "Will perceived improper use of PPE be deemed by OSHA evidence of inadequate training in the absence of training documentation?"

Also, McDonnell Douglas (Ex. 3: 129) stated, "Even though OSHA has stated to OMB that this NPR does not have any recordkeeping requirements, what would be required to prove the "training" has been performed?"

Members of the Midwest Consortium for Hazardous Waste Worker Training (Ex. 3: 49, 59, 98, 123) suggested that OSHA require employers to document the content of their training programs. For example, Murray State University (Ex. 3: 123) stated, "Training should be mainly hands-on with appropriate documentation."

In addition, several commenters (e.g. 3: 46, 75, 88, 116) stated that proposed paragraph (f) would already require employers to document training. Some of those commenters (Ex. 3: 46, 88) stated simply that, contrary to the statement in Section VII of the proposed rule, OSHA had proposed to require recordkeeping, so the Agency had a responsibility to justify the burden and to properly estimate the cost of documentation. Other commenters (Ex. 3: 75, 116) stated that the documentation was needed to verify compliance with the training requirements, and that OSHA should not impose extensive recordkeeping requirements. For example, the Chemical Manufacturers Association (CMA) stated (Ex. 3: 75):

CMA agrees with OSHA's determination to omit recordkeeping from the proposed rule. While some form of verification should be maintained as an indication that training has taken place, specific documentation requirements would only add to the recordkeeping burden without increased safety benefits for employees.

In addition, CSX Transportation (Ex. 3: 116) remarked:

In Section 1910.132 a new training requirement exists that will require the establishment of training records for employees using PPE. While the standard does not specify any recordkeeping requirements, documentation for compliance purposes is clearly indicated.

As noted above, OSHA requested additional comments on the proposed training provision, including information on the recordkeeping needed to document compliance, in Issue 4 of the hearing notice (55 FR 3414, February 1, 1990). In particular, Issue 4 indicated that, based on NPRM comments (Ex. 3: 70, 86, 97), OSHA was considering training requirements similar to the HAZWOPER provisions promulgated in 1910.120(e). Section 1910.120(e)(6) requires employers to certify successful completion of training and to give graduates a written certificate. That provision further provides that persons who lack such certification shall be prohibited from engaging in hazardous waste operations.

In response to Issue 4, Jackson Products (Ex. 7: 8, pg. 2) stated:

Training of employees in the use of PPE should be the central focus of any rules OSHA is promulgating, as this issue has the highest potential for reducing worker injuries. Documentation of the training programs could follow the existing guidelines OSHA has developed for hazardous waste operations and employee right to know training, i.e., training log, employee signature sheet, etc.

In addition, BP America (Ex. 7: 39) stated, "we feel that the only criteria for successful completion of a training course can be that the trainee has mastered the information to the instructor's satisfaction. This can be documented in several ways including written exams and awarding of certificates."

As noted above, some Issue 4 commenters (Ex. 7: 13, 19, 25, 31, 35) opposed the adoption of the HAZWOPER training provisions in proposed paragraph (f). Regarding the applicability of the HAZWOPER recordkeeping requirements, the National Solid Wastes Management Association (NSWMA) stated (Ex. 7: 19, pg. 3):

Congress mandated additional regulations in the narrow field of the occupational safety and health of hazardous waste workers because hazardous waste operations and remediations involve, in OSHA's words, "unique" work environments. 54 Fed. Reg. 9312. Congress recognized that such operations involve potential exposure to a number of hazardous health risks unlike those encountered by employees in general industry activities. Thus, the OSHA standard prohibits work upon a hazardous waste site by anyone who is not properly OSHA-qualified and OSHA-certified. Certification may be granted only upon completion of initial training and continuing education courses within a comprehensive and exhaustive number of areas. See 29 CFR 1910.120(e)(6). These comprehensive standards apply whenever and wherever hazardous waste workers handle hazardous substances. The occupational safety and health requirements in Section 1910.120 were, accordingly, crafted in response to the Congressional insistence that safety and health standards more stringent than those applied to general industry be fashioned.

As noted above, the NSWMA suggested that OSHA model the requirements of proposed 1910.132(f) on the Hazard Communication Standard. The NSWMA recognized that recordkeeping would be necessary for training, stating: "In a low-risk situation, where bump hats and eye shields may be the only devices needed, a simple written program of several pages would suffice." In addition, the NSWMA stated:

Companies should not be required under this suggested system to gain prior OSHA certification of individual programs. Rather, companies should be permitted to certify that they have developed and implemented programs that are consistent with OSHA approved standards.

OSHA acknowledges that the proposed training provision implicitly required some method for verifying compliance. The Agency believes that the discussion of recordkeeping in Issue 4 of the hearing notice provided adequate notice that OSHA might require employers to create some method of verifying their training activities. Accordingly, based on the rulemaking record and for the sake of clarity, the Agency is revising proposed paragraph (f) to state explicitly that employers must verify that they have provided their employees with the requisite training.

Regarding the information needed to verify compliance, OSHA agrees with the commenters who have stated that it would be inappropriate to require specific documentation of the training provided. Given the performance-oriented focus of this rulemaking, the Agency has determined that the generation and review of extensive documentation would be unnecessarily burdensome. The Agency also notes that the training needs of employees covered by paragraph (f) of this section (approximately 22 million) are too diverse to enable OSHA to specify the details required for all of their PPE training.

Based on the rulemaking record, OSHA has determined that employers can adequately verify compliance with 1910.132(f) of the final rule through a written certification. The Agency has determined that a certification record which identifies each employee trained, the date(s) of training, and which identifies the document as a certification of training in the use of PPE, will provide adequate assurance that the employer has provided the requisite training.

The Agency notes that OSHA has also required certification of training in the permit-required confined space standard, 1910.146(g)(4); the control of hazardous energy (lockout/tagout) standard, 1910.147(c)(7)(iv); and, in the Telecommunications standard, 1910.268(c).

OSHA also notes that such a document will not preclude a citation if the Agency determines that the employees have not, in fact, been adequately trained. OSHA believes that compliance with this requirement, while imposing a minimal burden, provides an important benefit because it enables the employer and OSHA to verify the status of training efforts. Therefore, OSHA is promulgating new 1910.132(f)(4).

The Paperwork Reduction Act (PRA) (44 U.S.C. Chapter 35) sets limits on the efforts of federal agencies to collect "information". The definition of "information" in the OMB regulations implementing the PRA (5 CFR 1320.7(j)) specifies that "Information does not generally include \* \* \* certifications \* \* \* provided that they entail no burden other than that necessary to identify the respondent, the date, the respondent's address, and the nature of the instrument."

OSHA has determined that the certification of training required by paragraph (f)(4) constitutes a "certification" for the purposes of the PRA. Therefore, the certification would not be subject to the requirements of the Paperwork Reduction Act or of the implementing regulations (5 CFR Part 1320).

1910.133 Eye and face protection.

Proposed 1910.133(a) contained general requirements for eye and face protection. Proposed paragraph (a)(1) required the employer to ensure that employees use appropriate eye or face protection when they are exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acid and caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

Proposed paragraph (a)(1) also required that eye protection used by employees provide both front and side protection from flying objects. This portion of proposed paragraph (a)(1) resulted in many comments. Most rulemaking participants agreed with OSHA that eye protectors should provide both front and side protection from flying objects (e.g. Ex. 3: 28, 49, 59, 61, 83, 128; Tr. 53: 4/3) because studies (Ex. 2: 11) have indicated that most injuries have occurred (in those instances when eye protection was used) because flying objects went around the protection. However, several rulemaking participants disagreed with this requirement because they believed that OSHA was proposing that all eye protectors would have to provide side protection (e.g. Ex. 3: 41, 69). For example, a commenter from the Exxon Company (Ex. 3: 47, pp.1-2) said:

Exxon is concerned that the proposal could be interpreted to require all safety glasses to be equipped with side shields. Exxon's position is that many situations exist where safety glasses without side shields are adequate. For such routine operations, OSHA should not ignore the fact that most employees will be more reluctant to wear safety glasses with side shields than glasses without side shields. The mandatory use of side shields on all safety glasses could deter the overall use of safety glasses on and off the job which would ultimately lead to an increase in the total number of eye injuries.

We concur with OSHA that employees should be equipped with adequate eye protection to prevent injuries from flying objects. In those instances where our employees may be potentially exposed to flying objects, our safety program calls for the mandatory use of eye protection that provides both front and side protection.

Another commenter, from the American Optometric Association, remarked (Ex. 3: 60, pg. 2):

While we recognize that mandatory side shields would afford additional protection in many instances, they may not be practical in all situations. In addition, they may tend to reduce compliance with the use of the protector in cases where peripheral hazard protection is not required. We would recommend that side shields be required only when the job evaluation indicates that a definite peripheral hazard exists.

OSHA intended that proposed paragraph (a)(2) require side protection only when flying object hazards were present. Therefore, the Agency has revised the provision concerning flying object hazards to state clearly that front and side protection are required when there is a hazard from flying objects.

OSHA agrees that there are situations when side protection is unnecessary, and that employers should be allowed to decide, based on a hazard assessment which complies with the requirements of 1910.132(d) of the final rule, if such protection is necessary for their employees.

While one rulemaking participant (Ex. 3: 66) believed that side shields should be permanently attached, other rulemaking participants stated that side protectors need not be permanent and that OSHA should permit detachable or clip-on side protectors. For example, a commenter from Liberty Optical (Ex. 3: 63) said:

Clip-on side shields meet all the Z-87 performance standards that the permanent side shields meet and can be worn when necessary. To be able to wear proper protection where appropriate and be realistic in its use, will make the employee not look to side step it and, therefore, make it more effective and safer. If a blanket mandatory permanent side shield regulation to cover all industrial environments is implemented, it will reverse all gains made in recent years and will not accomplish its goal for a safer industrial environment.

OSHA agrees that side protection need not be permanent and that detachable side shields should be permitted as long as they meet the criteria specified in this section of the final rule. Permitting detachable side shields will provide employers the flexibility to use this kind of protection when necessary, based on conditions at the workplace.

The Agency has revised proposed paragraph (a)(1) accordingly, dividing the proposed paragraph into two provisions, 1910.133(a)(1) and (a)(2). Paragraph (a)(1) of the final rule states the general requirement to have each employee use eye or face PPE when exposed to eye or face hazards, while paragraph (a)(2) states that eye PPE must provide side protection, which may be detachable, when flying object hazards are present.

Proposed paragraph (a)(2) required that eye and face protection properly fit employees. Although the Agency did not receive any comments concerning the proper fit of eye and face protection, OSHA did receive comments addressing the proper fit of PPE, in general, and the need for properly fitting PPE for both male and female employees. This subject was discussed previously under 1910.132 of this preamble, and OSHA has included a requirement in 1910.132 of the final rule that all PPE properly fit employees. Therefore, proposed paragraph (a)(2) has not been included in the final rule, since it would be redundant.

OSHA proposed in paragraph (a)(3) that protectors with tinted or variable tinted lenses not be worn when an employee must pass from a brightly lighted area, such as outdoors, into a dimly lighted area, such as a warehouse. The Agency proposed this requirement because it believed that the provision might reduce the

likelihood that extreme lighting changes would temporarily impair the vision of an employee.

This proposed requirement was the subject of Issue 3 of the hearing notice (55 FR 3412, February 1, 1990). The proposed paragraph and Issue 3 generated a substantial amount of comment and testimony. While a few rulemaking participants agreed with the proposed provision (e.g. Ex. 3: 28; Ex. 7: 2, 38), many opposed the provision and/or approach proposed by OSHA (e.g. Ex. 3: 55, 61, 68; Ex. 7: 7, 8, 15, 23; Tr. 193: 4/3; Tr. 150-156: 4/4; Tr. 169: 4/4). Some of the rulemaking participants stated that the proposed paragraph was too restrictive and vague. These rulemaking participants stated that the employer (or designated safety officer) should decide when the use of this type of eyewear may create a hazard. This approach is similar to that used in the ANSI standard for eye protection (ANSI Z87.1-1989; paragraph 6.5.2).

For example, a commenter from the American Optometric Association (Ex. 7: 11, pg. 2) stated:

The use of photochromic lenses in industrial situations is dependent upon the visual demands of the task and the visual needs of the wearer. The decision on the need for and use of photochromic lenses can best be made by evaluation of the work place requirements by the employer in consultation with the employee's eye doctor. The development of a blanket policy restricting the use of photochromic lenses for certain job tasks is unwarranted. The individual visual needs and working conditions should dictate when photochromic lenses may be inappropriate.

The American Optometric Association supports the ANSI Z87.1 position which provides employers the discretion to decide when photochromic lenses may be utilized.

Additionally, an ophthalmologist from the Mount Sinai Medical Center (Ex. 7: 14 pg. 2) remarked:

\* \* \* the many beneficial features of photochromic lenses, particularly in safety glasses, justifies their continued unfettered use in the workplace. My concern is that this proposed government intervention will likely deter workers from using these photochromic lenses as safety devices and that increased numbers of eye injuries and workplace accidents will ultimately result.

A hearing participant from Corning, Inc. (Tr. 111-114: 4/4) testified:

Today, photochromic lenses are used throughout the world and over 500 million lenses have been sold. Roughly, more than 250 million pairs of eye glasses. Currently, more than 38 million photochromic lens blanks are sold each year. Corning has therefore literally hundreds of millions of man years of experience with the use of photochromic eyeglasses without any reported health or safety problem of the type to which the proposed regulation is addressed. I believe that proposal 1910.133 (a)(3) is too vague and is in any event unnecessary and overly restrictive. The use of photochromic lenses are subject to the ANSI Z87.1 standards including paragraph 6.5.2 and we believe this is the appropriate standard for dealing with any possible need for a limitation on photochromic usage.

