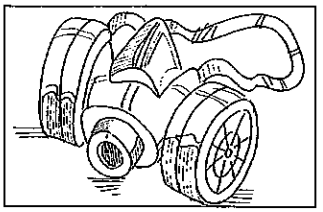


Occupational Health—An Overview

Overview of Topic

Protecting your employees against harmful stuff they can breathe (silica dust), absorb through their skin (ionizing radiation), or noise that can damage their hearing, all deal with occupational health.

Issues that are covered in the OSHA construction regulations for occupational health are: first aid; sanitation; noise exposure; radiation; gases, vapors, fumes, dusts, and mists (including silica); spray booths; illumination; ventilation; and hazard communication. Since most of these issues are (or will be) represented in this collection of toolbox talks, let's look (briefly) at a few other "hot" occupational health issues not found in the regulation but being currently looked at by OSHA for some type of action.

Diesel exhaust

Diesel exhaust is a dangerous airborne contaminant. Currently available control technology could significantly limit many diesel exhaust exposures, although additional information and research is needed on the methods to monitor diesel particulates, and determine the level of risk such particulates cause. OSHA is developing an action plan to reduce worker exposures to this hazard but is not initiating rulemaking at this time.

Asphalt fumes

When hot asphalt is applied in a molten state, it generates toxic fumes. Workers exposed to asphalt fumes are at risk of developing headaches, rashes, cough, and possibly cancer. There is no OSHA standard for asphalt fumes, although, in 1992, it proposed a 5 mg/m3 permissible exposure limit. The American Conference of Governmental Hygienists (ACGIH) currently recommends the same.

Noise/hearing conservation

Occupational exposures to noise levels in excess of the current OSHA standards places hundreds of thousands of workers at risk of developing hearing impairment, hypertension, and elevated blood pressure levels. Workers in the construction industry are not fully covered by the current OSHA standards and lack the protection of an adequate hearing conservation program. OSHA has designated this issue as a priority for rulemaking action to extend hearing conservation protection provided in the general industry standard to the construction industry.

Reproductive hazards

A large number of workplace chemicals, physical and biological agents can damage reproductive systems resulting in infertility, spontaneous abortion, developmental impairment, or death in an embryo, fetus or child. In the past, OSHA has issued a limited number of standards that acknowledge and provide partial protection from reproductive risks. OSHA is developing an action plan to reduce worker exposures to reproductive hazards but is not initiating rulemaking at this time.

Employee Training

The following training requirements are a part of the Occupational health and environmental controls section of the OSHA rules:

- 1926.50(c)—An employee with a valid first-aid training certificate must be on site when medical services and first aid are not reasonably accessible.
- 1926.53(b)—Activity involving the use of radioactive materials/X-rays must be done by competent persons trained in the proper and safe use of the equipment.
- 1926.54(a) and (b)—Only qualified/trained employees can install, adjust, and operate laser equipment.
- 1926.55(b)—When respirators are used to protect against gases, vapors, fumes, dusts, and mists, 1926.103 rules must be met. Employees must be thoroughly trained in respirator use when in atmospheres immediately dangerous to life.
- 1926.59(h)(2)(i)-(iv)—Hazard communication training is extensive and includes explanations of the hazcom program, labeling systems, and material safety data sheets.
- 1926.62—Rules for lead work and process safety management of highly hazardous chemicals, contains extensive training requirements when in these environments.

Training Tips

An overview of occupational health and environmental controls is appropriate for this toolbox talk. Each issue is or will be covered in another toolbox talk in greater depth.

Where To Go For More Information

Construction regulatory text: 29 CFR, Subpart D.

KELLER'S CONSTRUCTION TOOLBOX TALKS

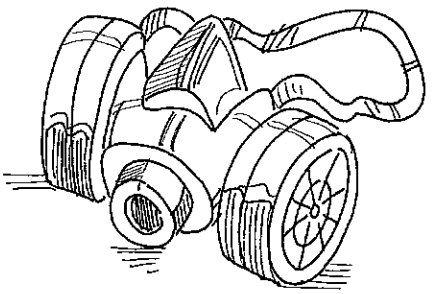
Occupational Health—An Overview

Protecting you against harmful stuff you can breathe (silica dust), absorb through your skin (ionizing radiation), or noise that can damage your hearing, all deal with occupational health.

Issues that are covered in the OSHA construction regulations for occupational health are such things as first aid; sanitation; noise exposure; radiation; gases, vapors, fumes, dusts, and mists (including silica); spray booths; illumination; ventilation; and hazard communication. Since most of these issues are (or will be) covered in a toolbox talk, let's look (briefly) at a few other "hot" occupational health issues not found in the rules but being looked at by OSHA for some type of action.

Diesel exhaust—Diesel exhaust is a dangerous airborne contaminant. Currently available technology can greatly limit many diesel exhaust exposures and the adverse health effects ranging from headaches to nausea to cancer and respiratory disease, although additional information and research is needed on the way to monitor diesel particles, and determine the level of risk such particles cause. OSHA is developing an action plan to reduce worker exposures to this hazard.

Asphalt fumes—When hot asphalt is applied in a molten state, it generates toxic fumes. Workers exposed to asphalt fumes are at risk of developing headaches, rashes, coughs, and possibly cancer. There is no OSHA standard for asphalt fumes, although, in 1992, it proposed a 5 mg/m^3 permissible exposure limit.



Noise/hearing conservation—Occupational exposures to noise levels in excess of the current OSHA standards places hundreds of thousands of workers at risk of developing hearing impairment, hypertension, and elevated blood pressure levels. Workers in construction are not fully covered by the current OSHA standards and lack the protection of an adequate program. OSHA has designated this issue as a priority for rulemaking action to extend hearing conservation protection to the construction industry.

Reproductive hazards—A large number of workplace chemicals, physical and biological, can damage reproductive systems resulting in infertility, spontaneous abortion, developmental impairment or death in an embryo, fetus or child. In the past, OSHA has issued a limited number of rules that acknowledge and provide partial protection from reproductive risks. OSHA is currently developing an action plan to reduce worker exposures to reproductive hazards.

Occupational health and environmental issues are complex and sometimes difficult to implement. First aid, respiratory protection, and field sanitation are fairly easy to understand and put into place. However, issues such as lead, asbestos, and process safety management of highly hazardous chemicals can be intimidating. Nevertheless your employee has a responsibility to protect you against the most complex of health issues at your jobsites.

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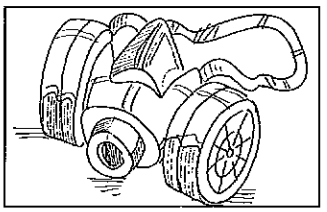


Occupational Health—An Overview, Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—An Overview at _____.
(company name)

The session covered:

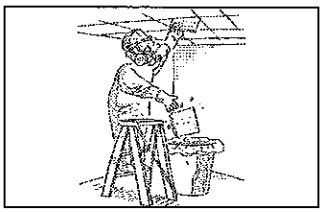
- Occupational health issues.
- Health issues OSHA is currently looking at for action.
- Training requirements for occupational health issues.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Occupational Health—Asbestos

Overview Of Topic

According to 29 CFR 1926.1101, employers must ensure that no employee is exposed to an airborne concentration of asbestos in excess of the PEL (0.1 fiber per cubic centimeter of air as an 8-hour time-weighted average (TWA)). Employers must also ensure that no employee is exposed to an airborne concentration of asbestos in excess of the STEL (1.0 f/cc as averaged over a sampling period of 30 minutes).

Note: The construction asbestos rule does not apply to asbestos-containing asphalt, roof cements, coatings, and mastics.

Asbestos construction work is divided into four classes:

Class:	Definition:
I	Activities involving removal of thermal system insulation (TSI) and surfacing ACM and presumed asbestos-containing material (PACM).
II	Activities involving the removal of ACM which is not TSI or surfacing material. Includes, but is not limited to, removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.
III	Repair and maintenance operations, where ACM, including TSI and surfacing ACM and PACM, is likely to be disturbed.
IV	Maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, III activities.

