

mask respirators. However, for full-face negative pressure respirators QNFT is required where protection factors up to 50 are required. Respirator fit testing procedures were subject to scrutiny during the public rulemaking for the lead standard, and the findings are relevant to this asbestos standard (47 FR 51110 to 51119).

From past experience, OSHA is aware of the problems of respirator use as the primary means of exposure control. Proper facial fit is essential, but variations in individual facial dimensions, as well as facial hair, scars or growths, make it difficult to maintain this facial fit. Fatigue and reduced efficiency may occur because of increased breathing resistance when negative-pressure respirators are used. Additionally, heat stress, reduced vision, and other safety problems presented by respirators should be considered by the employer. Visual impairment could pose a significant problem where physical hazards exist and the ability to see is important. Speech is also limited by respirator use. Voice transmission through a respirator can be difficult, annoying, and fatiguing, and communication may make the difference between a safe and efficient operation and a hazardous operation, especially in dangerous jobs.

OSHA does not presently believe that respirators should be considered the primary means of employee health protection against exposure to asbestos for activities where engineering controls are feasible. However, despite these problems OSHA has concluded that if the permissible exposure level for asbestos is exceeded, employers must provide respiratory protection as a supplementary means of protection. However, the goal of the standard is the control of emissions using engineering and work practice controls which will minimize the need for routine use of respirators.

The employee must be properly trained to wear the respirator, to know why the respirator is needed, and to understand the limitations of the respirator. An understanding of the hazards involved is necessary to enable the employee to take steps for his or her own protection. The respiratory protection program implemented by the employer must conform to that set forth in paragraph (g)(3). That section contains basic requirements for proper selection, fit, use, cleaning, and maintenance of respirators.

8. Paragraph (h). Protective work clothing and equipment.

This paragraph requires the employer to provide and ensure that employees use protective clothing where the

employee is exposed above the permissible exposure limit. Specifically, the employer is to provide coveralls or other full body clothing, gloves, and foot coverings. The employer must also provide eye protection when necessary to prevent eye irritation.

The standard requires that the employer clean, launder, or dispose of the required protective clothing to eliminate any potential exposure that might result were the clothing to be laundered by the employee at home. Furthermore, the standard provides that the employer assure that all protective clothing is removed at the end of each work shift, and that the clothing that is to be laundered, cleaned, or disposed of be placed in a closable container. The standard also requires that protective clothing be maintained and replaced as needed in order to ensure effectiveness.

The requirement to provide and ensure the use of personal protective clothing when exposed to asbestos generally met with approval by all participants to the rulemaking. Many commenters endorsed triggering this requirement at the PEL [Exs. 84-387, 86-4, 90-173, 90-236, 328]. There were other commenters that were strongly in favor of requiring the use of protective clothing below the PEL [Exs. 84-244, 90-140, 127]. Other interested parties supported the requirement of furnishing and wearing of protective clothing when employee exposures exceed the ceiling limit [Exs. 90-188, 90-174, 90-180].

The final standard makes a change from the current standard to respond to the comments, and because OSHA believes a modification is appropriate in light of the evidence developed since 1971 that asbestos is a potent human carcinogen. Protective clothing is to be supplied to employees exposed above the PEL of 0.2 f/cc. It is necessary that protective clothing and foot coverings be required to prevent contamination of the employee's street clothing and shoes, so that exposure is not extended beyond the work day and workplace. Wearing contaminated clothing outside the work area where exposure controls are operating will lengthen the duration of exposure through both inhalation and ingestion routes. In addition, asbestos will accumulate in employee's cars and homes exposing other family members to the hazard. Evidence has shown that family members of asbestos workers face a substantially increased risk of cancer and other asbestos-related diseases from exposure to asbestos carried home on work clothes [Ex. 146]. At exposures lower than the PEL, OSHA believes it is less likely that clothing will become significantly contaminated with asbestos.

The proposal did not specify the frequency with which work clothing must be provided. OSHA has determined that if clean work clothing is provided at least weekly to employees whose exposure levels are above the PEL, adequate protection will be afforded and unnecessary costs minimized.

The final standard provides that the employer ensure that all protective clothing is removed at the end of each work shift only in change rooms. Furthermore, the standard emphasizes the need to assure that contaminated clothing is stored, cleaned/launched, or disposed of in a safe manner. It requires that contaminated clothing be stored in closable containers prior to laundering or disposal so that contamination in the change room is minimized and that employees who later handle the clothing are protected. The latter group are further protected by the requirement to put warning labels on the containers. Since these containers are to be located in the change room, it is appropriate to limit the removal of contaminated clothing to that area.

The final standard clarifies that the obligation is on the employer to provide personal protective clothing at no cost to the employee. In this way the employer is in the best position to provide the correct type of clothing and keep it in repair. Also, as the employer has permitted exposures to exceed the permissible exposure limit the obligation properly rests on the employer. The cost of necessary clothing has been included in the various economic analyses performed.

Finally, the standard requires the employer to inform those who handle the contaminated protective clothing of the potentially harmful effects of exposure to asbestos. This provision is designed to make clear the need to use proper care in handling of the contaminated protective clothing.

9. Paragraph (i). Hygiene facilities and practices.

This provision requires employers to provide hygiene facilities and to assure employee compliance with basic hygiene practices which are recognized industrial hygiene practices for minimizing additional sources of asbestos which can accumulate on a worker's clothes or body. As discussed earlier, the employer must provide adequate shower and washing facilities, clean rooms for changing clothes, and filtered air lunchrooms for employees who have exposure above the PEL. In addition, employers must assure that employees use the facilities as required by the standard as well as observe