That witness also asserted (Tr. 120: 4/4):

In daylight, outdoors, when the photochromic lenses darken to function as sunglasses they protect the eyes dark adaptation process. It is well known that those who wear sunglasses in sunlight adapt to darker environments up to twice as fast as those who do not. In the transient condition, that is, coming in from a brighter outdoor condition to a darker indoor condition, wearing photochromic lenses can actually provide better and more comfortable vision under a broad variety of work conditions. Visual function in the transition to and from bright light is superior when photochromic rather than clear lenses are used.

After evaluating the rulemaking record, OSHA has concluded that the proposed requirement was too restrictive. The Agency has determined that the employer, or the employer's representative (such as the company safety professional), will be in the best position to determine when tinted or variable tint lenses should or should not be used, based on awareness of workplace conditions. OSHA also notes that this approach is consistent with the current ANSI standard (ANSI Z87.1-1989-paragraph 6.5.2) which is (as discussed below) being incorporated by reference in the final rule. Accordingly, proposed paragraph (a)(3) has not been retained in the final rule.

Proposed paragraph (a)(4) required that employees who wear prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in their design, or shall be protected by eye protection that can be worn over prescription lenses without disturbing the proper position of the prescription or protective lenses.

The Agency did not receive any comments on this proposed provision and it is, therefore, contained in the final rule as proposed. However, since this section has been reorganized, the provision has been redesignated as 1910.133(a)(3) of the final rule.

Existing 1910.133 (a)(4) states that "every protector shall be distinctly marked to facilitate identification only of the manufacturer." OSHA had proposed to delete this provision because the Agency believed that compliance did not add to or detract from the safety of the protector.

Although a few commenters agreed with OSHA in principle (e.g. Ex. 3: 50, 92, 115), the vast majority of commenters stated that the marking requirement should not be deleted (e.g. Ex. 3: 75, 88, 92, 114, 126).

For example, a commenter from the Optical Laboratories Association (Ex. 3: 71, pg. 4) asserted:

The existing system of easily identifying the manufacturers of the components of eye PPE is embedded in the standard to assure accountability and is accepted throughout the industry. It should be retained.

In addition, a commenter from Monsanto (Ex. 3: 102, pg. 3) stated:

Since employees are permitted to provide their own eye protection and employers are held accountable to ensure that employees are wearing the proper eye protection, these markings provide employers a ready way of checking for whether or not employees are wearing the proper eye protection.

Also, CF Industries (Ex. 3: 74) commented:

The identification markings are necessary in the event of a manufacturing defect or material defect, so that the purchaser may receive an adjustment from the seller or manufacturer. Identification is also needed in case the manufacturer makes a product recall.

Dr. Joseph F. Novak (Ex. 3: 107-A) commented:

My suggestion is that OSHA approved safety eyewear be marked in a manner similar to that of the ANSI Z87.1-1989 Code.

In supporting the concept that OSHA should be consistent with the ANSI requirement for marking, a commenter from US West, Inc. (Ex. 3: 85, pp. 2-3) stated:

US WEST, Inc. recommends that the identifying marking, i.e. manufacturers monogram and "Z87", continue to be required (ANSI Z87.1-1989 8.10). US WEST, Inc. disagrees with OSHA's statement that " \* \* \* marking to identify the manufacturers of eye and face protection does not add or delete from the safety afforded by the protector." Lenses meeting ANSI Z87 are easily identified by the manufacturers monogram. "Street" or "dress" spectacles not meeting ANSI Z87 are also easily identified by the absence of such markings. US WEST, Inc. has found non-Z87 replacement prescription lenses placed in employees Z87 frames, reducing the employees degree of protection.

Based on the above-discussed comments, OSHA included Issue 1 in the Hearing Notice, to elicit more information regarding the utility of compliance with existing 1910.133(a)(4). The comments and testimony received (Ex. 7: 2, 13, 31; Tr. 55, 133, 156: 4/3; Tr. 68, 148, 225: 4/4) uniformly supported retaining the marking requirement.

For example, one commenter from SIGNODE (Ex. 7: 6) stated:

There is agreement that marking of eye and face protection "does not add or detract from the safety afforded by the protector" however, the current etched lens marking provide the safety manager, management and supervision a means of verifying that the worker, employee, contractor or visitor is, in fact, wearing proper safety eyewear, not street wear. Based on the rulemaking record, OSHA has concluded that the requirement for marking



of eye and face protectors should be retained. OSHA agrees with commenters that the marking of eye and face protectors provides easy recognition that the protectors meet specified criteria (ANSI Z87.1-1989); that marking will provide accountability, and traceability in cases of product recall; and that marking requirements should be consistent with the ANSI Z87.1-1989 standard, since this is the accepted and recognized practice throughout the industry. Accordingly, the requirement for marking of eye and face protectors is being retained in 1910.133(a)(4) of the final rule.

Proposed paragraph (a)(5) required that employees use equipment with filter lenses that have a shade number appropriate for the work being performed for protection from potentially injurious light radiation. OSHA also proposed a table in this paragraph which contained a list of appropriate shade numbers for various operations. The Agency did not receive any comments on this provision, and it is contained in the final rule with minor editorial changes.

Proposed paragraph (b) of 1910.133 contained "acceptable design" requirements for eye and face protection. In this provision, OSHA proposed that eye and face protection comply with the design requirements specified in ANSI Z87.1-1989, or be of a design which could be demonstrated to be equally effective.

Rulemaking participants supported the proposed adoption of the ANSI standard for eye and face protection (ANSI Z87.1-1989). However, a few commenters (e.g. Ex. 3: 101, 125) expressed concern that the Agency proposed to adopt only the "design requirements" of ANSI Z87.1. These commenters asserted that OSHA should adopt by reference all of the ANSI standard, not just the design requirements.

OSHA agrees that eye and face protective devices must meet all of the provisions contained in the ANSI standard. This requirement is stated explicitly in ANSI Z87.1-1989, Section 3. OSHA acknowledges that the proposal did not clearly express the Agency's intent to reference ANSI Z87.1-1989 in its entirety and is revising the proposed rule accordingly.

Other rulemaking participants (e.g. Ex. 3: 1, 62, 75, 102, 128) suggested that OSHA adopt by reference the "current" edition of all of the applicable ANSI standards (i.e., the ANSI standards for eye and face protection, head protection, and foot protection) rather than referencing a specific edition. These commenters stated that this approach would prevent a situation where the OSHA standards would be outdated when the ANSI standards are revised in the future.

OSHA notes that it would be improper for the Agency to reference consensus standards as suggested, because such action would illegally subdelegate authority over the content of OSHA standards to the committees responsible for updating the ANSI standards.

The Agency will accept eye and face protective devices as complying with this section if they are demonstrated to be as effective as those meeting the specific ANSI standard referenced by the final rule. For example, the final rule is incorporating by reference the 1989 edition of ANSI Z87.1 for eye and face protection. Eye and face protective devices meeting a subsequent edition of the same ANSI standard would be acceptable to the Agency (and a de minimis violation of the standard) if it could be demonstrated by the employer that they were as effective as those meeting the 1989 edition.

In particular, employers would need to establish either that there was no substantive difference between a subsequent edition of Z87.1 and the 1989 edition, or that PPE which satisfied subsequently modified test criteria provided protection equivalent to that provided by PPE which satisfied the 1989 edition. Proposed paragraph (b) of 1910.133 has been revised accordingly.

The incorporation by reference of ANSI Z87.1-1989 has been approved by the Office of the **Federal Register**, in accordance with the requirements of 5 U.S.C. 552(a) and 1 CFR part 51. Therefore, proposed paragraph (b) has been revised so that paragraph (b)(1) of the final rule reflects that approval and provides the requisite information regarding access to the text of ANSI Z87.1-1989.

As discussed above, OSHA has also determined that it is appropriate to permit the continued use of eye and face PPE purchased prior to the effective date of the final rule, as long as it complies with the ANSI standard (Z87.1-1968) referenced by existing 1910.133(a)(6). To this end, the Agency has redesignated proposed paragraph (b) as paragraph (b)(1) of the final rule and has added "grandfathering" text in paragraph (b)(2) of the final rule.

With respect to the subject of eye and face protection, Issue 5 of the Hearing Notice (55 FR 3412) requested comments and information concerning the use of contact lenses. Specifically, the Agency asked if it should expand its eye and face requirements to cover contact lenses.

Some commenters (e.g. Ex. 7: 13, 15, 16) stated that no additional regulations were necessary for the use of contact lenses. Other commenters (Ex. 7: 21, 26) believed that OSHA should address the issue of contact lenses in the final rule, and should clarify if it is permissible to wear contact lenses with eye protection.

Several commenters (e.g. Ex. 3: 107-D; Ex. 7: 5, 22) stated that wearing contact lenses with appropriate eye protection does not present any additional hazards.

Based on the rulemaking record, OSHA believes that contact lenses do not pose additional hazards to the wearer, and has determined that additional regulation addressing the use of contact lenses is unnecessary. The Agency wants to make it clear, however, that contact lenses are not eye protective devices. If eye hazards are present, appropriate eye protection must be worn instead of, or in conjunction with, contact lenses.

#### 1910.135 Head Protection

Proposed 1910.135 set requirements for the use of protective helmets and set criteria for acceptable equipment designs. Proposed paragraph (a) required employees to wear protective helmets (1) "when working in areas where there is a potential for injury to the head from falling or moving objects" and (2) "where they are near exposed electrical conductors which could be contacted by the protective helmets." Proposed paragraph (b) referenced American National Standard, ANSI Z89.1-1986, "Protective Headwear for Industrial Workers-Requirements".

The proposed language was based on existing 1910.132(a) and 1910.135 and on ANSI Z89.1-1986. Existing 1910.132(a) requires that the PPE necessary to protect employees from workplace hazards be provided, used and maintained properly. That standard specifically includes head protection under its coverage. Existing 1910.135 facilitates compliance with existing 1910.132(a) regarding helmets worn for protection "from falling and flying objects and from limited electric shock and burn," by requiring that those helmets comply with the American National Standard Safety Requirements for Industrial Head Protection, Z89.1-1969. ANSI Z89.1-1986 is the most recent edition of the pertinent national consensus standard.

Proposed 1910.135(a)(1), unlike existing 1910.135, explicitly required the use of protective helmets. The proposed paragraph also made some editorial revisions to existing 1910.135. For example, the proposal replaced "flying" with "moving", because OSHA believed the term "moving" better described the means in which objects contact employees. OSHA used the terms "flying" and "moving" in the existing and proposed rules, respectively, in conjunction with the term "falling" to be consistent with ANSI Z89.1-1969.

A commenter (Ex. 7: 20) stated that OSHA should address lateral impact protection "since there are substantial injuries that occur from directions other than vertical impact\* \* \*" In the course of this rulemaking, OSHA obtained a helmet (Ex. 46) capable of protecting employees against lateral as well as vertical impacts.

In addition, NIOSH testified (Tr. 30: 4/3) that, while most blows to the head come from the back, front or side, ANSI Z89.1 1986 addresses only protection for the top of the head. NIOSH further testified: "Currently helmets are being marketed that provide impact protection to most parts of the head. OSHA standards should encourage the use of these more protective helmets."

Some rulemaking participants (Ex. 3: 84, 96) expressed concern regarding the use of the term "moving" in the proposed paragraph. For example, the American Petroleum Institute (API) (Ex. 3: 84, pg. 4) stated:

API is opposed to the wording of this paragraph. The ANSI Standard Z89.1-1986 referenced in 1910.135(b) contains helmet specifications "to protect the heads of industrial workers from impact or penetration by falling objects\* \* \*" OSHA must recognize that the ANSI standard does not provide design criteria for moving objects. If OSHA intends this section to also cover helmets protecting against moving objects, as proposed in 1910.135(a)(1), additional design criteria should be cited in 1910.135(b).

In addition, United Technologies (Ex. 3: 96, pg. 2) stated:

Under 1910.135 Head Protection, we find the requirement to provide head protection vague, and welcome additional clarification from OSHA with regard to potential for injury to the head from moving objects. We are concerned compliance personnel will interpret the requirement so broadly as to include any use of hoisting equipment. Although we can envision an occasional situation where there may be a hazard, most operations using a hoist would present no significant hazard.

Another commenter (Ex. 3: 40) suggested that OSHA revise proposed 1910.135(a)(1) so that the provision "Mandates that employers require their employees wear protective helmets when they are in an area where there is potential for injury to the head from falling, moving, swinging, flying or airborne objects." The commenter did not state why it believed the recommended language was needed.

Also, commenters (Ex. 3: 72, 79) stated that proposed 1910.135(a)(1) should also require employees to wear head protection when working in confined spaces and commenters (Ex. 3: 79, 119) have stated that OSHA should require protection against impacts with fixed objects.. For example, Centel (Ex. 3: 72) noted that injuries may result from contact with low hanging structures and that Centel already requires its employees working in confined spaces to wear head protection.

In addition, the Tennessee Valley Authority (TVA) (Ex. 3: 79) stated:

We believe a statement should be added with provision for protection against impacts with fixed objects. We recommend a sentence should be added that addresses this hazard. We also suggest that in areas that are confined or congested and the employee is subject to impact with fixed objects, suitable protective helmets be worn. We recommend that bump caps should not be used in an industrial environment because there are too many possibilities of head injuries that could occur. We recommend maximum head protection at all times in this type of environment.

The current ANSI standard, Z89.1-1986, addresses only protection "from impact and penetration by falling objects and from high-voltage electric shock and burn." The Agency has determined that it would be inappropriate for 1910.135(a) to cover head protection that is not also covered by the ANSI standard referenced in 1910.135(b), unless OSHA provides criteria for assessing compliance. The Agency has determined that it is not in a position to set such criteria, so OSHA has deleted the term "moving" from 1910.135(a)(1) of the final rule and has not added the terms suggested by commenters.

The Agency believes that compliance with the ANSI criteria referenced through 1910.135(b) of the final rule will enable employers to protect their employees from a large proportion of potential head hazards. Head protection not covered by 1910.135 of the final rule, such as would be needed to protect employees from "moving" or "fixed" objects, is covered by the general requirements of 1910.132, as revised. OSHA anticipates that employers whose hazard assessments identify head hazards that are not abated through compliance with ANSI Z89.1-1986, will develop and implement other measures as necessary, to protect their employees.