29 CFR 1926.1101 is very detailed, see the regulation for specific information on the following:

- Permissible exposure limits.
- Regulated areas.
- Methods of compliance (e.g., engineering controls, work practices).
- Protective clothing.
- Multi-employer worksites.
- Exposure assessments/ monitoring.
- Respiratory protection.
- Hygiene facilities & practices.
- Housekeeping.
- Recordkeeping.

- Communication of the hazards.
- Medical surveillance.
- Competent person.

Employee Training

You must communicate asbestos hazard information prior to or at the time of initial assignment and at least annually thereafter and include detailed information on the following:

For:	Training elements include:	
All employees installing and handling asbestos-containing products and for employees who perform class I - IV operations.	• Recognizing asbestos. • Adverse health effects associated with exposure. • Relationship between smoking and asbestos in causing lung cancer. • Operations that could result in exposure, and the importance of necessary protective controls to minimize exposure. • Purpose, proper use, fitting instructions, and limitations of respirators. • Appropriate work practices for performing asbestos jobs.	• Medical surveillance program requirements. • Content of 29 CFR 1926.1101 and its appendices. • Names, addresses and phone numbers of public health organizations which provide information, materials and/or conduct programs concerning smoking cessation. • Requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

Additional training requirements for Class I-IV operations are found in 29 CFR 1926.1101(k)(9).

Training Tips

As a safety trainer, you may want to show a complete set of PPE to be used. Demonstrate donning and doffing the PPE, give respiratory protection training separately, covering 29 CFR 1926.103.

Where To Go For More Information

29 CFR 1910.1001—Asbestos.

40 CFR 61, Subpart M—National emission standards for asbestos (EPA).

40 CFR 763, Subpart E—Asbestos containing materials in schools.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Asbestos in Construction

Asbestos is a mineral-based material that is resistant to heat and corrosive chemicals. Asbestos is found in building materials such as shingles, floor tiles, cement pipes, roofing felts, insulation, ceiling tiles, fire-resistant drywall, and acoustical products. Today, fortunately, very few asbestos-containing products are being produced and installed. So, most worker exposures occur during the removal of asbestos or renovation of structures containing asbestos.

Asbestos symptoms

If you are not properly protected, your chances of exposing yourself to asbestos are high. OSHA requires training to protect you. Let's look at the effects of asbestos exposure:

Exposure:	Effects:
Acute (short term)	Shortness of breath, chest or abdominal pain, or irritation of the skin and mucous membranes
Chronic (long term)	Breathing difficulty, dry cough, broadening and thickening of the ends of the fingers, bluish discoloration of the skin and mucous membranes, asbestosis (an emphysema-like condition), lung cancer, and/or mesothelioma (a cancerous tumor that spreads rapidly in the cells of membranes covering the lungs and body organs).

How exposure occurs

Asbestos fibers enter the body by the inhalation or ingestion of airborne particles that become embedded in the tissues of the respiratory or digestive systems. Should exposure occur, asbestos symptoms may not surface for 20 or more years. Smoking around this substance greatly increases your risk of exposure and potential for developing lung cancer.

Exposure must be limited to 0.1 fibers per cubic centimeter of air (0.1 f/cc), averaged over an 8-hour work shift. The excursion or short-term limit is one fiber per cubic centimeter of air (1 f/cc) averaged over a sampling period of 30 minutes. This means that if you had a pinch of asbestos between your thumb and forefinger and threw it into the air, you'd meet the exposure limit.

Protection methods

Personal protective equipment—NIOSH-approved respirators, protective clothing (i.e., full-body suits, gloves, and footwear);

Work practices—One good work practice is to place and store contaminated clothing in closed containers which prevent the dispersion of the asbestos outside the container; and

Signs—An asbestos warning will state:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

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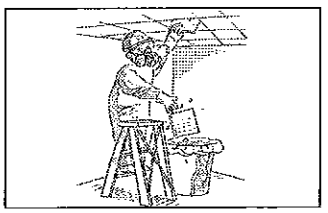

Occupational Health—Asbestos Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Asbestos at _____.
(company name)

The session covered:

- Recognizing asbestos.
- Health effects associated with exposure.
- Relationship between smoking, asbestos, and lung cancer.
- Requirements for posting signs, affixing labels, and the meaning of the required legends for such signs and labels.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature

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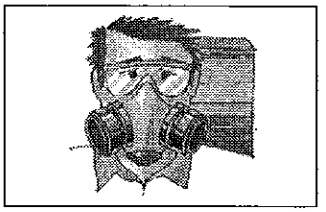


Occupational Health—Asbestos (EPA Requirements)

Overview of Topic

The Environmental Protection Agency (EPA) lists asbestos as a hazardous air pollutant and controls asbestos emissions under the National Emission Standards for Hazardous Air Pollutants (NESHAPS)[40 CFR Part 61, Subpart M].

The purpose of NESHAPS, as it relates to asbestos, is to prevent asbestos fibers from becoming airborne by controlling manufacturing, spraying, fabrication, application, removal, and disposal operations.

Whether you are an asbestos abatement contractor doing renovation work, or a demolition company, dealing with asbestos is a huge responsibility. It takes a lot of research and knowledge of EPA, Occupational Safety and Health Administration (OSHA), and Department of Transportation (DOT) standards and the know-how to implement them. A quick glance at the EPA standards will give you an idea of the depth of the EPA requirements.

Standard for demolition and renovation (40 CFR 61.145)

This section of the NESHAPS rule determines what level of requirements apply to the owner or operator of a demolition/renovation activity. The determination is made after inspecting a facility for the presence of asbestos. Requirements are based on the amount of regulated asbestos-containing material (RACM) at a jobsite.

Notification requirements (61.145(b))—Depending on inspection results an owner or operator may have to:

- Provide the EPA with a written notice of intention to demolish or renovate.
- Update the notice, as necessary, including when the amount of asbestos affected changes by at least 20%.

The notice is complicated and requires all information listed in 61.145(b)(4).

Procedures for asbestos emission control (61.145(c))—Depending on inspection results an owner or operator may have to comply with the procedures for asbestos emission controls in 61.145(c). Owner/operators must:

Remove all RACM from a facility being demolished or renovated before any activity begins that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal. A list of reasons that RACM would not need to be removed is found in 61.145(c)(1).

The standard also provides for:

Spraying operations—Operations in which asbestos-containing materials are spray applied. (61.146)

Installation of insulating materials—Operations for installing or reinstalling any insulating materials that contain commercial asbestos if the materials are either molded and friable or wet-applied and friable after drying. (61.148)

Disposal—Waste disposal for manufacturing, fabricating, demolition, renovation, and spraying operations. (61.150)

Reporting—Providing information to the EPA. (61.153)

Employee Training

There are no specific training requirements in 40 CFR 61.145 for training asbestos demolition/renovation workers. Training requirements are in 29 CFR 1926.1101.

Depending on the class of work, as defined in the OSHA rules, training can be OSHA requirements; from EPA's Model Accreditation Plan (40 CFR, Part 763, Subpart E, Appendix C); or 40 CFR 763.92(a), Training of maintenance/custodial employees.

OSHA state-plan-states: Remember that certain states have more stringent regulations that go above and beyond the OSHA standards.

Training Tips

This Toolbox Talk is an overview of the Environmental Protection Agency's requirements for asbestos demolition/renovation work. The Toolbox Talk itself is the training. If you are, or are planning to go into installation of materials containing asbestos (e.g., roofing and flooring), or are in demolition or renovation you need to know not only the OSHA rules but also the EPA requirements.

