

# OSHA Proposes New Health Standards

**Asbestos:** In light of new scientific evidence, exposure limit cut to 0.5 fibers per cubic centimeter.

**Toluene:** Exposure limit halved, and new requirements for medical exams, recordkeeping, monitoring, and training added.

**Standards Completion Project:** Exposure limits unchanged, but complete standards written for alkyl benzenes, ketones, cyclohexane, and ozone.

## ASBESTOS

Reductions in permissible exposures and ceiling limits are among proposed changes to OSHA's job health standard on asbestos (1910.1001). The proposed revision was published in the *Federal Register* October 9.

The preamble to the proposal stresses that it is OSHA's intention to safeguard employees wherever asbestos or a product containing asbestos is manufactured, processed, packaged, stored, applied, used, or otherwise handled, but that it is not OSHA's intention to create any undue administrative or economic burdens on employers, particularly those who have only a few workers or a highly transient workforce. Written comments or requests for a public hearing were invited, as well as comments on environmental and inflationary impact.

Asbestos

Toluene

Alkyl benzenes

Asbestos in its various forms is said to have more than 1,000 uses; the fibrous mineral has been known for 2,000 years and widely used industrially for 100 years.

The United States uses more than 800,000 tons of asbestos annually: 27 percent in asbestos cement pipe and sheet; 19 percent in vinyl asbestos floor tile; 12 percent in sheet vinyl flooring; 10 percent in roofing papers; and smaller percentages in gaskets and packing, friction materials, pipe and thermal insulation, coatings and compounds, plastics, and miscellaneous uses.

An estimated 50,000 workers help make products containing asbestos, while apparently millions of others are exposed in secondary manufacturing involving use of such products. Occupational exposure may occur in industries including: asbestos fiber processing; manufacture of asbestos-containing products; construction; shipbuilding; auto manufacture; and auto repair.

The current standard, issued June 7, 1972, limits worker exposure to an eight-hour time-weighted average (TWA) of five asbestos fibers per cubic centimeter of air (five million fibers per cubic meter of air); the ceiling limit is 10 fibers. Effective July 1, 1976, the 1972 rule would reduce the exposure limit to an eight-hour TWA of two fibers.

Reexamination of the 1972 standard was based on new research developments regarding the harmful effects of asbestos exposure, plus advances in monitoring and protective technology, over the last few years. Recent clinical data, for example, associate asbestos with producing not only asbestosis (non-malignant scarring of the lungs which, in its severe forms, can cause death); but also with cancers of the lungs, chest cavity, abdomen, stomach, colon, and rectum.

The diseases are progressive. Even in the absence of further exposure, inhaled fibers continue their biological action. Asbestosis and asbestos-caused cancer usually do not become clinically evident until 20, 30, 40, or more years after the onset of exposure, even when exposure has been short-term or intermittent.

Family contacts of former asbestos factory workers are also showing an incidence of x-ray changes characteristic of asbestos exposure.

Calculations suggest that cigarette-smoking asbestos workers have approximately eight times the risk of developing lung cancer as other smokers.

Much of this clinical data on carcinogenicity was either not developed or not known to OSHA when the original standard was issued. Because the new evidence is that asbestos acts as a lung carcinogen at levels below those that will pro-

duce asbestosis, OSHA's concern is reoriented toward the prevention of asbestos-caused cancer. Reduction of asbestos exposure enough to prevent asbestos-caused cancer is also expected to prevent asbestosis.

The October 9, 1975, proposed revision of the standard would:

- Leave the construction industry under the initial standard and plan separate rulemaking to revise the asbestos standard for construction. (Approximately three-fourths of all asbestos products in 1972 were used in the construction industry.)

- Modify definitions as follows: "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite, and every product containing any of these minerals; and "asbestos fiber" means a particulate form of asbestos, longer than five micrometers, with a length-to-diameter ratio of at least three-to-one and with a maximum diameter of five micrometers.

- Reduce permissible exposures to an eight-hour TWA of 0.5 fibers per cubic centimeter (500,000 fibers per cubic meter of air).

- Reduce the ceiling limit, which would be determined during any 15-minute sampling period, to five fibers per cubic centimeter.

- Establish requirements for engineering controls, work practices, and supplemental use of respirators and protective clothing.