Proposed 1910.135(a)(2) required that employees who are near exposed energized conductors which their heads could contact must wear helmets designed for protection from electrical hazards. Two commenters (Ex. 3: 36, 73) suggested that OSHA revise the proposed provision by adding requirements for proper maintenance of head protection. In particular, Public Service Electric and Gas Company (Ex. 3: 36) stated that proposed paragraph (a)(2) should also require: "Protective helmets shall be worn and cared for as recommended by the manufacturer. Protective helmets shall not be altered or defaced which would take away the impact and/or dielectric integrity of the helmet."

OSHA has determined that any employee protection which could result from compliance with the suggested language on maintenance will already be attained through compliance with existing and proposed 1910.132. This section contains requirements concerning defective and damaged equipment, 1910.132(e); and, training requirements pertaining to the maintenance of PPE, 1910.132(f)(1)(v).

Another commenter (Ex. 3: 81) stated that proposed paragraph (a)(2) was unclear, because it appeared "to require nonconductive helmets for electricians whenever they are "near exposed electrical conductors" even if there is no reasonable probability of contact." The commenter suggested that OSHA revise the proposed language to require the wearing of protective helmets "WHEN they are near exposed electrical conductors which their heads could contact."

The Agency notes that the suggested language is consistent with the description of proposed paragraph (a)(2) in the preamble to the proposed rule (54 FR 33836). OSHA agrees that clarification of the proposed paragraph is appropriate and has revised the proposed paragraph accordingly.

Proposed 1910.135(b) required that the design of protective helmets comply with the design requirements of ANSI Z89.1-1986 or be of a design that provides equivalent protection. Existing 1910.135 references the requirements and specifications established in ANSI Z89.1-1969. As noted in the preamble to the NPRM (54 FR 33837), OSHA has determined that, except as regards electrical insulation for Class B helmets, the 1969 and 1986 editions of ANSI Z89.1 set essentially the same requirements. The Agency also has determined that Class B helmets currently in use already comply with the electrical insulation requirements of ANSI Z89.1-1986.

OSHA also proposed to allow protective helmets which, while not designed to the specifications of ANSI Z89.1-1986, were "demonstrated to be equally effective". The Agency believed that this performance-oriented approach would encourage innovation and the use of improved equipment.

A commenter (Ex. 3: 119) stated that the proposed language allowing protective helmets of a design which has been demonstrated to be equally effective "is not well defined." In addition, the commenter questioned the availability of the means and the personnel to determine if helmets not designed according to ANSI Z89.1-1986 were equally effective. The commenter suggested that OSHA delete the language in question and require compliance with ANSI Z89.1-1986.

Another commenter (Ex. 7: 20, pg. 3), in discussing the proposed language "demonstrated to be equally effective", inquired:

Does this mean or does it include possible - prototype lab tests with field trials - engineering or technical expert evaluation - certification agency assessment - appropriate standard and certification by foreign manufacturer, or certification or testing agency which could presumably satisfy the primary intent for protection of the reference standard.

To require a user to develop a new standard or a new certification process for a new product or design already proven elsewhere could void the flexibility intended in the "equivalency" clause.

OSHA believes that the performance criteria set out in ANSI Z89.1-1986, Section 7, indicate clearly how employers or the Agency can determine if helmets that do not otherwise comply with the consensus standard are "equally effective". OSHA also believes that the performance-oriented language of proposed paragraph (b) allows employers the appropriate flexibility to address their particular safety needs.

Another commenter (Ex. 3: 126) stated that "protective helmets should comply with the performance requirements as well as the design requirements of ANSI Standard Z89.1-1986."

In the course of evaluating these comments, OSHA noted that there are no provisions specifically designated as "design requirements" in ANSI Z89.1-1969 or ANSI Z89.1-1986. The 1986 edition, in particular, sets scope and purpose provisions; definitions; types and classes provisions; materials provisions; physical requirements; performance requirements; and test methods for protective helmets. The preamble discussion of proposed paragraph (b) (54 FR 33836-33837) referenced the physical requirements (e.g., the maximum weight), the

performance requirements (e.g., impact resistance, penetration protection, flammability, water absorption resistance and electrical insulation) and the test methods (e.g., "stringent" test methods for testing of "Class B" helmets against high-voltage) of ANSI Z89.1-1986.

OSHA agrees, and intends, that head PPE meet all of the provisions contained in the ANSI standard. This requirement is stated explicitly in ANSI Z89.1-1986, Section 2. OSHA acknowledges that the proposal did not clearly express the Agency's intent to reference ANSI Z89.1-1986 in its entirety and is revising the proposed provision accordingly.

The incorporation by reference of ANSI Z89.1-1986 has been approved by the Office of the **Federal Register**, in accordance with the requirements of 5 U.S.C. 552(a) and 1 CFR part 51. Paragraph (b) of the final rule has been revised to reflect that approval and to provide the requisite information regarding access to the text of ANSI Z89.1-1986.

As discussed above, OSHA has determined that it is appropriate to permit the continued use of head PPE purchased prior to the effective date of the final rule, as long as it complies with the ANSI standard (Z89.1-1969) referenced by existing 1910.135. To this end, the Agency has redesignated proposed paragraph (b) as paragraph (b)(1) of the final rule and has added "grandfathering" text in paragraph (b)(2) of the final rule.

In the proposal (54 FR 33837), OSHA solicited comments and information concerning bump caps, head protection that was not addressed in existing or proposed 1910.135 and that would not satisfy the criteria of Z89.1-1986. In particular, the Agency requested information with respect to the appropriateness of addressing this type of head protection in the final rule. OSHA also solicited input regarding the need for regulation of bump caps in Issue 5 of the Hearing Notice (55 FR 3412). Some rulemaking participants (e.g. Ex. 3: 28, 40, 58) have suggested that OSHA establish requirements for bump caps. For example, Sandia National Laboratories (Ex. 3: 58) stated:

Currently, there are no Federal standards, regulations, or guidance of any kind with which industry can make proper and adequate decisions on the use of bump caps.

Bump caps are not new to the work place. Where the risk of head injury has been determined to be of low probability or result in minor contusions, scraps or cuts, bump caps have been provided. The old adage that "something is better than nothing" tends to prevail when industry is forced to make an educated guess. Is the adage true in the case of bump caps? In summary there is a need for Federal time and money to be spent on discovering the pro's and con's associated with bump caps and developing corresponding guidance for their use in the work place.

On the other hand, Kerr-McGee Corporation (Ex. 3: 119, pg. 3) stated:

Kerr-McGee's use of bump caps is limited to areas where there is no potential for injury to the head from electrical contact or from falling or moving objects, but where a hazard may exist due to striking one's head against fixed, low-clearance objects.

Kerr-McGee is not aware of any voluntary or consensus standards covering bump caps. If the degree of protection afforded by currently-produced bump caps is determined by scientific studies to be inadequate for their intended use as stated on the products, then OSHA should request ANSI to develop a standard. Otherwise, we do not see the need for additional specifications or standards.

Most rulemaking participants ( e.g. Ex. 3: 2, 64, 65, 68; Ex. 7: 22; Tr. 140: 4/3; Tr. 160-61: 4/3) opposed adding requirements for bump caps to the final rule because they believe that if head protection is needed, then it would be safer to require head protection meeting ANSI Z89.1-1986. For example, a commenter from the American Trucking Association (Ex. 3: 64, pg. 5) remarked:

For the trucking industry in general, bump caps are not practical. Although they are used in some operations for select job tasks, the motor carrier industry has found little benefit in reducing minor head injuries through their use. In fact, safety personnel from a cross section of the nation's motor carriers recently explained that bump

caps can be more of a hinderance than a help; they frequently fall off, and in some instances, they can cause vision obstructions.

Another commenter, from the Union Carbide Corporation (Ex. 3: 68, pg. 3), said:

\* \* \* Union Carbide would not support a provision pertaining to "bump caps". Where there is sufficient hazard potential to indicate the need for bump caps, it is safer simply to require that hard hats be used.

A commenter from the Amoco Corporation (Ex. 7: 21, pg. 2) stated:

We believe that the use of "bump caps" has no place in a company-sponsored safety program and therefore do not favor its inclusion in this proposal.

OSHA has concluded, based on review of the rulemaking record, that the available data do not support regulatory action regarding bump caps. Therefore, the Agency will neither restrict the use of bump caps nor set criteria for such use. OSHA will evaluate an employer's choice of head protection based on the e hazards to which employees may be exposed. Therefore, the employer's compliance with the requirement for a hazard assessment, in 1910.132(d), is of critical importance.

### 1910.136 Foot Protection

Proposed paragraph (a) of this section required employers to ensure that employees wear protective footwear when working in areas where there is a danger of foot injuries due to falling and rolling objects, or objects piercing the sole. This proposed provision received a large amount of support from rulemaking participants (e.g. Ex. 3: 49, 59, 64, 67). Many of the rulemaking participants agreed with referencing the American National Standards Institute (ANSI) standard for personal protection, ANSI Z41-1983, "Protective Footwear," particularly since this standard, unlike the superseded 1967 edition, sets criteria for women's footwear and for puncture resistance. However, two commenters were concerned as to when this protection would be required. A commenter from the American Trucking Association (ATA) stated (Ex. 3: 64, pp. 4-5):

\* \* \* in some operations drivers may be exposed to falling or rolling freight hazards, or other hazards presented by nails or other sharp objects. In these cases, safety shoes, non-penetrable soles, or some other type of protective footwear are appropriate. On the other hand, there are thousands of drivers that never handle freight or come into exposure with falling or rolling freight, sharp objects, or any other number of hazards.

\* \* \* The need to require the equipment must be determined on a case by case basis--taking into account the specific operations, and the specific tasks and hazards of the various job functions.

Another commenter, from the Aluminum Company of America (ALCOA), expressed a similar concern with respect to when foot protection is required (Ex. 3: 2):

Specialty shoes such as "electrical hazard" footwear or "conductive" shoes have special requirements that would not permit metal insoles to prevent the puncture. If this requirement is upheld, the current design standards and performance criteria for electrical hazard shoes could not be met.

OSHA notes that these concerns are addressed by 1910.132(d), as proposed and as promulgated. That provision requires the employer to perform a hazard assessment. From the hazard assessment, the employer can determine what PPE is needed. As to the example presented by the ATA, if it is determined through an appropriate hazard assessment that an employee is not exposed to foot hazards, the employer would not have to provide this type of protection. As discussed above, the hazard assessment provision allows employers the flexibility to choose the PPE that is appropriate for a particular workplace situation.

Regarding the ALCOA comment, OSHA notes that if it is determined through a hazard assessment that electrical workers are not exposed to the hazard of sharp objects puncturing the soles of shoes (which would be the case in many instances), the protective footwear would not have to provide this type of protection.

On the other hand, if it is determined through a hazard assessment that employees are exposed both to electrical and puncture hazards, the employer would be required to ensure that employees wear shoes which protect the employees from both hazards.

Both the 1983 and 1991 editions of ANSI Z41 set criteria for protection of feet from electrical hazards. While proposed 1910.136(b) required that footwear be designed to either comply with Z41-1983 or be demonstrated to provide equivalent protection, proposed 1910.136(a) did not explicitly require that employees wear foot protection against electrical hazards. The Agency had intended proposed paragraphs (a) and (b) to be consistent and to reflect the 1983 edition of ANSI Z41. While employers are already required to protect employees from electrical hazards under existing 1910.132, OSHA believes that guidance regarding foot protection against electrical hazards will be clearer and more useful if it appears in 1910.136. OSHA has revised proposed 1910.136(a) accordingly.

In paragraph (b) of 1910.136, OSHA proposed that the design of protective footwear comply with the requirements of ANSI Z41-1983, or be of a design which has been demonstrated to be equally effective.

Rulemaking participants (e.g. Ex. 3: 49, 59, 67, 72, 105, 118, 123) supported the adoption of the ANSI standard for foot protection (ANSI Z41). Further, several commenters (e.g. Ex. 3: 65, 67, 82, 84) suggested that OSHA adopt by reference the "updated" or "current" edition of ANSI Z41. For example, Footwear Industries of America (FIA) (Ex. 3: 67, pg. 2) remarked:

FIA therefore agrees with OSHA's proposal to update its personal protective equipment standard for foot protection to comply with the improvements made in the ANSI standard. The Agency should note, however, that the 1983 version of the ANSI Z41 standard may soon be replaced by an updated set of industry standards.

FIA suggests that OSHA may wish to await the 1990 version of ANSI Z41 rather than to incorporate a seven-year old, nearly outdated standard into 29 C.F.R. 1910.136.

The Agency notes that the 1991 edition of the ANSI standard for foot protection has, in fact, replaced the 1983 edition of ANSI Z41 referenced by OSHA in proposed 1910.136(b).

OSHA has determined that it is appropriate to reference the current 1991 edition of ANSI Z41 in 1910.136(b) of the final rule because that edition imposes essentially the same requirements as the 1983 edition, except that the 1991 edition provides more specific performance requirements for resistance to compressive forces and standardizes the puncture resistance testing method. OSHA believes, based on its review of the pertinent ANSI standards and of the protective footwear currently available, that compliance with the referenced requirements of ANSI Z41-1991 will not result in disallowing foot protection that would have complied with the requirements of ANSI Z41-1983.

As discussed above, OSHA has determined that it is appropriate to provide explicitly for the continued use of foot PPE purchased prior to the effective date of the final rule, as long as it complies with the ANSI standard (ANSI Z41.1-1967) referenced by existing 1910.136. Therefore, the Agency has redesignated proposed paragraph (b) as paragraph (b)(1) of the final rule, and has added "grandfathering" text in paragraph (b)(2) of the final rule.