Where To Go For More Information

29 CFR 1926.1101—Asbestos (Occupational Safety and Health).

40 CFR 61, Subpart M—National Emission Standards for Asbestos (EPA).

40 CFR 763—Asbestos (EPA).

KELLER'S CONSTRUCTION TOOLBOX TALKS

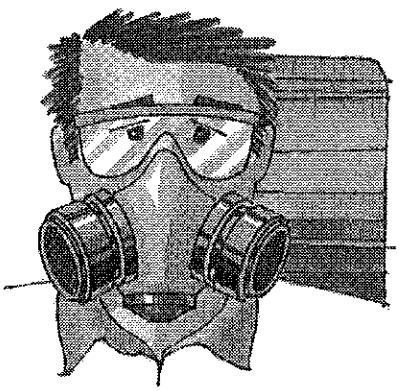
Occupational Health—Asbestos (EPA Requirements)

Increasing public health concerns about the effects of exposure to asbestos, primarily through the inhalation of airborne asbestos fibers, resulted in the Environmental Protection Agency (EPA) listing asbestos as a hazardous air pollutant and controlling asbestos emissions under the National Emission Standards for Hazardous Air Pollutants (NESHAPS).

Whether your company does asbestos abatement, renovation work, or you are a demolition company, dealing with asbestos is a huge responsibility. Working with asbestos takes a lot of difficult training and that includes knowledge of both EPA and Occupational Safety and Health Administration (OSHA) standards.

Training requirements are in the OSHA standards at 29 CFR 1926.1101 for asbestos workers. Depending on the class of asbestos work you are involved in (Class I-IV), your training can be strictly OSHA requirements or they can be an intense 40 hour program from EPA's Model Accreditation Plan for training of maintenance and custodial employees.

If you are involved in asbestos work you should be very familiar with the OSHA asbestos regulations. Let's take a look at some of the EPA requirements found at 40 CFR 61.145 for owners or operators of demolition or renovation activities.



Standard for demolition and renovation

This section of the NESHAPS rule determines what level of requirements apply to the owner or operator of a demolition/renovation activity. The determination is made after inspecting a jobsite for the presence of asbestos. Requirements are based on the amount of regulated asbestos-containing material (RACM) at a jobsite.

Depending on inspection results, an owner or operator may have to provide the EPA with a written notice of intention to demolish or renovate. The notice is complicated and requires a lot of information listed in the EPA rules.

Depending on inspection results an owner or operator may also have to comply with the procedures for asbestos emission controls in 61.145(c). Owner/operators must remove all RACM from a jobsite being demolished or renovated before any activity begins that would break up, dislodge, or disturb the material.

The rule also provides for: ***Spraying operations***—Operations in which asbestos-containing materials are spray applied. ***Installation of insulating materials***—Operations for installing or reinstalling any insulating materials that contain certain commercial asbestos. ***Disposal***—Waste disposal for manufacturing, fabricating, demolition, renovation, and spraying operations. ***Reporting***—Providing information to the EPA.

Working with asbestos is difficult because of all the requirements, both OSHA and EPA. However, they are all designed to keep you from developing asbestosis, a disabling and sometimes fatal disease caused by inhalation or ingestion of asbestos fibers.

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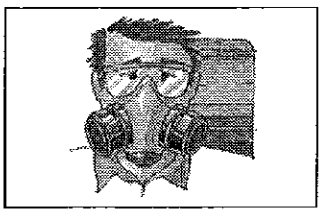

Occupational Health—Asbestos (EPA Requirements) Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Asbestos (EPA Requirements) at _____ .
(company name)

The session covered:

- Background of topic.
- Requirements for owners or operators of a demolition/renovation activity.
- Training.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature

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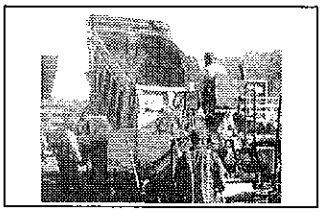


Occupational Health—Asphalt Hazards

Overview of Topic

Daily, thousands of construction workers are exposed to the hazards from asphalt, a petroleum product used extensively in road paving, roofing, siding, and concrete work. When hot asphalt is applied in a molten state, it is hot and it generates toxic fumes.

Hazard description

The primary danger from hot mix asphalt is thermal burns. Asphalt fumes may also cause eye, skin, and/or respiratory tract irritation. Workers exposed to asphalt fumes have reported headaches, rashes, cough, breathing problems, asthma, bronchitis, and skin irritation. A recent study has shown that some effects occur at exposures of 0.5 to 1.3mg/m^3.

Exposures vary considerably between different asphalt jobs (roofing vs. paving) and different worker tasks (kettle operator vs. paver operator). More research is needed to determine and control important factors which cause increase or decrease worker exposures such as application temperatures, equipment, environmental conditions, workplace practices, and asphalt constituents.

Exposure standards

OSHA does not have a standard for asphalt fumes, although it proposed a 5 mg/m^3 Threshold Limit Value in 1992. OSHA's quantitative risk assessment estimated a significant risk of lung cancer among exposed workers at levels as low as 0.2 mg/m^3. OSHA is developing an action plan to reduce worker exposures to this hazard but is not initiating rulemaking now.

The American Conference of Governmental Hygienists (ACGIH) currently recommends a Threshold Limit Value (TLV) of 5 mg/m^3, 15 minute short-term exposure limit.

Safety and health requirements

You should have an Emergency Action Plan for asphalt hazards first aid. The emergency action plan could include:

Eyes—If any hot material is splashed in a worker's eyes, flush eyes immediately with fresh water for 15 minutes and then see a doctor.

Skin—If any hot material gets on your skin, cool in cold water as soon as possible to stop further damage. If ice is available, pack ice on the asphalt adhering to the skin. Do not try to remove the solidified bitumen material from the skin in any way. Get to a doctor immediately.

Inhalation—Move the employee to fresh air. Call a physician.

Fumes—To protect workers against the potential hazards of asphalt fumes, you can treat it as if it were on the list of gases, vapors, fumes, dusts, and mists in 1926.55. Therefore you would:

- Implement administrative or engineering controls whenever feasible. New asphalt paving equipment manufactured after July 1, 1997, will incorporate ventilation systems to reduce asphalt fumes by 80% under an agreement with paving equipment manufacturers and OSHA.
- When such controls are not feasible to achieve desired results, protective equipment or other protective measures can be used to keep the exposure of employees to air contaminants within the limits suggested. Whenever respirators are used, their use must comply with 1926.103—Respiratory protection.
- Ensure proper personal protective equipment is available and being used such as: respiratory protection, heavy duty gloves, splash goggles or effective safety glasses, long pants and sleeves, and boots.

Employee Training

There are no specific training requirements in the OSHA regulations for asphalt hazards. The general OSHA rule for training construction employees at 29 CFR 1926.21(b)(2) applies.

Training Tips

Customize your safety plan for asphalt hazards around your operation. Share this plan with your employees. You may want to include asphalt hazards in with your written safety plans for first aid and/or hazardous gases, vapors, fumes, dusts, and mists.

Where To Go For More Information

29 CFR 1926.55—Gases, vapors, fumes, dusts, and mists.

29 CFR 1926.103—Respiratory protection.

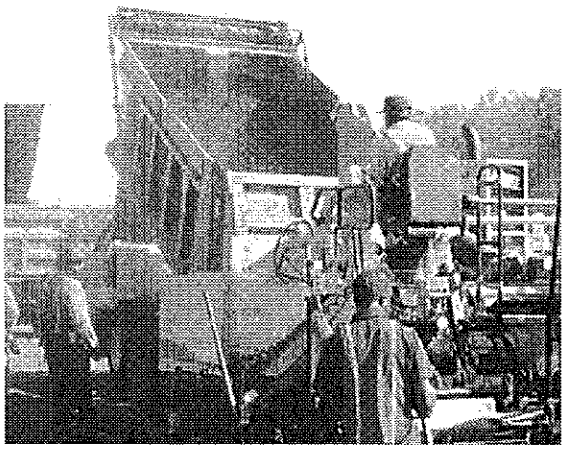
KELLER'S CONSTRUCTION TOOLBOX TALKS

Occupational Health—Asphalt Hazards

Are you one of the thousands of construction workers who are exposed daily to the fumes from asphalt? Asphalt is a petroleum product used extensively in road paving, roofing, siding, and concrete work. When hot asphalt is applied in a molten state, it generates toxic fumes.