- Revise procedures for monitoring.

- Suggest work practices to be followed for certain operations and processes involving asbestos.

- Revise and update the requirements for respirators, referencing NIOSH as the approving authority. The proposal would not render any existing respirators obsolete, but would enable a greater variety of respirators to be used under different conditions of exposure.

- Establish additional requirements for: regulated areas; hygiene facilities and practices (including a requirement for change rooms and showers); worker training and information programs; and warning signs and labels.

- Require specific medical surveillance and minimum data on medical and monitoring records.

- Provide for job reassignment in case of medical unsuitability.

- Extend the period during which the employer must retain monitoring and medical records to 40 years, or employment plus 20 years, whichever is longer.

- Provide procedures for the transfer of employees' medical and monitoring records when one employer succeeds another, or when an employer goes out of business.

Appendices to be published with the standards will offer further information and guidance.

## TOLUENE

OSHA has proposed a new standard on toluene, an industrial chemical made primarily from petroleum. Under the proposal, which appeared in the *Federal Register* October 6, the OSHA exposure limit would be cut from the present 200 parts per million (ppm) of air to 100 ppm as a time-weighted average (TWA) over eight hours. The proposal also sets up requirements for medical exams, recordkeeping, monitoring workplace air, and training employees.

Toluene (also known as methylbenzene, methacide, phenylmethane, toluol) is a clear, flammable liquid that evaporates at a moderate rate. About 70 percent of the more than one billion gallons of toluene manufactured in the United States each year is used to make benzene; the rest goes into the production of other chemicals, solvents, and gasoline. The National Institute for Occupational Safety and Health (NIOSH) estimates that 100,000 or more workers in the petrochemical, rubber, paint, glue, shipbuilding, construction, and automotive industries may be exposed to toluene on the job.

The prime health hazard arises when workers breathe high concentrations of toluene vapor. This depresses the central nervous system and often creates effects similar to being drunk. Workers may get headaches, feel weak and drowsy, lose coordination, and display poor judgment. Extremely high exposures have caused test animals to lapse into coma and die if the exposure continues long enough.

The chief long-term effects are much like those of chronic intoxication—nervousness, insomnia, fatigue, loss of appetite. A few people exposed to very high toluene levels—glue-sniffers, for instance—have suffered permanent brain damage. Though some workers have developed enlarged livers after repeated exposures, there is no evidence of permanent liver damage.

Early studies on toluene, which showed serious effects on the blood and blood-forming organs, are now thought inaccurate because the toluene used was contaminated by benzene. In industry today the poorer grades of toluene may contain up to 25 percent benzene—a substance long known for its highly toxic action on the blood-forming organs.

OSHA's current standard on toluene (the 200 ppm TWA and a 300 ppm ceiling limit) is based on a 1943 American National Standards Institute (ANSI) standard. Closely following recommendations in NIOSH's criteria document on tol-

uene and a 1974 revision of the ANSI standard, OSHA proposes to lower the permitted TWA to 100 ppm because studies have shown that workers exposed for eight hours to 200 ppm experience mild fatigue, muscular weakness, and poor coordination. The proposal also would reduce the ceiling limit to 200 ppm as measured over 15 minutes.

Since toluene is a defatting agent, contact with the liquid can cause skin irritation and dermatitis after prolonged exposure. Splashed in the eyes, toluene will bring severe pain and burn the cornea if not flushed quickly with water. As a result, the proposal would require the employer to prevent any eye contact or repeated skin contact with liquid toluene among his employees.

Other key provisions include:

- **Action level.** In any workplace where toluene is used the employer must make an initial written determination of employee exposures. If any employees are exposed above the "action level"—half the permitted limit or 50 ppm—then monitoring and medical requirements go into effect.

- **Monitoring.** The employer may take either personal, breathing zone, or general air samples as long as the method gives an accurate indication of each employee's exposure. If exposures are above the TWA, monitoring must continue monthly. If employees are exposed above the action level (but below the TWA), monitoring must be done once every three months. Employees must have the chance to observe monitoring and have the procedure and results explained to them.

- **Training.** The employer must tell employees about the hazards of toluene, explain the control procedures in effect, and instruct them to report any symptoms of overexposure.