A commenter from the Tennessee Valley Authority (Ex. 3: 79) observed that OSHA proposed to incorporate only the design requirements of the referenced ANSI standards and not the selection requirements, guidelines, and other general information contained in the documents. As explained above in the preamble, OSHA acknowledges that the proposal did not clearly express the Agency's intent to reference the ANSI standards in their entirety and is revising proposed paragraph (b) accordingly.

The incorporation by reference of the pertinent ANSI standards has been approved by the Office of the **Federal Register**, in accordance with the requirements of 5 U.S.C. 552(a) and 1 CFR part 51. Therefore, proposed paragraph (b) has been revised so that paragraphs (b)(1) and (b)(2) of the final rule reflect that approval and provide the requisite information regarding access to the text of those ANSI standards.

1910.138 Hand protection.

Issue 5 of the hearing notice (55 FR 3414), requested testimony, comments and information regarding the need for regulation of additional types of PPE. Specifically, the Agency stated that it was considering the appropriateness of promulgating requirements for hand protection (gloves) and skin protection (chemical protective clothing).

The Agency's concern with respect to hand protection and chemical protective clothing arose from information contained in the record (e.g. Ex. 6: 2, 3, 4, 5), which indicates that a large number of employee injuries are occurring due to the lack of adequate protection from hand and skin hazards. Additionally, neither OSHA or ANSI currently have criteria for hand protection nor for chemical protective clothing.

While OSHA received some information pertaining to chemical protective clothing, most of the rulemaking participants who addressed Issue 5 focused their remarks on gloves. Those rulemaking participants suggested that OSHA provide performance criteria and test methods for gloves and provide better guidance for the selection of gloves. They stated that in many instances gloves are not being worn, and when gloves are worn, they are often the wrong type of glove for the application involved (e.g. Ex. 3: 114; Ex. 7: 33, 38, 42; Ex. 53; Tr. 213-236: 4/3; Tr. 13-20: 4/4).

For instance, a commenter from the United Steelworkers of America (Ex. 3: 114, pg. 2) said:

Protective clothing and gloves: OSHA should also set standards for these items since so many gloves do not work with some chemicals and last longer with other chemicals.

Also, a commenter from the Washington State Department of Transportation (Ex. 7: 33) stated:

I think that additional language regarding skin and hand protection needs to be added to this section so this type of PPE is not excluded from the selection process.

That commenter also submitted suggested language to address hand hazards, and the selection and fit of gloves.

Boeing (Ex. 7: 38, pg. 2) commented:

Boeing supports the position that additional guidelines related to body and hand protection are necessary in 1910.132. Such guidelines should provide information on the selection of hand and body PPE based on reported experience and industry needs. Such guidance would facilitate the acquisition and use of appropriate PPE and eliminate any uncertainty regarding proper application.

A hearing participant from the Occupational Health Foundation testified (Tr. 213: 4/3):

Based on our experience visiting plants and working with workers, we believe there's a critical need for language to really spell out the program requirements for effective use of gloves.

That participant also remarked (Tr. 215: 4/3):

In 1988, occupational skin disease accounted for about one-fourth of all reported occupational illnesses. Even with under-reporting, it's a very serious worker health problem.

In addition, a hearing participant from the International Chemical Workers Union testified (Tr. 15-16: 4/4):

I go into a lot of plants throughout the country and site visits and the first thing I do is I look at the OSHA 200 log. I see many cases of occupational dermatitis. My first assumption was these people are not wearing gloves. After further investigation once I'm in that facility, I find out that the workers are wearing gloves, but they're wearing the wrong glove for the application involved. So, this really needs to be addressed.

The Agency also received some useful information about the various types of gloves and types of hazards for which they should be used; the composition of the various types of gloves; and, other helpful information (Ex. 3: 27). There were also some informative studies submitted to the record concerning the hand and skin hazards posed by certain chemicals (Ex. 42).



After careful evaluation of the rulemaking record, OSHA has concluded that the high incidence of hand injuries, together with evidence that hand protection either is not being worn by employees or is being worn for the wrong type of hazards, warrants the inclusion of more detailed requirements for selection and wearing of hand protection.

Therefore, a new section, 1910.138, is being added to the final rule to address hand protection.

Paragraph (a) requires that employers select, and that employees use, appropriate hand protection. In addition, paragraph (a) identifies some of the types of hazards for which hand protection must be worn by employees. These include hand hazards and potential hand hazards from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

Paragraph (b) addresses the selection of the appropriate type of hand protection for the hazard or potential hazard that is present at the workplace. The purpose of this provision is to assure that employees are using the appropriate type of gloves for the tasks to be performed. For example, foundry workers generally must wear gloves that provide thermal protection, while meat cutters must wear gloves that protect against cuts. While the selection of the appropriate type of glove for a certain task or hazard may seem to be obvious, the rulemaking record indicates that many hand injuries have occurred because the wrong type of glove was used for a certain task.

Therefore, OSHA has determined that employers need more explicit guidance in determining what hand protection their employees need. The Agency anticipates that compliance with this provision will assure that employees use the appropriate type of hand protection for the assigned tasks and the identified hazards.

OSHA has also added information to Appendix B of the final rule regarding the selection of appropriate hand protection.

#### Third party certification

In the NPRM (54 FR 33835), OSHA solicited comments on whether or not the Agency should require third party certification of PPE. OSHA indicated that it would consider promulgating such a provision to ensure that PPE meets OSHA standards. In addition, Issue 2 of the hearing notice (55 FR 3413) solicited testimony, with supporting information, regarding the extent to which third party certification of PPE required by Subpart I would be appropriate.

The third party certification issue generated more response than any other subject covered by this rulemaking. Many of the participants in this rulemaking supported third party certification (e.g. Ex. 3: 3, 16, 27, 37, 83, 90, 92, 98, 114, 120, 123; Ex. 7: 3, 18, 20; Tr. 55: 4/3; Tr. 92-97: 4/3; Tr. 6-7: 4/4; Ex. 49).

In supporting third party certification, a commenter from MSA (Ex. 3: 18) stated:

In order to provide user companies with assurances that personal protective equipment meets the appropriate standards, we think it would be highly desirable for OSHA to require third-party certification of PPE. We think a program such as the one offered by the Safety Equipment Institute that provides independent testing and quality assurance audits is extremely valuable and adds minimum cost to safety equipment.

A commenter from ETL Testing Laboratories, Inc. (Ex. 3: 43) added:

Our experience supports the use of third-party certification as positive assurance that the products covered by a program do, in fact, meet the standards to which they are tested, and that follow-up inspections verify that they continue to meet the requirements. Third-party certification programs offer the user of personal protective equipment a positive pledge that the product has been designed and manufactured to provide the protection needed. It further simplifies the selection process by way of readily available lists of complying products and recognizable labels and marks on them.

Although we are not prepared to give detailed estimates of costs of third-party certification for the various products, the fees are not burdensome, even on small businesses. The equipment must be tested, whether it is in a program or not; therefore, that cost is present in either case. The administration of a simple yet effective program with follow-up factory inspection would probably not exceed \$1,500-2,000 per year per plant based on some similar programs we operate. Obviously, there are many types of programs, and the fees will vary dependent on the level of services rendered.

In supporting third party certification, a commenter (Ex. 3: 103) from the Safety Equipment Institute (SEI) described that organization's certification program as follows:

SEI's program of periodic quality assurance audits and product testing is now widely accepted by industry and government. Over two hundred organizations and federal agencies require the SEI certification as a condition of procurement for PPE. SEI combines both compliance testing of product and periodic quality assurance audits of manufacturers' production facilities. These activities are performed under SEI direction by independent third parties to maintain an objective program.

A commenter from the Food & Allied Service Trades (Ex. 3: 128, p.4) asserted:

We feel that third party certification, akin to that currently required for respiratory protection, should be mandated by the proposed rule. Such certification would guarantee that equipment was thoroughly tested prior to its being relied on to provide safety for workers who may daily, or even occasionally, encounter hazardous situations.

A hearing participant from the Industrial Safety Equipment Association (ISEA) (Tr. 136-137: 4/3) testified:

Whether the third party certification is performed by private or governmental entity, ISEA supports its use as a means of confirming the quality of products made for the protection of workers. In the absence of government standards and certification of compliance, ISEA endorses third party certification of compliance with ANSI standard Z87.1, 1989, and Z89.1, 1986.

We believe that the additional cost involved for manufacturers of personal protective equipment to obtain certification is minimal, as is reflected by the number of eye and face protection devices and industrial helmets which are already certified by the Safety Equipment Institute.

Third party certification costs are averaged over the volume of units sold, and we believe end up as an insignificant cost increase.

Other rulemaking participants expressed concerns with the concept of third party certification. One concern expressed by several rulemaking participants (e.g. Ex. 3: 28, 79, 87, 105) was the belief that OSHA envisioned requiring employers, rather than manufacturers of the PPE, to obtain the third party certification. That was not the Agency's intent. OSHA notes that the manufacturer of the PPE, not the purchaser/user, is, in general, the party who is in the appropriate position to have products tested and evaluated. OSHA's intention regarding the duty of employers was to reaffirm the employer's responsibility to purchase and have employees use only PPE that would meet the requirements of the pertinent standards.

Rulemaking participants also expressed concern that it would be very difficult to have third party certification of prescription safety eyewear (e.g. Ex. 3: 60, 71, 93, 115; Ex. 7: 11, 34; Tr. 184-191: 4/3; Tr. 206: 4/4; Ex. 50). They asserted that third party certification would not be practical since the eyecare providers and prescription laboratories, generally small businesses, who produce prescription eyewear would be unable to bear the burden of third party certification. They also stated that each pair of prescription glasses is unique to the individual for whom it was prescribed. Those rulemaking participants explained that lenses are tested by the manufacturer to meet ANSI standards, and frames are tested to meet ANSI standards by the frame manufacturers. Those participants also expressed the belief that this testing meets the intent of third party certification. OSHA notes that the assurance provided by such procedures may be even better than that obtained through third party certification because each lens and frame is tested, rather than the representative sample of eyewear that would be tested through a third party certification program.

For example, a commenter from the Optical Laboratories Association (OLA), stated (Ex. 3: 71, pp.1-2):

It is the position of OLA that third-party certification of devices utilizing lenses made to individual prescription (Rx) is not feasible, and in fact would not guarantee the safety-level provided by the present system as prescribed by Z87. This is so because third-party certification of all devices would not be practicable, whereas under the present system prescription lenses are subject to a rigorous test and the fabricator of each lens certifies, by its trademark, that the lens meets the standard.

It is therefore submitted that the existing system of separate testing of the frame and lenses of spectacles containing prescription lenses meets OSHA's objectives and is practical. Further testing of the completed device after the lenses are inserted would not be feasible. While the test may not cause a device failure, it may damage the lenses and weaken the frame.

A commenter from Corning (Ex. 3: 115, pg. 4) said:

We do not believe that this [third party testing of prescription eyewear] is practical. Most industrial eyewear today [is] prescribed. \* \* \* each prescription pair of glasses is unique to the individual for which it was prescribed and made. The common denominator is that prescription eyewear lenses are 100% tested to pass the industrial eyewear requirements for primary protection, i.e., impact resistance. Further, frames are tested and marked by the frame manufacturer to meet the requirements.

Other rulemaking participants opposed third party certification of PPE (e.g. Ex. 3: 65, 68, 99; Ex. 7: 1, 8, 39). For instance, the belief was expressed (Ex. 3: 119) that the present voluntary system is adequate, particularly in light of widespread concerns regarding product liability. In general, those opposed to third party certification believed it would add cost, without adding any appreciable safety benefit.

For example, a commenter from the American Gas Association (Ex. 3: 46, pg. 13) stated:

We urge OSHA not to adopt such a requirement. Such certification would increase unnecessarily the incremental cost of compliance while providing few, if any, benefits. Manufacturers who claim they are in compliance with the ANSI standard could be subject to liability in cases where products fail to meet that standard. The cost of third party compliance would be borne by the industry when the risk of liability should be sufficient to ensure compliance.

Another commenter, from the Pacific Maritime Association (Ex. 3: 80), remarked:

Third party certification of personal protective equipment by employers would be both costly to the manufacturer and, subsequently, the employer. Additionally, it is not clear in the proposal as to how this requirement would enhance the safety of the workforce. It would place an additional administrative and financial burden on both manufacturers and employers, which does not seem to be justified.

In response to the hearing notice, a commenter from the Motor Vehicle Manufacturers Association (MVMA) asserted (Ex. 7: 31, pg. 2):

MVMA strongly objects to the proposal of requiring third party certification for personal protective equipment. We believe that personal protective equipment which meets the requirements of various safety standards such as ANSI and the certification programs conducted by the Safety Equipment Institute are adequate to provide the assurance that the PPE will meet the performance specifications necessary to protect an employee. To require a third party certification will be redundant, costly and will not enhance the safety or performance of PPE.

In opposing third party certification, a commenter from Monsanto (Ex. 7: 16) said:

[W]e question whether third party certification will add any benefits in terms of protection for employees. It will certainly add to the cost of such equipment. We believe that the manufacturers' written statement that their equipment meets the requirements of the appropriate ANSI standard should be sufficient. Our perception is that this arrangement has worked well over the years and we see no benefit in changing it.

OSHA has carefully considered this issue and, after a thorough evaluation of all of the information contained in the record, has concluded for several reasons, that it would not be appropriate to require third party certification.

First, while OSHA has recognized that third party certification of PPE can increase confidence in and use of PPE, a requirement for such third party certification will not add to the inherent safety of the PPE tested and certified. Also, given the extent to which the PPE industry has already voluntarily adopted third party certification, the Agency believes that any benefit resulting from the addition of such a requirement would be minimal.

Furthermore, revised subpart I provides other means to determine if PPE meets the pertinent standard. In particular, compliance with revised subpart I's performance-oriented requirements for hazard assessment, PPE selection, and training will result in appropriate selection, use and maintenance of PPE by affected employees. For example, the Agency expects that the training required in new 1910.132(f) will increase affected employee confidence in the assigned PPE and, as a consequence, increase the use of PPE.