Hazard description

The primary danger from hot mix asphalt is thermal burns. Asphalt fumes may also cause eye, skin, and/or respiratory tract irritation. Workers exposed to asphalt fumes have reported headaches, rashes, cough, breathing problems, asthma, bronchitis, and skin irritation.



Safety and health requirements

Your company should have an Emergency Action Plan for asphalt hazards first aid. The emergency action plan could include:

Eyes—If any hot material is splashed in a worker's eyes, flush eyes immediately with fresh water and then see a doctor.

Skin—If any hot material gets on your skin, cool in cold water as soon as possible to stop further damage. If ice is available, pack ice on the asphalt adhering to the skin. Do not try to remove the solidified bitumen material from the skin in any way. Get to a doctor immediately.

Inhalation—Move the employee to fresh air. Call a physician.

Fumes—OSHA does not have a standard for asphalt fumes, although it proposed a 5 mg/m^3 Threshold Limit Value in 1992.

To protect you against the potential hazards of asphalt fumes, your company can treat it as if it were on the list of gases, vapors, fumes, dusts, and mists in 1926.55. Therefore they would:

- Implement administrative/engineering controls whenever feasible. New paving equipment manufactured after July 1, 1997, will incorporate ventilation systems to reduce asphalt fumes by 80% under an agreement with equipment manufacturers and OSHA.
- When such controls are not feasible to achieve desired results, protective equipment or other protective measures can be used to keep employee exposure to air contaminants within the limits suggested.

Ensure you are equipped with the proper personal protective equipment such as: respirators, heavy duty gloves, splash goggles or effective safety glasses, long pants and sleeves, and boots.

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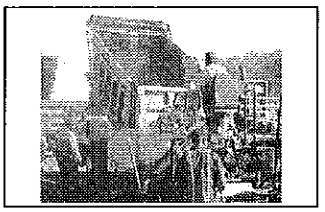

Occupational Health—Asphalt Hazards Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Asphalt Hazards at _____ .
(company name)

The session covered:

- Overview of topic.
- Hazard descriptions.
- Exposure standards.
- Safety and health information.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	Print Name Here

_____
Supervisor's Signature

Sign-off sheets may be copied and distributed to workers for use during your training session. Please refer to HOW TO USE THIS MANUAL for restrictions.

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Occupational Health — Cadmium

Overview Of Topic

Cadmium (Cd) is either a blue-white metal or a grayish-white powder found in lead, copper, and zinc sulfide ores, but most cadmium compounds are highly colored from brown to yellow and red. Cadmium can threaten the health of workers in many construction activities including, but not limited to, wrecking, demolishing, and salvaging structures where cadmium or cadmium-containing materials are present; cutting, brazing, grinding, or welding on surfaces that are painted with cadmium-containing paints; and transporting, storing, and disposing of cadmium or cadmium-containing materials on the site or location where construction activities are performed.

The purpose of the OSHA regulation, 29 CFR 1926.1127, is to prevent the absorption of harmful quantities of cadmium and protect construction workers from the toxic effects of cadmium.

Cadmium exposure and how it affects the body

When absorbed into the body by inhalation or ingestion in certain doses, cadmium is a toxic substance. Skin contact with cadmium is not known to cause health effects in humans or animals.

Cadmium exposure limits

OSHA limits the concentration of cadmium in work area air to 5 micrograms per cubic meter of air (5 $\mu g/m^3$) for an 8-hour workday. This is the permissible exposure limit (PEL). OSHA has also specified an action level (AL) as 2.5 mg/m3 for an 8-hour workday.

Worker protective measures

Protective measure:	Description:
Cadmium monitoring	Determine whether Cd is present and whether the AL is reached/exceeded.
Engineering controls (EC) & good work practices (GWP)	For exposure beyond the PEL, use engineering controls like installing equipment (e.g., source point capture) or modifying a process (e.g., enclosure) to control employee exposure levels, and use good work practices (proper clothing, personal protective equipment (PPE), housekeeping, and hygiene).

Occupational Health — Cadmium

Protective measure:	Description:
Regulated areas	Establish regulated areas where airborne concentrations exceed the PEL.
Respiratory protection	Use in combination with EC and GWP. Don & doff outside Cd area. Fit test.
Medical surveillance	Biennial surveillance. If biological monitoring results exceed trigger limits, the physician may determine that the employee should be removed temporarily.
Training	Provide annual training for employees who are potentially exposed to Cd.
Signs and labels	Provide and display warning signs in regulated areas. Label containers of Cd.
Written compliance program	Establish and implement a written program if exposure exceeds the PEL.
Recordkeeping	Maintain records for Cd monitoring, medical surveillance, and training.

Employee Training

Your company must initially and annually train workers in a whole variety of detailed information as specified in the regulation. The Toolbox Talk provided here cannot fulfill all of your training requirements, but it can provide a handy refresher or supplement to training.

Training Tips

As a safety trainer, you may want to, display the signs, labels, or other warning devices your company may use for alerting employees to the presence of cadmium. In addition you may want to combine cadmium training with your Hazard Communication Training.

Where To Go For More Information

29 CFR 1910.1027, Cadmium

KELLER'S CONSTRUCTION TOOLBOX TALKS

Cadmium (Cd) Precautions

OSHA estimates that approximately 70,000 employees in the construction industry are potentially exposed to cadmium. Unfortunately, cadmium exposure can threaten you if you perform construction activities like the following without protection:

- Wrecking, demolishing, and salvaging structures where cadmium is present.
- Cutting, grinding, or welding on surfaces painted with cadmium-containing paints.
- Transporting, storing, and disposing of cadmium or cadmium-containing materials on site.

Let's look at the effects of cadmium exposure:

Exposure:	Effects:
Short-term high exposure	If ingested-stomach irritation, leading to vomiting and diarrhea. If inhaled-constriction of the throat, chest pain, weakness, fever, severe lung damage & death.
Long-term low exposure	Build up of cadmium in the kidneys causing kidney disease; lung damage; fragile bones.

How does exposure occur

Because cadmium exposure is serious, you should know how exposure occurs, and protection measures. When absorbed into the body in certain doses, cadmium is a toxic substance. Cadmium is absorbed by:

Absorption method:	Description:
Inhalation (breathing)	When cadmium is scattered in the air as dust or fume, it can be inhaled and enter the upper respiratory tract and lungs. Operations that generate cadmium dust and fumes include: welding with cadmium solder, or heating cadmium-containing compounds. Use a respirator to protect from this hazard.
Ingestion (eating)	Cadmium can be absorbed through the digestive system, if a worker handles food, cigarettes, chewing tobacco, or cosmetics which have cadmium on them. Never eat, smoke, or apply cosmetics around cadmium or until fully cleaned up after working with it.

Eye exposure may cause redness and pain. Skin exposure may result in irritation. In both cases wash with large amounts of water. In all cases of exposure, seek medical attention.