- **Medical surveillance.** The employer must provide annual medical exams—including lung function tests, urinalysis and blood count—to all employees exposed above the action level. From the examining physician he must obtain a written opinion on whether individual workers would be harmed by further exposure to toluene. If they would, it is the employer's responsibility to see that affected employees are removed from jobs involving hazardous exposures.

- **Recordkeeping.** The employer must keep records of medical exams and air sampling results for at least 10 years and make these available to employees or their representatives.

- **Compliance.** First, the employer must use engineering controls to bring toluene exposures within the TWA. If engineering controls and work practices can't accomplish this, the employer must use them to the extent feasible and



supplement them with respirators to protect workers.

As we go to press, OSHA is conducting a study to determine whether an inflationary impact statement for the toluene proposal is necessary. If an inflationary impact statement is required, it will be available to the public for review and comment at least 30 days before the hearing on the proposal.

Comments on the proposed toluene standard should be submitted to: U.S. Department of Labor, OSHA, Docket Officer, Docket No. H-026, Room N3620, Third and Constitution, NW, Washington, D.C. 20210.

## STANDARDS COMPLETION PROJECT

Job health standards proposed by OSHA on October 8 spell out compliance requirements for fast, comprehensive action by employers wherever employee exposure to any of 11 toxic substances climbs above the halfway mark toward current exposure limits. The substances are: six alkyl benzenes (p-tert-butyltoluene, cumene, ethyl benzene, alpha-methyl styrene, styrene, and vinyl toluene); cyclohexane; three ketones (camphor, mesityl oxide, and 5-methyl-3-heptanone); and ozone.

Following publication of the proposed standards in the *Federal Register* October 8, OSHA invited the submission of public views and requests for public hearings on the proposed standards or any issue raised in the standards. Comments on environmental or inflationary impact also were invited.

In discussing the proposals, OSHA made clear that all issues raised are open to comment and subject to revision if the public record demonstrates need and support for alternatives.

These 11 proposals comprise the second and third sets of rules drafted as part of the Joint OSHA-NIOSH Standards Completion Project (SCP) begun in March 1974. Together with the first section on ketones, OSHA now has proposed 17 new rules under the SCP. (See *Job Safety and Health*, June 1975, "The First of 400.")

The object is to flesh out existing regulations on workplace exposure to nearly 400 toxic substances by issuing new and more complete standards to guide the employer. These substances presently are listed under Section 1910.1000 (formerly 1910.93) of OSHA's general industry standards, where permissible exposure limits for airborne concentrations are expressed in terms of eight-hour workshift time-weighted averages (TWA's).

OSHA's October 1 proposal would establish requirements for measuring exposure; engineer-

ing and work practice controls; handling and use of liquid, solid, gas, or vapor forms of the substances; personal protective equipment; employee training; medical surveillance; sanitation; and recordkeeping.

The "action level" that would trigger these comprehensive safety measures is a determination that airborne concentration has reached 50 percent of the threshold limit values (TLV's) currently prescribed. In this way, the employer can adequately safeguard the health of the worker by acting on a problem as soon as he learns it is serious and before it becomes critical.

The newly written standards also would help the employer by providing cross references to other requirements in Part 1910 pertaining to the toxic substances addressed. An example of a referenced standard is Section 1910.106, which prescribes storage requirements for combustible and flammable liquids in terms of flash points and boiling points. The proposed standard would inform employers of the proper classification of these substances, how to deal with them, and how to comply with related regulations.

Billions of pounds of the toxic substances named in the proposal are produced annually in the United States. The chemicals are used primarily in the manufacture of synthetic rubber, nylon, plastics, and resins; as chemical and pharmaceutical intermediates; and as solvents. They can be inhaled, ingested, or absorbed. Because use is widespread and diverse, the precise number of employees exposed is not known.

Among the industries where exposure to these 11 substances may be most common are: rubber, pharmaceuticals, cosmetics, chemical manufacturing, shoemaking, plastics, food, tobacco, paint and coatings manufacturing, aerospace, auto, shipbuilding, and steel.