Also, OSHA believes, given the limited benefit expected from third party certification, that it would be unreasonable to require that employers procure only PPE that has third party certification. Such a requirement would impose unnecessary burdens on PPE manufacturers who can establish by other means that their products comply with the pertinent OSHA standards.

In addition, the Agency believes that allocating the resources needed to implement and enforce a requirement for third party certification would unreasonably detract from OSHA's ability to enforce the other provisions of revised subpart I.

The Agency is also adding non-mandatory appendices A and B to provide additional guidance to employers and employees with regard to PPE for eye, face, head, foot, and hand hazards.

#### **IV. Regulatory Impact, Regulatory Flexibility and Environmental Assessment of Revisions to Subpart I, Personal Protective Equipment**

##### Introduction

In 1971, OSHA adopted its current standards for personal protective equipment (PPE) from national consensus standards under section 6(a) of the OSH Act. Since then, advances in PPE technology have resulted in greater occupational protection in workplaces where equipment innovations have been adopted. In this final rule, OSHA promulgates a nationwide standard for PPE that reflects these improved means of hazard prevention.

Executive Order 12866 (58 FR 51735) requires that a Regulatory Impact Analysis be prepared for any "significant regulatory action". A "significant" rule would have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local or tribal governments or communities. In addition, the Regulatory Flexibility Act (5 U.S.C. 601, et seq.) requires an analysis of whether a regulation will have a significant economic impact on a substantial number of small entities. Finally, section 6(f) of the Occupational Safety and Health Act provides that, where a party has challenged the validity of an OSHA standard in the Court of Appeals, the determinations of OSHA (such as findings regarding the nature and severity of workplace hazards and the feasibility of identified abatement measures) shall be conclusive if supported by substantial evidence in the record considered as a whole.

OSHA determined, based on the Agency's Preliminary Regulatory Impact Analysis [1] and its review of the rulemaking record, that the final rule for General Industry PPE is not a "significant regulatory action" for the purposes of review under Executive Order 12866. However, in order to satisfy the various statutory requirements placed upon the Agency and to further explain why OSHA has classified this regulatory action as "non-significant" for Executive Order 12866 purposes, OSHA presents this Final Regulatory Impact, Regulatory Flexibility and Environmental Impact Assessment.

##### Industry Profile

Based on a report prepared by Eastern Research Group under contract to the Department of Labor [2], OSHA has determined that the hazards addressed by the personal protective equipment standard are present in varying degrees in virtually all workplaces covered by the OSHA General Industry standards (29 CFR 1910). The extent of the rule's impact will vary by industry depending on the hazards, the types of occupational activity and current practices regarding PPE use.

Many types of PPE have been in widespread use in industry for many years. However, until recently very little statistical data existed to determine the number of employees who either are using PPE or who should be wearing PPE by virtue of the hazards to which they are exposed.

OSHA's inspection data document that approximately 3.5 percent of all planned safety inspections result in citations under the existing PPE standards. The inspection data identifies the standard industrial classification (SIC) of the establishment, size of plant workforce, union status, and information related to the inspection itself; less frequently reported are data on degree of hazard present in workplaces, the number of workers exposed to the hazard, or the type of PPE required.

In its Preliminary Regulatory Impact Analysis [1], OSHA examined injury statistics for affected industry sectors. Among the accident databases searched by OSHA were Work Injury Reports (WIR) published by the Bureau of Labor Statistics (BLS). These reports examine cases where a worker was injured and provide evidence that many workers are not wearing adequate personal protective equipment. Based on the BLS data, relatively few firms with serious recordable injury cases have performed a formal assessment of the potential hazards in their workplace. In addition, little training was offered to workers regarding the importance of using protective equipment in these firms.

To obtain accurate information on the need for personal protective equipment and the extent to which that need is being met, OSHA conducted a national survey in 1989 [3,4,5]. The survey sampled 5,361 establishments, representing 1.1 million establishments in 61 SIC groups. The survey identified the hazards related to industrial processes and the types of PPE required when working in or near these processes. The survey solicited information on PPE practices and safety procedures and assessed whether engineering controls such as protective guards or overhead nets were in place. Answers to survey questions were used to evaluate the appropriateness of PPE use. Survey questions also addressed PPE training and hazard assessment. (See the background document and appendices in this docket for more detailed information on the survey and supporting data related to this analysis.) Table 1 shows the major industry groups covered by the PPE standard, the total number of affected establishments, total affected employment, number of production employees and number of employees exposed to PPE-related hazards. Of the 16.9 million production workers, the survey identified 11.7 million exposed workers within 1.1 million establishments who should be wearing some form of PPE. These numbers are lower than was indicated in the PRIA, due to a refinement in the analysis regarding affected population. Occupational categories identified by OSHA as having a significant degree of required PPE use include craft, operating, maintenance and material handling employees. These categories encompass most production employees and are most likely to be affected by this standard. However, as noted in the PRIA [1, p. II-2-4], OSHA has previously estimated over a million other workers may also be exposed to hazards requiring PPE use in the rest of general industry (1).

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Footnote(1) As was indicated in the PRIA, while all general industry workers are potentially affected by these standards, exposed workers are heavily concentrated in certain occupations and in certain industries. Building upon information provided for the PRIA and comments to the record, this final analysis focuses on those groups of workers and industries judged to have a heavy concentration of PPE use. In this analysis population at risk was determined by survey results indicating a hazard that required the use of PPE. The PRIA had used the term "population at risk" to refer to all workers in two "production worker" job categories in general industry [1, p. II-1-5]. It should be noted that this analysis in no way implies that other workers may not be exposed to hazards preventable by PPE, but simply that the great majority are found in certain specific job categories and industries.

SICs	Industries	Total Establishments	Total Employees	Production Employees	Employees At Risk
20,21	Food & Tobacco	23,388	1,673,287	1,196,818	782,205
22	Textiles	6,439	727,651	596,846	255,815
23,31	Apparel & Leather	25,708	1,239,402	964,677	558,884
24	Lumber & Wood Products	37,063	739,296	597,764	405,054
25	Furniture & Fixtures	10,563	515,866	412,323	306,280
26	Paper & Allied Products	6,732	680,961	479,730	387,578
27	Printing & Publishing	60,836	1,499,451	680,370	462,259
28	Chemicals	12,411	1,023,169	497,054	402,925
29	Petroleum Refining	2,158	166,032	44,169	33,805
30	Rubber & Plastics	14,703	851,467	565,705	393,468
32	Stone, Glass, Concrete	15,351	550,779	400,987	282,065
33	Primary Metals	7,130	741,297	549,603	476,145
34	Fabricated Metals	34,605	1,401,605	921,660	638,577
35	Machinery & Computers	53,031	2,032,338	1,018,420	788,598
36	Electric & Electronics	17,836	2,063,033	1,204,266	810,492
37	Transportation Equipment	9,688	1,762,926	1,113,656	894,417
38,39	Misc. Manufacturing	24,860	1,091,140	599,624	410,532
41,42	Transportation	124,121	1,770,983	1,258,897	688,183
48	Communications	23,505	1,281,837	788,800	642,609
49	Utilities	17,741	934,650	334,492	266,440
501,55,					
75	Automotive Trade & Services	326,793	3,066,501	1,373,718	803,309
50,51,					
52	Wholesale & Retail Trade	189,947	2,056,173	963,641	822,312
7692	Welding Repair	6,653	31,800	24,622	20,317
13	Oil & Gas Extraction	26,957	396,519	117,579	92,602
078,08	Horticulture & Forestry	46,294	290,552	173,863	106,782
	<b>TOTAL</b>	<b>1,124,513</b>	<b>28,588,715</b>	<b>16,879,284</b>	<b>11,731,653</b>

Source: U.S. D.O.L., OSHA, Office of Regulatory Analysis, based on the results of a 1989 nationwide survey

From survey results OSHA developed a profile of the affected population by exposed bodily area (anatomical part), summarized in Table 2. As the table shows, almost 8.8 million workers are exposed to foot injury, while the potential for hand injury exists for 4.7 million workers. Other anatomical parts covered by this rule are eyes (2.8 million workers at risk), head (1.9 million workers) and face (381,000 workers).

SICs	Industries	Production Employees	Total Exposed Population	Body Part Exposed(*)				
				Head	Eye	Face	Hand	Foot

20,21	Food & Tobacco	1,196,818	782,205	112,574	91,806	0	220,059	652,884
22	Textiles	596,846	255,815	36,685	104,918	3,877	134,689	129,498
23,31	Apparel & Leather	964,677	558,884	16,527	72,682	0	462,683	133,101
24	Lumber & Wood Products	597,764	405,054	65,597	29,483	104,352	103,547	388,436
25	Furniture & Fixtures	412,323	306,280	26,231	41,767	26,130	127,295	234,696
26	Paper & Allied Products	479,730	387,578	35,146	132,898	4,576	156,569	326,256
27	Printing & Publishing	680,370	462,259	0	242,298	0	257,095	333,121
28	Chemicals	497,054	402,925	116,763	158,344	3,098	155,596	322,095
29	Petroleum Refinin	44,169	33,805	14,562	11,918	476	16,136	15,948
30	Rubber & Plastics	565,705	393,468	47,984	57,839	20,048	124,766	313,688
32	Stone, Glass, Concrete	400,987	282,065	64,462	38,156	19,234	81,620	243,835
33	Primary Metals	549,603	476,145	95,001	95,727	120,272	214,995	394,255
34	Fabricated Metals	921,660	638,577	33,157	85,767	12,101	144,447	570,595
35	Machinery & Computers <sup>1</sup> ,	018,420	788,598	59,583	146,365	2,246	329,603	631,485
36	Electric & Electronics	1,204,266	810,492	66,001	334,211	611	469,622	455,479
37	Trans- portation Equipment	1,113,656	894,417	53,777	129,841	4,575	315,617	759,262
38,39	Misc. Manu- facturing	599,624	410,532	35,815	124,151	9,092	203,543	284,091
41,42	Trans- portation	1,258,897	688,183	70,798	79,546	588	67,043	665,473
48	Communi- cations	788,800	642,609	461,102	133,783	15,162	341,999	182,129
49	Utilities	334,492	266,440	126,995	106,879	24,321	96,394	246,691
501,55,								
75	Automotive Trade & Services	1,373,718	803,309	55,791	297,398	0	407,995	595,690
50,51,								
52	Wholesale & Retail Trade	963,641	822,312	255,319	154,863	4,842	134,153	742,635
7692	Welding Repair	24,622	20,317	797	11,108	172	10,492	15,278
13	Oil & Gas Extraction	117,579	92,602	49,872	51,451	0	51,804	76,391

078,								
08	Horticulture & Forestry	173,863	106,782	22,050	39,546	5,146	83,217	44,856
TOTAL		16,879,284	11,731,653	1,922,589	2,772,745	380,919	4,710,979	8,757,868
Footnote(*) "Exposed body part" total exceeds total exposed population because some employees are exposed to multiple hazards								
Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis								

### Technological Feasibility and Costs of Compliance

#### Technological Feasibility

The existing and revised standards for subpart I require personal protective equipment wherever necessary by reason of the hazards of processes, environment or worker activity. New 1910.132(d) requires workplace hazard assessment and new 1910.132(f) requires employee training in the use of PPE. The revised standards for eye and face protection, protective headwear and foot protection update, prospectively, references to pertinent consensus standards. OSHA expects that employers will be able to comply with the new and revised requirements without difficulty, because the means of compliance are readily available and because the final rule "grandfathers" equipment that complies with the existing standards.

OSHA anticipates that the new requirements for hazard assessment, prohibition of defective and damaged equipment, and employee training can be implemented with available technical personnel and other resources. OSHA's survey probed the extent to which firms have already adopted the elements of a PPE program. Comments in the record were also evaluated in order to establish current industry practices.

On the basis of evidence in the record, including results from the OSHA PPE survey, OSHA has determined that the final PPE standard is both technologically and economically feasible.

#### Costs of Compliance

OSHA estimated compliance costs using data on current practices and exposed population from the PPE survey. Aggregating costs across industry sectors, OSHA estimates a total annual compliance cost of new provisions in the revised rule will result in a cost of \$52.4 million. Total compliance costs by industry sector are presented in Table 3.

SICs	Industries	Annualized Cost of Compliance with Training Requirement	Annualized Cost of Hazard Assessment	Total Annualized Cost of Compliance with Revisions to PPE Standard
20,21	Food & Tobacco	\$2,672,097	\$563,775	\$3,235,871
22	Textiles	\$1,533,441	\$170,892	\$1,704,333
23,31	Apparel & Leather	\$2,582,549	\$742,021	\$3,324,570
24	Lumber & Wood Products	\$1,676,192	\$584,579	\$2,260,771
25	Furniture & Fixtures	\$1,250,063	\$263,721	\$1,513,783
26	Paper & Allied Products	\$1,403,654	\$149,625	\$1,553,279
27	Printing & Publishing	\$3,346,716	\$1,083,078	\$4,429,794
28	Chemicals	\$1,059,463	\$116,425	\$1,175,888
29	Petroleum Refining	\$44,768	\$22,235	\$67,003



30	Rubber & Plastics	\$1,312,997	\$339,299	\$1,652,296
32	Stone, Glass, Concrete	\$591,905	\$237,192	\$829,097
33	Primary Metals	\$688,419	\$142,911	\$831,330
34	Fabricated Metals	\$1,073,787	\$610,317	\$1,684,104
35	Machinery & Computers	\$1,694,596	\$914,849	\$2,609,445
36	Electric & Electronics	\$3,259,889	\$349,067	\$3,608,956
37	Transportation Equipment	\$1,748,188	\$152,397	\$1,900,586
38,39	Misc. Manufacturing	\$1,525,950	\$297,213	\$1,823,163
41,42	Transportation	\$1,345,878	\$1,873,465	\$3,219,343
48	Communications	\$302,276	\$105,567	\$407,843
49	Utilities	\$466,182	\$118,261	\$584,444
501,55,				
75	Automotive Trade & Services	\$3,873,396	\$4,772,142	\$8,645,538
50,51,				
52	Wholesale & Retail Trade	\$1,757,275	\$1,736,471	\$3,493,746
7692	Welding Repair	\$44,047	\$50,749	\$94,796
13	Oil & Gas Extraction	\$927,521	\$175,555	\$1,103,077
078,08	Horticulture & Forestry	\$282,269	\$373,659	\$655,928
TOTAL		\$36,463,518	\$15,945,464	\$52,408,983

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis

OSHA's survey identified 433,149 establishments which need to take steps to come into compliance with the new provisions for hazard assessment. (Of 825,265 affected establishments, approximately 47 percent already had a hazard assessment program in place.) The cost to conduct hazard assessments was estimated to be \$15.9 million per year, assuming a reassessment is conducted once every five years.