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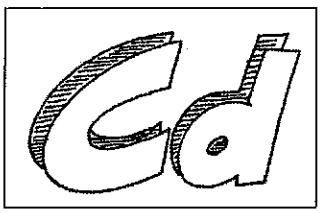


Occupational Health — Cadmium Sign-Off Sheet

This sign-off sheet documents the employees who have taken part in a training session on Occupational Health — Cadmium at _____.
(company name)

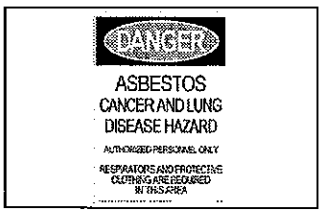
The session covered:

- Health hazards associated with cadmium exposure.
- Quantity, location, manner of use, release, and storage of cadmium and nature of operations that could result in exposure, especially exposure above the permissible exposure limit (PEL).
- Exposure protection measures employees can take (i.e., modifying smoking habits, using hygiene, work practices, and personal protective equipment (PPE)).

The space below is for each individual who has been trained on this topic to sign his/her names.

Date of Training: **Job Location:**

Employee Signature	Print Name Here



Occupational Health—Carcinogens

Overview of Topic

Carcinogens are agents that can cause cancer. In the construction industry, there are many potential exposures to carcinogens. This Toolbox Talk points out the Hazard Communication (HazCom) Standard's unique requirements for carcinogens.

All provisions of the HazCom standard must be followed when dealing with chemicals considered to be carcinogenic. As with all hazardous substances, carcinogen exposure should be controlled primarily using engineering and process controls. Personal protective equipment should only be used as an extension to these other measures.

How OSHA determines a carcinogen

OSHA's HazCom Standard, 29 CFR 1910.1200, considers a carcinogen as a chemical that:

- Has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen.
- Is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition).
- Is regulated by OSHA as a carcinogen.

Determinations by the above agencies that a chemical is a carcinogen or potential carcinogen will be considered conclusive evidence for purposes of the HazCom rule.

OSHA regulated carcinogens

OSHA does not maintain a list of known carcinogens but does regulate a number of specific carcinogenic materials (29 CFR 1926, Subpart Z—Toxic and hazardous materials).

Material safety data sheets

Only chemical manufacturers and importers are required to perform hazard determinations on chemicals. Any chemical you receive that is regulated by OSHA as a carcinogen, or is on one of the previously mentioned lists must be labeled as such, and an entry must be made on the Material Safety Data Sheet (MSDS).

MSDSs do not have to report negative findings of carcinogenicity. However, if the MSDS format provides a space for a carcinogen entry, this space must be filled with accurate information as no blank spaces may be present on the MSDS.

Labels and other forms of warning

Labels provide an immediate warning of the hazards to which employees may be exposed and also provide a link to other sources of more detailed information.

Chemicals "known to be carcinogenic" and those that may "reasonably be anticipated to be carcinogenic" by NTP must have a warning on the label and information on the MSDS. All IARC listed chemicals in Groups 1 (carcinogenic to humans), and 2A (probably carcinogenic to humans), must include appropriate entries on both the MSDS and label. Group 2B chemicals (possibly carcinogenic to humans) need be noted only on the MSDS.

When there is positive human evidence of carcinogenicity always requires carcinogen warnings on the label. In addition, the existence of one valid, positive study indicating carcinogenic potential in animals or humans is sufficient for a notation on the MSDS.

Employee training

Additional training is to be done whenever a new physical or health hazard is introduced into the work area. If the newly introduced hazard is a suspect carcinogen, and there has never been a carcinogenic hazard in the workplace before, then new training for carcinogenic hazards must be conducted for employees in those work areas where employees will be exposed.

Employee Training

Training requirements for the HazCom standard (29 CFR 1910.1200(h)), and any training requirements in "substance-specific" Subpart Z, cover training requirements for carcinogens.

Training Tips

If you have any known carcinogens at your jobsites ensure that you point them out during this Toolbox Talk. Discuss the MSDS for the carcinogens and point out the carcinogen labels.

Where To Go For More Information

29 CFR 1926.55—Gases, vapors, fumes, dusts, and mists.

29 CFR 1910.1200—Hazard communication.

KELLER'S CONSTRUCTION TOOLBOX TALKS

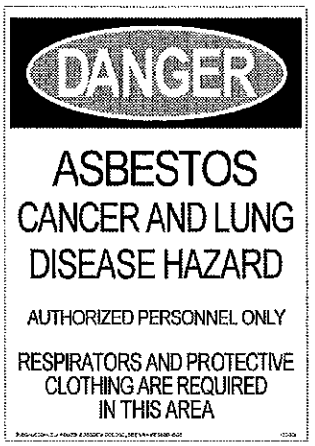
Occupational Health—Carcinogens

Carcinogens are hazardous substances at your jobsite that can cause cancer. This Toolbox Talk points out the Hazard Communication (HazCom) Standard's requirements for handling carcinogens. All requirements of the HazCom standard must be followed when dealing with chemicals considered to be carcinogenic.

As with all hazardous substances, carcinogen exposure should be controlled primarily using engineering and process controls such as ventilating a workspace. Personal protective equipment should only be used after other measures fail or are not feasible.

How OSHA determines a carcinogen

OSHA's HazCom Standard, 29 CFR 1910.1200, defines a carcinogen as a chemical that:



- Has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen.
- Is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP).
- Is regulated by OSHA as a carcinogen.

Material safety data sheets

Only chemical manufacturers and importers are required to perform hazard determinations on chemicals. Any chemical your company receives that is regulated by OSHA as a carcinogen, or is on one of the previously mentioned lists, must be labeled as such, and an entry must be made on the Material Safety Data Sheet (MSDS).

Labels and other forms of warning

Labels provide an immediate warning of the hazards to which you may be exposed. Chemicals "known to be carcinogenic" and those that may "reasonably be anticipated to be carcinogenic" by NTP must have warnings on the label and information on the MSDS. All IARC listed chemicals in Groups 1 (carcinogenic to humans), and 2A (probably carcinogenic to humans), must include appropriate entries on both the MSDS and label. Group 2B chemicals (possibly carcinogenic to humans) need be noted only on the MSDS.

Employee training

You must have additional training when a new physical or health hazard is introduced at your worksite. If the newly introduced hazard is a suspect carcinogen, and there has never been a carcinogenic hazard in the workplace before, then new training for carcinogenic hazards must be conducted for you in those work areas where you will be exposed.

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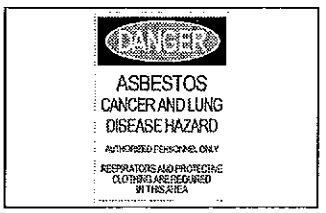


Occupational Health—Carcinogens Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Carcinogens at _____ .
(company name)

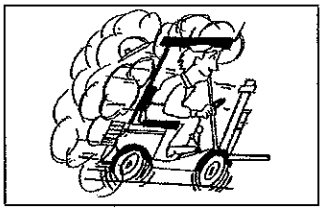
The session covered:

- OSHA's carcinogen determination.
- OSHA regulated carcinogens.
- Material safety data sheets (MSDSs).
- Labels and other forms of warning.
- Training requirements.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**



Occupational Health—Diesel Exhaust

Overview of Topic

Daily, workers exposed to diesel exhaust face the risk of adverse health effects including headaches, nausea, cancer, and respiratory disease.

In addition to employee exposure, the wide use of diesel engines in transportation and off-road vehicles results in atmospheric exposure to diesel emissions. The result of this exposure is the harmful health effects of ozone and particulate matter.

Is diesel exhaust carcinogenic?

In 1994, the Environmental Protection Agency (EPA) released a health assessment draft document for diesel emissions. The document concluded that there is limited evidence that diesel engine emissions is a carcinogen in humans. Supported by adequate evidence in animals, diesel engine emissions are considered to be a probable human carcinogen.

OSHA's current status for diesel exhaust

There are standards for the various chemical components of diesel exhaust. However, there are currently none for diesel exhaust as a unique hazard.

In 1988, NIOSH published an intelligence bulletin on diesel exhaust, recommending that whole diesel exhaust be regarded as a potential occupational carcinogen and controlled to the lowest feasible exposure level.