Short-term effects of overexposure include irritation of the eyes, nose, and upper respiratory tract; dizziness; nausea; and vomiting. In liquid form, mesityl oxide can produce corneal injury. Several of the toxic substances in the group of 11 are defatting agents, capable of causing the skin to crack and become inflamed. Sustained high levels of exposure to many of these 11 substances may lead to depression of the central nervous system, bone marrow injury, kidney damage, inflammation of the lungs, dizziness, and unconsciousness. Damage to chromosomal structures may result from excessive exposure to ozone; the corrosive nature of ozone gas is believed to have biological effects similar to radiation.

OSHA proposes to require employers to: learn the possible hazards of chemicals used in their plants; determine whether concentrations have

reached the "action level" and if so take necessary steps to control the exposure; and make information about exposure available to employees.

Following are other major provisions of the OSHA proposals:

- Permissible exposure limits are unchanged from those listed in Tables Z-1 and Z-2 of Section 1910.1000 of OSHA's general industry standards; these are not at issue in the current proposal.

- "Action level" is half the eight-hour time-weighted average exposure. If this level of exposure is reached, then the employer must begin specified procedures such as employee exposure measurement, training of employees, and medical surveillance.

- Wherever any of the regulated substances may be released into the workplace air, the employer must estimate whether any employee is exposed to concentrations above the "action level." He must make a written initial determination of his findings. Where concentrations are low, there is no need to use sophisticated sampling or measuring instruments; but if such measurements have been taken, they must be considered in the written determination. Where more than one workplace operation involves a regulated substance, a separate written determination must be made for each. Any change in process or control measure that might affect airborne concentrations requires that a new determination be made, in writing. Bi-monthly monitoring of individual work stations becomes necessary if exposure exceeds the "action level," even though the employees at those stations wear respirators; monthly measurements would be required where employee exposures exceed the permissible limit.

- Relatively accurate measurements are required, but the employer may choose the method or equipment, with equivalent accuracy, that suits his pocketbook and his available personnel. Accuracy of the sampling method is established at a confidence level of 95 percent; that is, out of a long series of measurements, 95 percent must be within 25 percent of the true value.

- In keeping with good industrial hygiene practices, methods of compliance must begin with engineering or work practice controls to reduce exposures to a level at or below the permissible limit. Where these methods are insufficient, they must still be used but can be supplemented by the use of respirators.

- Only NIOSH- or MESA-approved respirators may be selected for use. While different respirators are acceptable at various airborne concentrations or operating conditions, the employer

may always select a respirator which provides protection prescribed for higher concentrations than those present.

- Fire and safety precautions in the handling and use of the regulated substances are mandated. Data on chemical and physical characteristics, fire and explosion hazards, and spill, leak, and disposal procedures, are provided in Appendix B to each of the proposed standards.

- Protective clothing and equipment are required, and specific procedures established for action when a regulated toxic substance comes in contact with the employee's clothing or skin. Words and phrases are defined, to ensure uniform interpretation.

- For any of the substances which may cause fire or occupational hazard when spilled, procedures for cleanup and disposal are established.

- Employees must be informed of the presence of any of the regulated substances in the workplace, to the extent that they wish to be informed; it is the employer's obligation only to make copies of the appropriate regulations and appendices readily available.

- An annual training program must be provided by the employer for all employees who (a) are exposed to a regulated substance in excess of the "action level," (b) risk skin contact with a liquid or solid form of any of the 11 toxic substances, or (c) work in areas where the regulated substances create a fire or explosion hazard. Minimum requirements for this training are established.

- Different medical surveillance programs are prescribed according to the substance to which employees are exposed. For p-tert-butyltoluene and ozone, these involve preplacement and periodic medical examinations.