The new provision for PPE training would affect approximately 10.8 million employees estimated in need of PPE training, at an annual cost of \$36.5 million.

Estimates for the cost of providing PPE training differ from those in Preliminary Regulatory Impact Analysis due to comments received and results from OSHA's PPE survey. This information indicated that the problem of PPE non-usage is considerably more widespread than originally estimated. Correspondingly, this indicated that the population requiring PPE training was larger than originally estimated.

#### Assessment of Hazards and Benefits

##### Injuries

OSHA believes that the risk of fatality and injury to workers is unacceptably high among sectors affected by the revised personal protective equipment standard. The revised PPE standard is designed to enhance compliance with existing requirements and ensure future compliance related to a heightened level of hazard awareness and

training. These changes to the standard should help to eliminate or reduce accidents within industries subject to the rule.

The standard has performance-oriented provisions addressing eye, face, hand, head and foot hazards that allow employers to adopt the most up-to-date PPE for use in their establishment. The flexibility to substitute new materials and technologies should produce more comfortable and protective PPE. An increase in worker acceptance and use of PPE should translate into additional benefits. OSHA's expectation is that increased use of better equipment will prevent or lessen the severity of many incidents.

According to BLS statistics in Occupational Injuries and Illnesses in the United States by Industry, 1989 [6], there were a total of 1.6 million lost-workday cases and 1.8 million non-lost-workday cases during the survey year. Eastern Research Group [7] analyzed survey-related data, which were used to extract the number of these injuries that were related to use (or nonuse) of PPE. In turn, BLS Work Injury Reports were analyzed to estimate what portion of those injuries related to inconsistent or inappropriate use of PPE, or lack of hazard identification. Injuries prevented in significantly affected industry sectors are shown in Table 4. Since injuries will be prevented in some other industry sectors as well, total estimates are conservative.

SIC	Industry	Lost Workday Cases Prevented	Lost Workdays Prevented	Non-lost workday Cases Prevented
20,21	Food & Tobacco	3,178	57,195	3,945
22	Textiles	710	12,780	1,405
23,31	Apparel & Leather	607	11,531	1,482
24	Lumber & Wood Products	1,850	35,151	2,375
25	Furniture & Fixtures	1,216	20,680	1,818
26	Paper & Allied Products	978	21,512	1,718
27	Printing & Publishing	755	14,340	1,361
28	Chemicals	783	14,870	1,082
29	Petroleum Refining	120	2,529	125
30	Rubber & Plastics	1,873	31,837	2,625
32	Stone, Glass, Concrete	989	19,782	1,578
33	Primary Metals	1,829	36,587	2,821
34	Fabricated Metals	3,506	63,114	6,097
35	Machinery & Computers	3,372	57,324	6,744
36	Electric & Electronics	1,343	24,173	2,578
37	Transportation Equipment	1,966	37,359	5,829
38,39	Misc. Manufacturing	1,044	19,374	1,610
41,42	Transportation	2,127	54,710	2,355
48	Communications	255	4,846	357
49	Utilities	740	13,318	867
501,55,				
75	Automotive Trade & Services	1,423	26,005	7,942
50,51,				

52	Wholesale & Retail Trade	6,243	109,743	7,005
7692	Welding Repair	90	1,424	91
13	Oil & Gas Extraction	389	11,680	404
078,08	Horticulture & Forestry	537	10,358	316
		37,924	712,223	64,530

Source: U.S. Department of Labor, Bureau of Labor Statistics and OSHA, Office of Regulatory Analysis

OSHA estimates that 712,000 lost workdays<sup>(2)</sup> and 65,000 non-lost workday cases will be realized from compliance with requirements for employee training and workplace hazard assessment. These benefits will be gained through selection of more appropriate PPE, increased awareness of hazards and improved consistency in use. These benefit estimates exceed those of the PRIA because OSHA has determined that current compliance with the PPE standards is poorer than was estimated in the PRIA. In addition, OSHA believes these requirements will enhance compliance with existing requirements, thereby preventing more injuries; however, the extent of these benefits are difficult to quantify.

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Footnote<sup>(2)</sup> Recent research by Arthur Oleinick identifies a possible underestimation of lost workdays when reference periods are bounded by calendar years, as in the BLS survey. For elaboration of this point, see Oleinick [8].

OSHA also estimated the number of fatalities associated with the absence of personal protective equipment. From an analysis of BLS, NIOSH and OSHA accident data, OSHA estimates that 125 fatal head injuries occur annually. While most fatal head injuries are the result of crushing injuries, falls, explosions and other traumatic events beyond the scope of this standard, some are preventable with the use of head protection. Based on a review of OSHA accident abstracts and an understanding of the rule's scope and effectiveness, OSHA estimates that 4 head injury fatality cases are preventable each year through compliance with the new provisions of the standard.

### Cost Savings

Based upon these estimated reduction in injuries, OSHA estimates that society will reap substantial economic benefits from prevented injuries. Lost work time injuries can be particularly expensive.

PPE is uniquely effective in preventing eye injuries, for example, which can be severely debilitating. Dr. Leonard Parver [9, pp. 28-29] of Georgetown University's ophthalmology department elaborated on this cost to employers:

These injuries tend to be very devastating. They have severe impact on the patient in terms of vision, and the costs are phenomenal. We estimate the costs of hospitalizing these patients at \$250 million per year. That's just for the hospital stay; that doesn't include lost work days and compensation costs. This is a very significant problem, and very, very preventable. We're not talking about reinventing the wheel here. We have the means of doing this. We have adequate eye protective gear. It's a matter of educating the workforce that this is necessary.

While employers typically bear only a fraction of the costs related to injuries, these costs can be substantial. Employers specifically will benefit from reduced lost production time, administrative time spent preparing insurance claims and accident reports and replacing injured workers. Based on a 1981 study by Levitt and coworkers [10], OSHA estimates the cost to employers from the average lost worktime injury is at least \$4000<sup>(3)</sup>. This cost includes:

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Footnote<sup>(3)</sup> Levitt's wage rates were adjusted to reflect current wage conditions in general industry [11]. In light of the National Safety Council estimates presented later in this document, given the debilitating severity of many PPE accidents (eye, head), and the surge in workers compensation costs in recent years, an estimate of \$4000

per injury is likely to be conservative.

- \*Administrative cost of handling insurance company claims
- \*Wages paid to other workers for the time not worked (work interrupted)
- \*Cost of scheduling and funding overtime necessitated by the accident
- \*Cost to find and train a replacement worker
- \*Extra wage cost to rehabilitate the returning worker at a reduced capacity
- \*Cost to clean up, repair, or replace damage from the accident
- \*Cost of wages for supervision associated with the accident
- \*Cost for safety and clerical personnel to record and investigate the accident

Other nonquantifiable costs associated with accidents, such as increased anxiety among non-injured workers, the loss of employee goodwill towards the employer, and the impact on public perception of a company and its products were not considered in the Levitt study.

Based on the Levitt study and the estimated 37,924 lost workdays prevented, OSHA estimates that the rule will save firms over \$150 million annually.

However, as noted above, the cost of workplace injuries is typically borne primarily by employees themselves. The National Safety Council recently calculated the societal cost per lost worktime injury at \$27,000 [7,p. 35], by factoring in long-term wage losses, medical expenses, administrative expenses and miscellaneous employer costs. Applying this figure to OSHA's estimate of 37,924 lost workday injuries prevented annually, revisions to this rule should save society (employees, employers and third parties) over \$1 billion annually.

These estimates of the economic benefits of the rule may be conservative, since the benefits analysis focuses on injuries prevented, not reduced severity of injuries. To the extent the rule results in nonlost workday injuries, as opposed to disabling lost workday injuries, the economic benefits may be greater yet. In sum, OSHA estimates the rule will save society over \$1 billion annually, dwarfing the initial \$52 million investment. Employers themselves should save over \$150 million through full compliance with revisions to the PPE standard, approximately three times the estimated cost of compliance.

#### Economic Impact and Regulatory Flexibility Analysis

OSHA analyzed the potential economic impact of the revised PPE standard and has determined that none of the major industry groups subject to the standard would experience a significant economic burden as a result of compliance, even before cost savings to employers are factored in. Table 5 presents average compliance cost, revenue, profit, and economic impacts of the standard for establishments in affected industry groups. If all of the compliance costs are passed through to the consumer, OSHA estimates that the average price increase would be negligible, less than 0.001 percent, calculated as the ratio of total compliance cost to industry sales. The maximum price increase in any industry would be less than 0.005 percent. Given the minuscule price increases necessary to cover these safety investments, employers should be able to pass along compliance costs to their customers. However, even if all costs were absorbed by the affected firms, the average reduction in profits would be approximately 0.01 percent, the largest being 0.06 percent. OSHA, therefore, does not expect the revised standard to have a significant economic impact on affected firms or industries(4).

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Footnote(4) In the Preliminary Regulatory Impact Analysis [1], OSHA analyzed the entire spectrum of affected industries, and had determined no significant economic impact would result on establishments on any industry, with substantially less impact in those establishments without heavy PPE use. This determination was reached even though the PRIA included costs not directly attributable to the proposal, resulting in a total cost estimate which was nearly twice the cost estimated in this final analysis. Accordingly, OSHA reaffirms that establishments in those industries will incur minimal economic impact.

TABLE 5 - Economic Impact of the PPE Standard on Affected Establishments (Gross Costs)

(For Table 5, see paper copy)

In accordance with the Regulatory Flexibility Act of USC 601 et seq.), OSHA also analyzed the economic impact on small establishments (19 or fewer employees), looking particularly for signs that the rule would pose excessive burdens per employee, relative to impacts faced by larger entities. OSHA has determined that, in relation to compliance with the standard, equipment purchases and labor utilization will to a great extent depend positively on size of workforce; smaller firms are not expected to incur relatively higher costs per worker. As shown in Table 6, OSHA estimates that the average price impact for small establishments will be 0.002 percent, while profit impacts will not exceed 0.04 percent under the assumption that all compliance costs are absorbed by firms. These impacts are judged to be relatively minor; therefore, the

PPE standard is economically feasible for small establishments.

TABLE 6 - Economic Impact of the PPE Standard on Affected Small Establishments (19 or Fewer Employees)  
(Gross Costs)

(For Table 6, see paper copy)

### Environmental Impact

The revisions to the PPE standard have been reviewed in accordance with the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. 4321, et seq.), the regulations of the Council on Environmental Quality (40 CFR part 1500 through 1517), and the Department of Labor's NEPA procedures (29 CFR part 11). As a result of this review, OSHA has determined that the new PPE standard will have no significant environmental impact.

### References

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2. Eastern Research Group. Economic Analysis of the Revised General Industry Personal Protection Equipment Standard (CFR Part 1910.132 - 1910.140). Prepared for the U.S. Department of Labor, Occupational Safety and Health Administration under Contract No. J-9-F-0057. Arlington, MA. October 1988, as described in Exhibit 4-6.
3. PPE Survey Description. Exhibit 4-1.
4. Survey Instrument. Exhibit 4-2.
5. Tables of Weighted Survey Data. Exhibit 4-5.
6. Bureau of Labor Statistics. Summary and Analysis of Injuries and Illnesses in the United States by Industry, 1989. U.S. Department of Labor, Bulletin 2379, April 1991.
7. Eastern Research Group. Summary and Analysis of Injuries and Illnesses in a Data Base of OSHA Draft Form 200s (1986-1987). March 1990. Exhibit 32.
8. Oleinick, Arthur, et al. "Current Methods of Estimating Severity for Occupational Injuries and Illnesses: Data From the 1986 Michigan Comprehensive and Compensable Injury and Illness Database." *American Journal of Industrial Medicine* 23 (1993): 231-252.
9. "In the Blink of an Eye", *Occupational Hazards*, June 1991.
10. Levitt, Raymond, et al. Improving Construction Safety Performance: The User's Role. Stanford University Department of Civil Engineering. Technical Report No. 260. August 1981. Exhibit 3-20, Docket S-012A.

11. Eastern Research Group, Inc. Industry Profile Study of a Standard for Control of Hazardous Energy Sources Including Lockout/Tagout Procedures. Prepared for the U.S. Department of Labor, Occupational Safety and Health Administration, under Contract J-9-F-2-0047, Exhibit 3-15, Docket S-012A.

12. National Safety Council, Accident Facts, 1993 Edition.

## V. Statutory Considerations

### A. Introduction

OSHA has described the hazards that require the use of PPE and the measures required to protect affected employees from those hazards in Section I, Background, Section II, Workplace hazards involved; and Section III, Summary and Explanation of the Final Rule, above. The Agency is providing the following discussion of the statutory mandate for OSHA rulemaking activity to explain the legal basis for its determination that the revised PPE standard, as promulgated, is reasonably necessary to protect affected employees from significant risks of injury and death.