OSHA is developing an action plan to reduce worker exposure to this hazard but is not initiating rulemaking at this time.

Diesel exhaust and the hazard communication standard

Diesel exhaust emissions per se are not covered by the hazard communication standard (HCS). However, diesel fuel is covered, and any known hazards associated with diesel fuel must be reported on the material safety data sheet and full application of your hazard communication program is required. This includes the hazards associated with fuel combustion.

In the American Conference of Governmental Industrial Hygienists's (ACGIH) Notice of Intended Changes for 1997, the Time Weighted Average (TWA) is set at 0.15 mg/m3, with a designation as a suspected human carcinogen.

Since OSHA has not yet set a permissible exposure limit (PEL) for diesel exhaust, and OSHA still uses the ACGIH TLV's from 1970, you might want to consider using ACGIH's proposed (1997) TWA of 0.15 mg/m3 as your standard.

If you suspect that your employees are being subjected to diesel exhaust above the 0.15 mg/m^3 TWA, then you should implement the protection requirements of 29 CFR 1926.55—Gases, vapors, fumes, dusts, and mists.

What the EPA is doing

For construction employees who are outdoors the problems with diesel exhaust is not as bad as a manufacturing plant employee driving a diesel fueled forklift. The great outdoors is a pretty good ventilation system. This is evidenced by some Mine Safety and Health Administration (MSHA) studies comparing underground and surface mine operators who are exposed to diesel exhaust.

MSHA's studies indicate that diesel particulate exposures in surface mining are generally less than 200 m^3 (averaged over an 8-hour shift). Average exposures in most metal/non-metal underground mines range from 300 to 1600 m^3.

But, the EPA is concerned with the environment. This is why they are proposing stringent new standards to reduce emissions from a typical nonroad diesel engine by up to two-thirds. This rule would not apply to existing nonroad equipment. The program would represent a major step toward reducing the harmful health effects of ozone and particulate matter nationwide.

Employee Training

Training requirements for the HazCom standard (29 CFR 1910.1200(h)) cover all training requirements for carcinogens.

Training Tips

You may want to review an MSDS for diesel fuel and point out the hazards of diesel exhaust and how it fits into your hazard communication program.

Where To Go For More Information

29 CFR 1926.55—Gases, vapors, fumes, dusts, and mists.

29 CFR 110.1200—Hazard communication.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Occupational Health — Diesel Exhaust

Thousands of construction workers are exposed daily to diesel exhaust face the risk of adverse health effects including headaches, nausea, cancer, and respiratory disease.

In addition to your exposure, the wide use of diesel engines in transportation and off-road vehicles results in atmospheric exposure to diesel emissions. The result of this exposure is the harmful health effects of ozone and particulate matter.

Is diesel exhaust carcinogenic?

In 1994, the Environmental Protection Agency (EPA) released a health assessment draft document for diesel emissions. The document concluded that there is limited evidence that diesel engine emissions is a carcinogen in humans. Supported by adequate evidence in animals, diesel engine emissions are considered to be a probable human carcinogen.

OSHA's current status for diesel exhaust

There are standards for the various chemical components of diesel exhaust. However, there are currently none for diesel exhaust as a hazard in its self. OSHA is developing an action plan to reduce worker exposure to this hazard.

Diesel exhaust and the hazard communication standard

Diesel exhaust emissions are not covered by the hazard communication standard (HCS). However, diesel fuel is, and any known hazards associated with diesel fuel must be reported on the material safety data sheet and full application of your company's hazard communication program is required. This includes the hazards associated with fuel combustion.

What the EPA is doing

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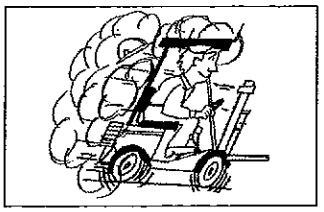


Occupational Health—Diesel Exhaust Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health — Diesel Exhaust at _____
(company name)

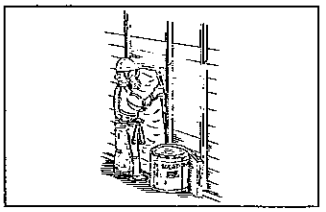
The session covered:

- Is diesel exhaust carcinogenic?
- OSHA current status for diesel exhaust.
- Diesel exhaust and the hazard communication program.
- What is the Environmental Protection Agency doing?

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**



Occupational Health—Fiberglass Insulation

Overview Of Topic

Fiberglass is a synthetic mineral fiber made from glass, sand, or inorganic substances. Each fiber is about one-seventh the diameter of a human hair or smaller and can reach several centimeters long. Due to their size, the fibers are easily airborne during insulation installation and can cause skin, eye, and upper-respiratory irritation. Also some studies suggest that fiberglass may cause a risk of cancer and chronic respiratory disease.

For these reasons, your company must determine whether an airborne concentration of fiberglass is present and whether it exceeds exposure limits of nuisance dust (50 fibers per cubic centimeter (f/cc) for an 8 hour time-weighted average). It is worth noting, however, that in 1999 the North American Insulation Manufacturers Association (NAIMA) and OSHA recently created a voluntary Health and Safety Partnership Program that established a voluntary permissible exposure limit (PEL) of 1 f/cc during an 8 hour time-weighted average for synthetic vitreous fibers (including fiberglass).

An effective fiberglass exposure prevention program will include:

- Implementation of engineering and administrative controls, where feasible;
- An ongoing exposure monitoring program;
- An ongoing medical surveillance program, including pulmonary function tests and chest X-rays;
- An effective respiratory protection program;
- Hygiene facilities and clothing change areas;
- Safe work practices including the use of personal protective equipment (PPE), dust collection systems, proper ventilation, storage and disposal procedures, housekeeping procedures, personal hygiene, and fire protection for insulation containing oil, and avoiding the use of compressed air; and
- Training and information to workers.

Employee Training

An effective training program might include coverage of:

- Fiberglass insulation installation activities;
- The hazards of working with fiberglass, such as skin, eye, and upper-respiratory irritation;
- The hazards of installing insulation, such as hand pain and fatigue, puncturing hazards, and falling hazards;
- PPE and clothing that is required, such as respirators, goggles, long sleeves and pants, gloves, and head protection;
- Safe handling procedures for insulation materials; and
- First aid procedures for eye irritation (flush with water).

Training Tips

As a trainer, you may want to:

- Have someone look up fiberglass in the dictionary before introducing fiberglass basics;
- Bring in a picture of a fiberglass fiber;
- Show a complete set of PPE for the insulation installer, and give the locations of all required PPE at your site;
- Go over respirators in your Respirator Training Program;
- Ask trainees what good work practices they have or would use when installing or removing fiberglass insulation (as employees mention PPE pull out an example to look at); and
- Use Hazard Communication Training for fiberglass training.

Where To Go For More Information

29 CFR 1926.55—Gases, vapors, fumes, dusts, and mists.

NAIMA Voluntary Health and Safety Partnership Program for Fiber Glass, Rock and Slag Wool Fiber Products.

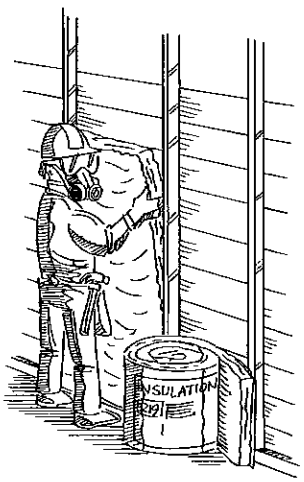
KELLER'S CONSTRUCTION TOOLBOX TALKS

Fiberglass insulation

Fiberglass is a synthetic mineral fiber made from glass, sand, or inorganic substances. Usually molten glass is sent through tiny holes of a spinning disc to create fibers. The fibers can then be coated, heated, and formed into insulation batts, blankets, or loose fill. Fiberglass insulation is used for its temperature-controlling, non-combustible, sound-proofing, and mold-prohibiting properties.