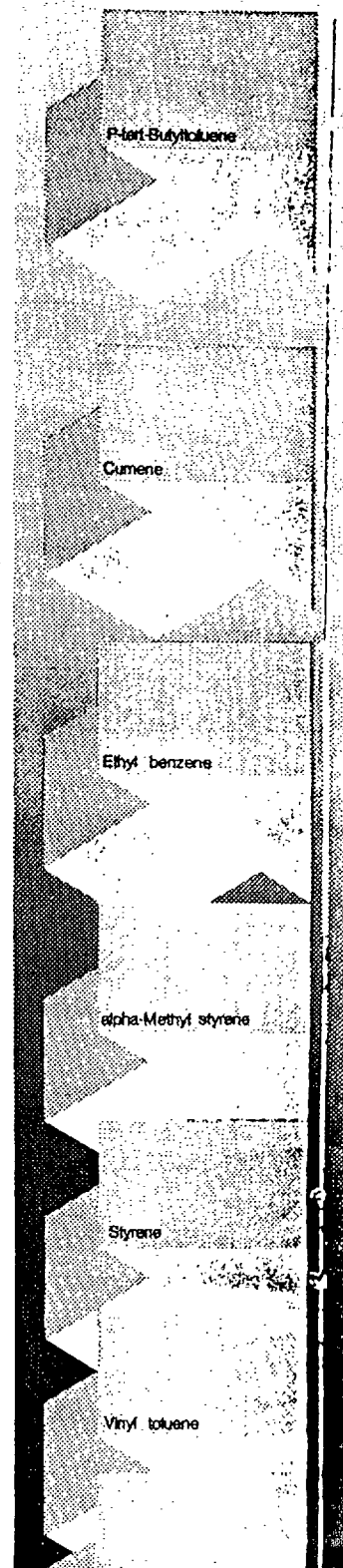
- Certain recordkeeping requirements are proposed. At the same time, OSHA is actively seeking information on ways to reduce the recordkeeping burden on the employer, if this can be achieved without detriment to the protection of the employee.

- For the period of time the employer is required to maintain records, access to these records must be provided to employees, former employees, their representatives, and designated physicians.

- Employees or their representatives must have an opportunity to observe any mandated measurement of employee exposure to a toxic substance, and specific steps are established for effective exercise of this opportunity.

- Data in the appendices are advisory in nature and do not create additional obligations.

- Public participation in consideration of these proposed additions to the standards is encouraged.



Proposal to amend Subpart Z of Part 1910, Title 29,  
Code of Federal Regulations, by addition of 11 Sections

| Section   | Toxic Substance      | CAS No.*   | Common Synonyms                                                                                                                     |
|-----------|----------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1910.1032 | p-tert-Butyltoluene  | 98-51-1    | 1-(1,1-Dimethylethyl)-4-methylbenzene<br>1-Methyl-4-tert-Butylbenzene<br>p-Methyl-tert-Butylbenzene<br>TBT                          |
| 1910.1033 | Cumene               | 98-82-8    | 1-Methylethylbenzene<br>Isopropylbenzene<br>2-Phenylpropane<br>Cumol                                                                |
| 1910.1034 | Ethyl benzene        | 100-41-4   | Phenyl ethane<br>Ethyl benzol                                                                                                       |
| 1910.1035 | alpha-Methyl styrene | 98-83-9    | 1-Methylethenylbenzene<br>AMS<br>Isopropenyl benzene                                                                                |
| 1910.1036 | Styrene              | 100-42-5   | Ethenyl benzene<br>Phenylethylene<br>Vinyl benzene<br>Styrene monomer<br>Styrol<br>Styrolene<br>Cinnamene<br>Cinnamenol<br>Cinnamol |
| 1910.1037 | Vinyl toluene        | 622-97-9   | 1-Ethenyl-4-methylbenzene<br>Methyl styrene<br>Tolyl ethylene<br>Mixed isomers of meta- and para-Vinyl toluene                      |
| 1910.1038 | Cyclohexane          | 118-82-7   | Hexahydrobenzene<br>Hexamethylene<br>Benzene hexahydride                                                                            |
| 1910.1039 | Camphor              | 76-22-2    | 1,7,7-Trimethyl-2-oxobicyclo-(2,2,1)-heptane<br>2-Camphonone<br>Synthetic camphor<br>Gum camphor<br>Laurel camphor                  |
| 1910.1040 | Mesityl oxide        | 141-79-7   | 4-Methyl-3-penten-2-one<br>Isobutenyl methyl ketone<br>Methyl isobutenyl ketone<br>Isopropylidene acetone                           |
| 1910.1041 | 5-Methyl-3-heptanone | 541-85-5   | Ethyl sec-amyl ketone**<br>Ethyl amyl ketone**<br>EAK**<br>Amyl ethyl ketone**                                                      |
| 1910.1042 | Ozone                | 10028-15-6 |                                                                                                                                     |

\* Chemical Abstracts Service (CAS) Registry Number

\*\* Commonly but incorrectly used as a synonym for this compound