Section 2(b)(3) of the Occupational Safety and Health Act authorizes "the Secretary of Labor to set mandatory occupational safety and health standards applicable to businesses affecting interstate commerce", and section 5(a)(2) provides that "[e]ach employer shall comply with occupational safety and health standards promulgated under this Act" (emphasis added). Section 3(8) of the OSH Act (29 U.S.C. 652(8)) provides that "the term 'occupational safety and health 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."

In two recent cases, reviewing courts have expressed concern that OSHA's interpretation of these provisions of the OSH Act, particularly of section 3(8) as it pertains to safety rulemaking, could lead to overly costly or under-protective safety standards. In *International Union, UAW v. OSHA*, 938 F.2d 1310 (D.C. Cir. 1991), the District of Columbia Circuit rejected substantive challenges to OSHA's lockout/tagout standard and denied a request that enforcement of that standard be stayed, but it also expressed concern that OSHA's interpretation of the OSH Act could lead to safety standards that are very costly and only minimally protective. In *National Grain & Feed Ass'n v. OSHA*, 866 F.2d 717 (5th Cir. 1989), the Fifth Circuit concluded that Congress gave OSHA considerable discretion in structuring the costs and benefits of safety standards but, concerned that the grain dust standard might be under-protective, directed OSHA to consider adding a provision that might further reduce significant risk of fire and explosion.

OSHA rulemakings involve a significant degree of agency expertise and policy-making discretion to which reviewing courts must defer. (See for example, *Building & Constr. Trades Dep't, AFL-CIO v. Brock*, 838 F.2d 1258, 1266 (D.C. Cir. 1988); *Industrial Union Dep't, AFL-CIO v. American Petroleum Inst.*, 448 U.S. 607, 655 n. 62 (1980).) At the same time, the agency's technical expertise and policy-making authority must be exercised within discernable parameters. The lockout/tagout and grain handling standard decisions sought clarification of the agency's view of the scope of its expertise and authority. In light of those decisions, the preamble to this safety standard states OSHA's views regarding the limits of its safety rulemaking authority and explains why the Agency is confident that its interpretive views have in the past avoided regulatory extremes and continue to do so in this rule.

Stated briefly, the OSH Act requires that, before promulgating any occupational safety standard, OSHA demonstrate based on substantial evidence in the record as a whole that: (1) the proposed standard will substantially reduce a significant risk of material harm; (2) compliance is technologically feasible in the sense that the protective measures being required already exist, can be brought into existence with available technology, or can be created with technology that can reasonably be developed; (3) compliance is economically feasible in the sense that industry can absorb or pass on the costs without major dislocation or threat of instability; and (4) the standard is cost effective in that it employs the least expensive protective measures capable of reducing or eliminating significant risk. Additionally, proposed safety standards must be compatible with prior agency action,

must be responsive to significant comment in the record, and, to the extent allowed by statute, must be consistent with applicable Executive Orders. These elements limit OSHA's regulatory discretion for safety rulemaking and provide a decision-making framework for developing a rule.

B. Congress concluded that OSHA regulations are necessary to protect workers from occupational hazards and that employers should be required to reduce or eliminate significant workplace health and safety threats.

At section 2(a) of the OSH Act (29 U.S.C. 651(a)), Congress announced its determination that occupational injury and illness should be eliminated as much as possible: "The Congress finds that occupational injury and illness arising out of work situations impose a substantial burden upon, and are a hindrance to, interstate commerce in terms of lost production, wage loss, medical expenses, and disability compensation payments." Congress therefore declared "it to be its purpose and policy \* \* \* to assure so far as possible every working man and woman in the Nation safe \* \* \* working conditions [29 U.S.C. 651(b)]."

To that end, Congress instructed the Secretary of Labor to adopt existing federal and consensus standards during the first two years after the OSH Act became effective and, in the event of conflict among any such standards, to "promulgate the standard which assures the greatest protection of the safety or health of the affected employees [29 U.S.C. 655(a)]." Congress also directed the Secretary to set mandatory occupational safety standards [29 U.S.C. 651(b)(3)], based on a rulemaking record and substantial evidence [29 U.S.C. 655(b)(2)], that are "reasonably necessary or appropriate to provide safe \* \* \* employment and places of employment." When promulgating permanent safety or health standards that differ from existing national consensus standards, the Secretary must explain "why the rule as adopted will better effectuate the purposes of this Act than the national consensus standard [29 U.S.C. 655(b)(8)]." Correspondingly, every employer must comply with OSHA standards and, in addition, "furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees [29 U.S.C. 654(a)]."

"Congress understood that the Act would create substantial costs for employers, yet intended to impose such costs when necessary to create a safe and healthful working environment. Congress viewed the costs of health and safety as a cost of doing business\* \* \*. Indeed, Congress thought that the financial costs of health and safety problems in the workplace were as large as or larger than the financial costs of eliminating these problems [American Textile Mfrs. Inst. Inc. v. Donovan, 452 U.S. 490, 519-522 (1981) (ATMI); emphasis was supplied in original]." "[T]he fundamental objective of the Act [is] to prevent occupational deaths and serious injuries [Whirlpool Corp. v. Marshall, 445 U.S. 1, 11 (1980)]." "We know the costs would be put into consumer goods but that is the price we should pay for the 80 million workers in America [S. Rep. No. 91-1282, 91st Cong., 2d Sess. (1970); H.R. Rep. No. 91-1291, 91st Cong., 2d Sess. (1970), reprinted in Senate Committee on Labor and Public Welfare, Legislative History of the Occupational Safety and Health Act of 1970, (Committee Print 1971) ("Leg. Hist.") at 444 (Senator Yarborough)]." "Of course, it will cost a little more per item to produce a washing machine. Those of us who use washing machines will pay for the increased cost, but it is worth it, to stop the terrible death and injury rate in this country [Id. at 324; see also 510-511, 517]."

[T]he vitality of the Nation's economy will be enhanced by the greater productivity realized through saved lives and useful years of labor.

When one man is injured or disabled by an industrial accident or disease, it is he and his family who suffer the most immediate and personal loss. However, that tragic loss also affects each of us. As a result of occupational accidents and disease, over \$1.5 billion in wages is lost each year [1970 dollars], and the annual loss to the gross national product is estimated to be over \$8 billion. Vast resources that could be available for productive use are siphoned off to pay workmen's compensation and medical expenses\* \* \*.

Only through a comprehensive approach can we hope to effect a significant reduction in these job death and casualty figures. [Id. at 518-19 (Senator Cranston)]

Congress considered uniform enforcement crucial because it would reduce or eliminate the disadvantage that a conscientious employer might experience where inter-industry or intra-industry competition is present. Moreover, "many employers -- particularly smaller ones -- simply cannot make the necessary investment in health and safety, and survive competitively, unless all are compelled to do so [Leg. Hist. at 144, 854, 1188, 1201]."

Thus, the statutory text and legislative history make clear that Congress conclusively determined that OSHA regulation is necessary to protect workers from occupational hazards and that employers should be required to reduce or eliminate significant workplace health and safety threats.

C. As construed by the courts and by OSHA, the OSH Act sets clear and reasonable limits for agency rulemaking action.

OSHA has long followed the teaching that section 3(8) of the OSH Act requires that, before it promulgates "any permanent health or safety standard, [it must] make a threshold finding that a place of employment is unsafe -- in the sense that significant risks are present and can be eliminated or lessened by a change in practices [Industrial Union Dep't, *AFL-CIO v. American Petroleum Inst.*, 448 U.S. 607, 642 (1980) (plurality) (Benzene); emphasis was supplied in original]." Thus, the national consensus and existing federal standards that Congress instructed OSHA to adopt summarily within two years of the OSH Act's inception provide reference points concerning the least an OSHA standard should achieve (29 U.S.C. 655(a)). As a result, OSHA is precluded from regulating insignificant safety risks or from issuing safety standards that do not at least lessen risk in a significant way.

The OSH Act also limits OSHA's discretion to issue overly burdensome rules, as the agency also has long recognized that "any standard that was not economically or technologically feasible would a fortiori not be 'reasonably necessary or appropriate' under the Act. See *Industrial Union Dep't v. Hodgson*, [499 F.2d 467, 478 (D.C. Cir. 1974)] ('Congress does not appear to have intended to protect employees by putting their employers out of business.') [*American Textile Mfrs. Inst. Inc.*, 452 U.S. at 513 n. 31 (a standard is economically feasible even if it portends 'disaster for some marginal firms,' but it is economically infeasible if it 'threaten[s] massive dislocation to, or imperil[s] the existence of,' the industry)]."

By stating the test in terms of "threat" and "peril," the Supreme Court made clear in *ATMI* that economic infeasibility begins short of industry-wide bankruptcy. OSHA itself has placed the line considerably below this level. (See for example, *ATMI*, 452 U.S. at 527 n. 50; 43 FR 27, 360 (June 23, 1978). Proposed 200 ug/m<sup>3</sup> PEL for cotton dust did not raise serious possibility of industry-wide bankruptcy, but impact on weaving sector would be severe, possibly requiring reconstruction of 90 percent of all weave rooms. OSHA concluded that the 200 ug/m<sup>3</sup> level was not feasible for weaving and that 750 ug/m<sup>3</sup> was all that could reasonably be required). See also 54 FR 29, 245-246 (July 11, 1989); *American Iron & Steel Institute*, 939 F.2d at 1003. OSHA raised engineering control level for lead in small nonferrous foundries to avoid the possibility of bankruptcy for about half of small foundries even though the industry as a whole could have survived the loss of small firms.) All OSHA standards must also be cost-effective in the sense that the protective measures being required must be the least expensive measures capable of achieving the desired end (*ATMI*, at 514 n. 32; *Building and Constr. Trades Dep't AFL-CIO v. Brock*, 838 F.2d 1258, 1269 (D.C. Cir. 1988)). OSHA gives additional consideration to financial impact in setting the period of time that should be allowed for compliance, allowing as much as ten years for compliance phase-in. (See *United Steelworkers of Am. v. Marshall*, 647 F.2d 1189, 1278 (D.C. Cir. 1980), cert. denied, 453 U.S. 913 (1981).) Additionally, OSHA's enforcement policy takes account of financial hardship on an individualized basis. OSHA's Field Operations Manual provides that, based on an employer's economic situation, OSHA may extend the period within which a violation must be corrected after issuance of a citation (CPL. 2.45B, Chapter III, paragraph E6d(3)(a), Dec. 31, 1990).

To reach the necessary findings and conclusions, OSHA conducts rulemaking in accordance with the requirements of section 6 of the OSH Act. The rulemaking process enables the Agency to determine the qualitative and, if possible, the quantitative nature of the risk with (and without) regulation, the technological feasibility of compliance, the availability of capital to the industry and the extent to which that capital is required for other purposes, the industry's profit history, the industry's ability to absorb costs or pass them on to the consumer, the impact of higher costs on demand, and the impact on competition with substitutes and imports.



(See ATMI at 2501-2503; American Iron & Steel Institute generally.) Section 6(f) of the OSH Act further provides that, if the validity of a standard is challenged, OSHA must support its conclusions with "substantial evidence in the record considered as a whole," a standard that courts have determined requires fairly close scrutiny of agency action and the explanation of that action. (See *Steelworkers*, 647 F.2d at 1206-1207.) OSHA's powers are further circumscribed by the independent Occupational Safety and Health Review Commission, which provides a neutral forum for employer contests of citations issued by OSHA for noncompliance with health and safety standards (29 U.S.C. 659-661; noted as an additional constraint in *Benzene* at 652 n. 59). OSHA must also respond rationally to similarities and differences among industries or industry sectors. (See *Building and Constr. Trades Dep't, AFL-CIO v. Brock*, 838 F.2d 1258, 1272-73 (D.C. Cir. 1988).) OSHA rulemaking is thus constrained first by the need to demonstrate that the standard will substantially reduce a significant risk of material harm, and then by the requirement that compliance is technologically capable of being done and not so expensive as to threaten economic instability or dislocation for the industry. Within these bounds, further constraints such as the need to find cost-effective measures and to respond rationally to all meaningful comment militate against regulatory extremes.

D. The revised PPE standard complies with the statutory criteria described above and is not subject to the additional constraints applicable to section 6(b)(5) standards.

Standards which regulate hazards that are frequently undetectable because they are subtle or develop slowly or after long latency periods, are frequently referred to as "health" standards. Standards that regulate hazards, like explosions or electrocution, that cause immediately noticeable physical harm, are called "safety" standards. (See *National Grain & Feed Ass'n v. OSHA (NGFA II)*, 866 F.2d 717, 731, 733 (5th Cir. 1989). As noted above, section 3(8) provides that all OSHA standards must be "reasonably necessary or appropriate." In addition, section 6(b)(5) requires that OSHA set health standards which limit significant risk "to the extent feasible." OSHA has determined that the revised PPE standard is a safety standard, because the revised PPE standard addresses hazards, such as molten metal, falling objects and electricity, that are immediately dangerous to life or health, not the longer term, less obvious hazards subject to section 6(b)(5).

The OSH Act and its legislative history clearly indicate that Congress intended for OSHA to distinguish between safety standards and health standards. For example in section 2(b)(6) of the OSH Act, Congress declared that the goal of assuring safe and healthful working conditions and preserving human resources would be achieved, in part:

\* \* \* by exploring ways to discover latent diseases, establishing causal connections between diseases and work in environmental conditions, and conducting other research relating to health problems, in recognition of the fact that occupational health standards present problems often different from those involved in occupational safety.