Hazards

Each fiber is about one-seventh the diameter of a human hair or smaller and can reach several centimeters long. Due to their size, the fibers are easily airborne during insulation installation and can cause skin, eye, and upper-respiratory irritation. Also some studies suggest that fiberglass may cause a risk of cancer and chronic respiratory disease. For these reasons, your company must determine whether an airborne concentration of fiberglass is present and whether it exceeds exposure limits specified by OSHA.



Protective measures

If you are not properly protected, your chances of exposure to fiberglass are high. Here's a list of protective measures to avoid fiberglass exposure:

- Wear proper eye protection to avoid eye irritation from fibers.
- Wear protective gloves.
- Use the correct, clean, NIOSH-approved dust respirator. Put on and remove respirators outside the installation area. Also, keep insulation in its package until you're ready to install it.
- Wear long sleeves and long pants, sealing the cuffs with rubberbands or tape to keep irritating fiberglass from reaching your skin.
- Place and store contaminated clothing in closed containers that prevent the dispersion of the fibers outside the container.
- Shower and change into clean clothes, including shoes, before leaving the worksite so that no fiberglass contamination is carried home.
- Wash your hands and face before eating, drinking, smoking, or applying cosmetics.
- Eat, drink, or smoke in areas outside the work area. Keep all lunch boxes and coffee cups away from the work area. Use a separate lunch area.

Other protective recommendations in relation to installing insulation include:

- Use adequate lighting in order to see nails.
- If the ceiling under you will not support a grown person, lay boards over the joists or trusses to create a walkway.
- Use a hedge clipper or serrated knife instead of a scissors or ordinary knife for cutting. Share the stapling and cutting work with a co-worker. These measures should prevent hand pain.

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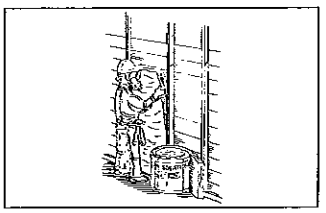


Occupational Health—Fiberglass Insulation Sign-Off Sheet

This sign-off sheet documents the employees at this company, _____, who have taken part in a training session on Occupational Health—Fiberglass Insulation. The session covered:

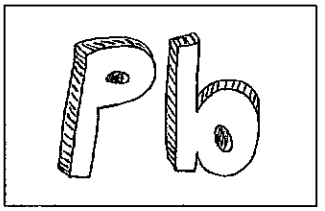
- Fiberglass insulation installation activities.
- The hazards of working with fiberglass, such as skin, eye, and upper-respiratory irritation.
- The hazards of installing insulation, such as hand pain and fatigue, puncturing hazards, and falling hazards.
- Safe handling procedures for insulation materials.
- PPE that is required, such as respirators, goggles, long sleeves and pants, gloves, and head protection.
- First aid procedures for eye irritation (flush with water).

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Occupational Health—Lead—An Overview

Overview Of Topic

Lead (Pb) is a basic heavy metal which can threaten the health of workers in many construction trades like welding, electricity, carpentry, painting, plumbing, and heating/air-conditioning. The object of the OSHA regulation, 29 CFR 1926.62, is to prevent absorption of harmful quantities of lead and protect construction workers from the toxic effects of lead.

Lead exposure and how it affects the body

When absorbed into the body by inhalation and ingestion in certain doses, lead is a toxic substance. Most lead is **NOT** absorbed through the skin; however, certain organic lead compounds, such as tetraethyl lead, are absorbed this way. Once lead is absorbed, most of it is circulated throughout the body and stored in various organs and tissues. Some is excreted with body waste, but some remains in the body. As exposure continues, lead stored in the body increases. The effects include serious complication, including death.

Lead exposure limits

OSHA limits the concentration of lead in work area air to 50 micrograms per cubic meter (50 $\mu g/m^3$) for an 8-hour workday. This is the permissible exposure limit (PEL). OSHA has also specified an action level to 30 $\mu g/m^3$ for an 8-hour workday, without regard to respirators.

Worker protective measures

Protective measure	Description
Exposure monitoring	If lead is present, make determinations whether the action level is reached/exceeded. If above, collect samples representing regular, daily exposure.
Engineering controls & good work practices including administrative controls.	For exposure beyond the PEL, use engineering controls (i.e., HEPA vacuum, exhaust ventilation, roll/brush paint not spray, distancing workers, encapsulation of lead surfaces) and good work practices (i.e., proper clothing, personal protective equipment (PPE), housekeeping, and hygiene).

Protective measure	Description
Respiratory protection	Used in combination with engineering controls and good work practices. Don & doff outside lead area. Fit test.
Medical surveillance	Provide initial and annual surveillance. For exposure more than 30 days annually and blood levels above µg/dl, full medical surveillance required. If blood lead level is 50 µg/deciliter, temporarily remove worker.
Training	Provide annual training for employees at or above the action level on any day or those that may suffer skin or eye irritation from lead.
Signs	If PEL exceeded, post, "WARNING LEAD WORK AREA POISON NO SMOKING OR EATING."

Employee Training

Your company must institute a training program for and ensure the participation of all employees who are subject to exposure to lead at or above the action level or for whom the possibility of skin or eye irritation exists. Initial training must be provided prior to the time of initial job assignment for those employees subsequently covered. Repeat the training program at least annually for each employee. Training must include a variety of detailed information from the regulation. The handout provided here cannot be used as the sole training source but it can serve as a useful refresher or supplement.

Training Tips

You may want to show a complete set of PPE to be used. Demonstrate donning and doffing. Have each employee practice or just circulate equipment for employees to see, and display a lead exposure warning sign and discuss it.

Where To Go For More Information

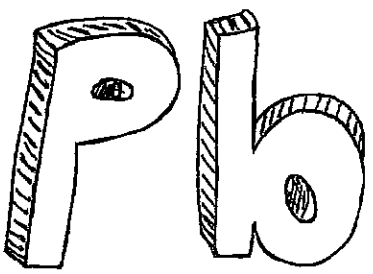
29 CFR 1926.62—Lead

KELLER'S CONSTRUCTION TOOLBOX TALKS

Lead—An Overiew

Lead exposure can threaten you if you perform activities like abrasive blasting, sanding, scraping, cutting, burning, welding, and painting during repair, reconstruction, dismantling, and demolition work. If you are not properly protected, your chances of exposing yourself to lead poisoning are high. A short-term high-dose exposure could result in a brain disorder escalating to seizures, coma or even death. Long-term low-level exposure can decrease reaction time, cause nervous system damage, kidney disease, reproductive impairment, or death.

When absorbed into the body in certain doses, lead is a toxic substance. Lead is absorbed when breathing or eating, and through the skin when in certain forms. OSHA limits the concentration of lead in work area air to 50 micrograms per cubic meter (50 mg/m^3) for an 8-hour workday. This is the permissible exposure limit (PEL). If lead is present at your worksite in any quantity, your company must determine whether OSHA's action level for workers has been reached/exceeded or not. You will be notified of the results. If exposure is beyond the PEL, your company must try to minimize exposure with controls like HEPA vacuums, distancing employees from abrasive blasting operations, chemical removal instead of hand scraping, replacement of lead-based painted building components, brushing/rolling paint instead of spraying, and substituting other coatings for lead-based coatings. You should use the following good work practices to help protect yourself when working with lead:



- Use the correct, clean respirator.
- Keep the worksite clean. Use only a vacuum with a HEPA filter or wet cleaning methods when removing lead dust. Never use compressed air for cleaning.
- Eat, drink, or smoke in areas outside the worksite. Keep all lunch boxes and coffee cups away from the work area. Use a separate lunchroom.
- Wash your hands and face before eating, drinking, smoking, or applying cosmetics.
- Use protective clothing. Store street clothes separately from work clothes. Never wear contaminated clothes home.
- Shower and change into clean clothes, including shoes, before leaving the worksite so that no lead contamination is carried home.