The legislative history makes this distinction even clearer:

[The Secretary] should take into account that anyone working in toxic agents and physical agents which might be harmful may be subjected to such conditions for the rest of his working life, so that we can get at something which might not be toxic now, if he works in it a short time, but if he works in it the rest of his life might be very dangerous; and we want to make sure that such things are taken into consideration in establishing standards. [Leg. Hist. at 502-503 (Sen. Dominick), quoted in *Benzene* at 648-49]

Additionally, Representative Daniels distinguished between "insidious 'silent killers' such as toxic fumes, bases, acids, and chemicals" and "violent physical injury causing immediate visible physical harm" (Leg. Hist. at 1003), and Representative Udall contrasted insidious hazards like carcinogens with "the more visible and well-known question of industrial accidents and on-the-job injury" (Leg. Hist. at 1004). (See also, for example, S. Rep. No. 1282, 91st Cong., 2d Sess 2-3 (1970), U.S. Code Cong. & Admin. News 1970, pp. 5177, 5179, reprinted in Leg. Hist. at 142-43, discussing 1967 Surgeon General study that found that 65 percent of employees in industrial plants "were potentially exposed to harmful physical agents, such as severe noise or vibration, or to toxic

materials"; Leg.Hist at 412; id. at 446; id. at 516; id. at 845; International Union, UAW at 1315.) In reviewing OSHA rulemaking activity, the Supreme Court has held that section 6(b)(5) requires OSHA to set "the most protective standard consistent with feasibility" (Benzene at 643 n. 48). As Justice Stevens observed:

The reason that Congress drafted a special section for these substances \* \* \* was because Congress recognized that there were special problems in regulating health risks as opposed to safety risks. In the latter case, the risks are generally immediate and obvious, while in the former, the risks may not be evident until a worker has been exposed for long periods of time to particular substances. [Benzene, at 649 n. 54.]

Challenges to the grain dust and lockout/tagout standards included assertions that grain dust in explosive quantities and uncontrolled energy releases that could expose employees to crushing, cutting, burning or explosion hazards were harmful physical agents so that OSHA was required to apply the criteria of section 6(b)(5) when determining how to protect employees from those hazards. Reviewing courts have uniformly rejected such assertions. For example, the Court in *International Union, UAW v. OSHA*, 938 F.2d 1310 (D.C. Cir. 1991) rejected the view that section 6(b)(5) provided the statutory criteria for regulation of uncontrolled energy, holding that such a "reading would obliterate a distinction that Congress drew between 'health' and 'safety' risks." The Court also noted that the language of the OSH Act and the legislative history supported the OSHA position (*International Union, UAW* at 1314). Additionally, the Court stated: "We accord considerable weight to an agency's construction of a statutory scheme it is entrusted to administer, rejecting it only if unreasonable" (*International Union, UAW* at 1313, citing *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 843 (1984)).

The Court reviewing the grain dust standard also deferred to OSHA's reasonable view that the Agency was not subject to the feasibility mandate of section 6(b)(5) in regulating explosive quantities of grain dust (*National Grain & Feed Association v. OSHA (NGFA II)*, 866 F.2d 717, 733 (5th Cir. 1989)). It therefore applied the criteria of section 3(8), requiring the Agency to establish that the standard is "reasonably necessary or appropriate" to protect employee safety.

As explained in Section I, Background, Section III, Summary and Explanation of the Standard, and in Section IV, Summary of the Final Regulatory Impact Analysis and Regulatory Flexibility Analysis, above, OSHA has determined that the non-use or misuse of appropriate PPE poses significant risks to employees and that the provisions of the final rule are reasonably necessary to protect affected employees from those risks. The Agency estimates that compliance with the revised PPE standard will cost \$52.4 million annually and will reduce the risk of the identified hazards (preventing 4 fatalities and 102,000 injuries annually). This constitutes a substantial reduction of significant risk of material harm for the exposed population of approximately 22 million general industry employees. The Agency believes that compliance is technologically feasible because the rulemaking record indicates that the PPE required by the standard is already in general use throughout the industries covered by the standard. Additionally, OSHA believes that compliance is economically feasible, because, as documented in the Regulatory Impact Analysis, all regulated sectors can readily absorb or pass on compliance costs during the standard's first five years, and economic benefits will exceed compliance costs thereafter.

As detailed in Section IV, Summary of the Final Regulatory Impact Analysis and Regulatory Flexibility Analysis and the Table below, the standard's costs, benefits, and compliance requirements are consistent with those of other OSHA safety standards, such as the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard.

Standard (CFR cite)	Final rule date (FR cite)	Number of deaths prevented annually	Number of injuries prevented annually	Annual cost first five (yrs) (mill)	Annual cost next five (yrs) (mill)
Grain handling (1910.272)	12-31-87 (52 FR 49622)	18	394	5.9 to 33.4	5.9 to 33.4

HAZWOPER (1910.120)	3-6-89 (54 FR 9311)	32	18,700	153	153
Excavations (Subpt P)	10-31-89 (54 FR 45,954)	74	800	306	306
Process Safety Mgmt (1910.119)	2-24-92 (57 FR 6356)	330	1,917	880.7	470.8
Permit- Required Confined Spaces (1910.146)	1-14-93 (58 FR 4462)	54	5,041	202.4	202.4

OSHA assessed employee risk by evaluating exposure to PPE-related hazards in a large range of industries. The Summary of the Final Regulatory Impact Analysis and Regulatory Flexibility Analysis, Section IV, above, presents OSHA's estimate of the costs and benefits of the revised PPE standard in terms of the Standard Industrial Classification (SIC) codes for the industries regulated.

The Agency acknowledges that some industries covered by the revised PPE standard have more documented PPE-related injuries or fatalities than do others. However, the record indicates that the hazards addressed by the standard exist throughout general industry. OSHA does not believe that the significance of the risk associated with exposure to PPE-related hazards within a given SIC classification is dependent on the number of incidents documented for that particular industry sector. OSHA has set the scope of the revised PPE standard to address those situations where employees are exposed to PPE-related hazards, regardless of the relative frequency of incidents. The Agency believes, based on analysis of the elements of the hazards identified, there is sufficient information for OSHA to determine that employees in the covered sectors face significant risks related to the non-use or misuse of PPE. Therefore, the Agency has determined that all employees within the scope of the revised PPE standard face a significant risk of material harm and that compliance with the revised PPE standard is reasonably necessary to protect affected employees from that risk, regardless of the number of injuries or fatalities reported for the SIC code to which the employer has been assigned.

In order to facilitate data analysis, OSHA has organized the pertinent injury and fatality information according to the SIC code for the particular industry sectors where incidents have been reported. Given the limitations of the OSHA database and the likelihood of misclassification (due, for example, to the difficulty of classifying contractors), the Agency does not believe that the risks associated with the use or misuse of PPE vary according to the SIC code to which employers have been assigned.

OSHA has considered and responded to all substantive comments regarding the proposed PPE standard on their merits in the Section III, Summary and Explanation of the Standard, earlier in this preamble. In particular, OSHA evaluated all suggested changes to the proposed rule in terms of their impact on worker safety, their feasibility, their cost effectiveness, and their consonance with the OSH Act.

## VI. Federalism

This regulation has been reviewed in accordance with Executive Order No. 12612 (52 FR 41685, October 30, 1987), regarding Federalism. Section 18 of the Occupational Safety and Health Act (OSH Act) preempts state laws relating to issues on which Federal OSHA has promulgated occupational safety and health standards. Under the OSH Act, a State can avoid preemption in issues covered by Federal standards only if it submits, and obtains Federal approval of, a plan for the development of such standards and their enforcement. Occupational safety and health standards developed by such Plan States must, among other things, be at least as effective in providing safe and healthful employment and places of employment as the Federal standards. Where such standards are applicable to products distributed or used in interstate commerce they may not unduly burden commerce and must be justified by compelling local conditions.

The Federal standard for personal protective equipment used in general industry addresses hazards that are not unique to any one State or region of the country. Nonetheless, States with occupational safety and health plans approved under section 18 of the OSH Act will be able to develop their own State standards to deal with any special problems which might be encountered in a particular State. Moreover, because this standard is written in general, performance-oriented terms, there is considerable flexibility for State plans to require, and for affected employers to use, methods of compliance which are appropriate to the working conditions covered by the standard.

In brief, this final rule addresses a clear national problem related to occupational safety and health in general industry. Those States which have elected to participate under section 18 of the OSH Act are not preempted by this standard, and will be able to address any special conditions within the framework of the Federal Act, while ensuring that the State standards are at least as effective as that standard.

## **VII. State Plan States**

The 25 States and territories with their own OSHA approved occupational safety and health plans must develop a comparable standard applicable to both the private and public (state and local government employees) sectors within six months of the publication date of a permanent final Federal rule or show OSHA why there is no need for action, e.g., because an existing state standard covering this area is already "at least as effective as" the new Federal standard.

These States and territories are Alaska, Arizona, California, Connecticut (plan covers only State and local government employees), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York (plan covers only State and local government employees), North Carolina, Puerto Rico, South Carolina, Oregon, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington and Wyoming.

After the effective date of the Federal final rule, until such time as a State standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate, in these States.

## **VIII. Recordkeeping**

This final rule does not contain recordkeeping requirements.

### **List of Subjects in 29 CFR Part 1910**

Eye protection; Face protection; Foot protection; Hand protection; Footwear; Hard hats; Head protection; Incorporation by reference; Occupational safety and health; Occupational Safety and Health Administration; Personal protective equipment; Safety glasses; Safety shoes.

### **Authority**

This document has been prepared under the direction of Joseph A. Dear, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Accordingly, pursuant to 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. 1-90 (55 FR 9033); and 29 CFR part 1911, 29 CFR part 1910 is amended as set forth below.

Signed at Washington D.C. this 25th day of March, 1994.

**Joseph A. Dear,**  
**Assistant Secretary of Labor.**

## **PART 1910 - [AMENDED]**

### **Subpart I - Personal Protective Equipment**

1. The authority citation for subpart I of part 1910 is revised to read as follows:

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) or 1-90 (55 FR 9033), as applicable; and 29 CFR part 1911, as applicable.

2. New paragraphs (d) through (f) are added to 1910.132 to read as follows:

**1910.132 General requirements.** \* \* \* \* \* (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.

(4) The employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

3. Section 1910.133 is revised to read as follows.

**1910.133 Eye and face protection.**

## (a) General requirements.

(1) Each affected employee shall use 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) Each affected employee shall use 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) Each affected employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design, or shall wear 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) Each affected employee shall use 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	Electric 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
Gas Tungsten arc welding		250-500	10
		less than 50	8
		50-150	8
Air carbon		150-500	10
	(Light)	less than 500	10
Arc cutting	(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 devices purchased after July 5, 1994 shall comply with ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection," which is incorporated by reference, or shall be demonstrated by the employer to be equally effective. This incorporation by reference was approved by the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American National Standards Institute. Copies may be inspected at the Docket Office, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Ave., N.W. room N2634, Washington, D.C. or at the Office of the **Federal Register**, 800 North Capitol Street NW., suite 700, Washington, DC.

(2) Eye and face protective devices purchased before July 5, 1994 shall comply with the ANSI "USA standard for Occupational and Educational Eye and Face Protection," Z87.1-1968 or shall be demonstrated by the employer to be equally effective. This incorporation by reference was approved by the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at the Docket Office, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Ave., N.W. room N2634, Washington, D.C. or at the Office of the **Federal Register**, 800 North Capitol Street NW., suite 700, Washington, DC.

4. Sections 1910.135 and 1910.136 are revised to read as follows:

#### **1910.135 Head protection.**

(a) General requirements. (1) Each affected employee shall wear protective helmets when working in areas where there is a potential for injury to the head from falling objects.

(2) Protective helmets designed to reduce electrical shock hazard shall be worn by each such affected employee when near exposed electrical conductors which could contact the head.

(b) Criteria for protective helmets. (1) Protective helmets purchased after July 5, 1994 shall comply with ANSI Z89.1-1986, "American National Standard for Personnel Protection - Protective Headwear for Industrial Workers-Requirements," which is incorporated by reference, or shall be demonstrated to be equally effective. This incorporation by reference was approved by the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American National Standards Institute. Copies may

be inspected at the Docket Office, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Ave., N.W. room N2634, Washington, D.C. or at the Office of the **Federal Register**, 800 North Capitol Street NW., suite 700, Washington, DC.

(2) Protective helmets purchased before July 5, 1994 shall comply with the ANSI standard "American National Standard Safety Requirements for Industrial Head Protection," ANSI Z89.1-1969, or shall be demonstrated by the employer to be equally effective. This incorporation by reference was approved by the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at the Docket Office, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Ave., N.W. room N2634, Washington, D.C. or at the Office of the **Federal Register**, 800 North Capitol Street NW., suite 700, Washington, DC.

#### **1910.136 Foot protection.**

(a) General requirements. Each affected employee shall wear protective footwear when working in areas where there is a danger of foot injuries due to falling and 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 purchased after July 5, 1994 shall comply with ANSI Z41-1991, "American National Standard for Personal Protection - Protective Footwear," which is incorporated by reference, or shall be demonstrated by the employer to be equally effective. This incorporation by reference was approved by the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the American National Standards Institute. Copies may be inspected at the Docket Office, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Ave., N.W. room N2634, Washington, D.C. or at the Office of the **Federal Register**, 800 North Capitol Street NW., suite 700, Washington, DC.

(2) Protective footwear purchased before July 5, 1994 shall comply with the ANSI standard "USA Standard for Men's Safety-Toe Footwear," Z41.1-1967, which is incorporated by reference, or shall be demonstrated by the employer to be equally effective. This incorporation by reference was approved by the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at the Docket Office, Occupational Safety and Health Administration, U.S. Department of Labor, 200 Constitution Ave., N.W. room N2634, Washington, D.C. or at the Office of the **Federal Register**, 800 North Capitol Street NW., suite 700, Washington, DC.

5. A new 1910.138 is added to read as follows.

#### **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.

6. Appendices A and B to Subpart I are added to read as follows.

#### **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
	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)
HEAT - Furnace operations, pouring, casting, hot dipping, and welding	High temperature exposure	Screen face shields, reflective face shields. See notes (1), (2), (3)
	Splash	Goggles, eyecup and cover types. For severe exposure, use face shield. See notes (3), (11)
CHEMICALS - Acid and chemicals handling, degreasing plating.	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 grinding machining, masonry work, woodworking, sawing, drilling, chiseling, powered fastening, riveting, and sanding. 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.

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.

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