Respirators—Respirators are used with engineering controls and work practices. They are put on and removed outside the lead area. Fit testing guarantees a tight seal.

Signs—If exposure exceeds the PEL, you'll see the following message posted: WARNING, LEAD WORK AREA, POISON, NO SMOKING OR EATING

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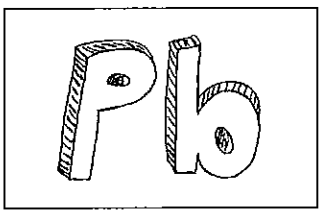


Occupational Health—Lead—An Overview Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Lead—An Overview at _____.
(company name)

The session covered:

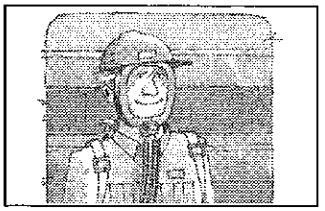
- The specific nature of the operations which could result in exposure to lead above the action level.
- The purpose, proper selection, fitting, use, and limitations of respirators.
- The work practices associated with the employee's job assignment.

The space below is for employees to "sign-off" that they were in attendance..

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Occupational Health—Lead Operations—An Overview

Overview of Topic

Pure lead (Pb) is a heavy metal. It can combine with various other substances to form numerous lead compounds.

When absorbed into the body in certain doses lead is toxic. It can be absorbed by inhalation and ingestion. A significant portion of the lead inhaled or ingested gets into the blood stream and is eventually stored in various organs and body tissues.

As exposure continues, and if not filtered by the body and excreted, lead is stored in increasing amounts causing irreversible damage to body cells, organs, and whole body systems.

Long term (chronic) overexposure to lead may result in severe damage to the blood-forming, nervous, urinary, and reproductive systems.

OSHA's lead standard

OSHA's 1993 interim lead standard for construction workers reduced the permissible exposure limit (PEL) from 200 micrograms per cubic meter of air (200 $\mu g/m^3$) as an 8-hour time weighted average (TWA) to 50 $\mu g/m^3$.

An action level is set at 30 $\mu g/m^3$ calculated as an 8-hour TWA. The action level is the level at which you must begin certain compliance activities outlined in the standard.

Who does the standard apply to?

The rule applies to all construction work where an employee may be exposed to: lead, all inorganic lead compounds, and organic lead soaps.

Some operations that generate lead dust and fume include:

- Flame-torch cutting, welding, the use of heat guns, sanding, scraping, and grinding of lead painted surfaces in repair, reconstruction, dismantling, and demolition work.
- Abrasive blasting of bridges and other structures containing lead-based paints.

- Use of torches and heat guns, sanding, scraping, and grinding lead-based paint surfaces during remodeling or abating lead-based paint.
- Maintaining process equipment or exhaust duct work.

Worker protection program

Employers must develop and implement a worker protection program. The program is essential in minimizing worker risk of lead exposure. Some projects, such as the removal of paint from a few interior residential doors, involve limited exposure. Others may involve the removal, or stripping off, of substantial quantities of lead-based paints on large bridges.

Engineering controls and good work practices are the most effective way to minimize exposure to your employees. Respirators cannot be used instead of engineering and work practices but must be used in conjunction with them to control employee exposures.

At a minimum, the following elements should be included in your worker protection program: (1) hazard determination, including exposure assessment, (2) engineering and work practice controls, (3) respiratory protection, (4) protective clothing and equipment, (5) housekeeping, (6) hygiene facilities and practices, (7) medical surveillance and provisions for medical removal, (8) training, (9) signs, and (10) recordkeeping.

Employee Training

You must institute a training program and ensure participation by all employees subject to lead exposure at or above the action level on any day. Initial training must be provided prior to initial job assignment. Training must be repeated at least annually and must include the requirements in §1926.62(l).

Training Tips

Use this Toolbox Talk: as an introductory outline for your training program, to inform non-lead workers about the hazards at a particular jobsite, or as a 5-minute refresher before starting a new lead project.

Where To Go For More Information

Construction regulatory text: §1926.62—Lead

Construction regulatory text: §1926.20—General safety and health provisions

Construction regulatory text: §1910.134—Respiratory protection

KELLER'S CONSTRUCTION TOOLBOX TALKS

Lead Operations—An Overview

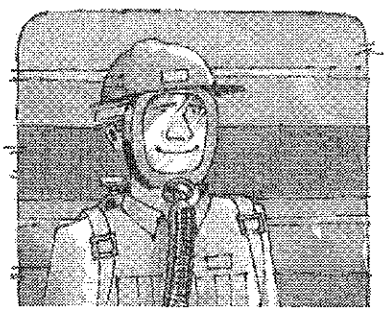
Pure lead (Pb) is a heavy metal. It can combine with various other substances to form numerous lead compounds.

If absorbed into your body in certain doses, lead is toxic. It can be absorbed by breathing it in and through your mouth. As exposure continues, and if not filtered by the body and excreted, lead is stored in increasing amounts causing irreversible damage to body cells, organs, and whole body systems.

Long term (chronic) overexposure to lead may result in severe damage to the blood-forming, nervous, urinary, and reproductive systems.

OSHA's lead standard

OSHA's lead rule for construction workers sets the permissible exposure limit (PEL) at 50 micrograms per cubic meter of air ($\mu g/m^3$) as an 8-hour time weighted average. An action level is set at 30 $\mu g/m^3$ calculated as an 8-hour TWA. The action level is the level at which your employer must begin certain compliance activities outlined in the standard.



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The rule applies to all construction work where an employee may be exposed to lead, all inorganic lead compounds, and organic lead soaps. Some operations that generate lead dust and fume include:

- Flame-torch cutting, welding, the use of heat guns, sanding, scraping, and grinding of lead painted surfaces in repair, reconstruction, dismantling, and demolition work.
- Abrasive blasting of bridges and other structures containing lead-based paints.
- Use of torches and heat guns, and sanding, scraping, and grinding lead-based paint surfaces during remodeling or abating lead-based paint.
- Maintaining process equipment or exhaust duct work.

Worker protection program

Your employer must develop and implement a worker protection program. The program is essential in minimizing your risk of lead exposure. Some projects involve limited exposure, such as the removal of paint from a few interior residential doors. Others may involve the removal, or stripping off, of substantial quantities of lead-based paints on large bridges.

Engineering controls and good work practices are the most effective way to minimize exposure. Respirators cannot be used instead of engineering and work practices but must be used in conjunction with them to control employee exposures.

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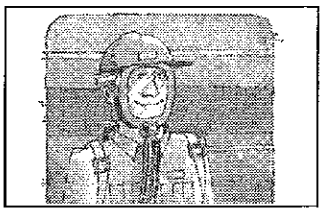


Occupational Health—Lead Operations—An Overview, Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Lead Operations—An Overview at _____.
(company name)

The session covered:

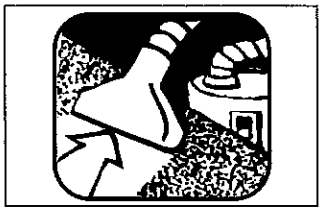
- OSHA's lead standard.
- Who does the standard apply to?
- Worker protection program?

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Occupational Health—Lead Operations—Engineering Controls

Overview of Topic

Engineering controls and good work practices are the major defense against employee exposure to lead. At a minimum, lead exposure must not exceed the OSHA permissible exposure limit (PEL) of 50 $\mu g/m^3$ averaged over 8-hours.

When feasible engineering controls and work practices cannot reduce worker exposure at or below the PEL, respirators must be used to supplement the engineering controls and work practices.

Competent person

Your "lead" competent person should review site operations and plan specific controls and work practices designed to reduce worker exposure to lead.

Engineering controls

Engineering controls reduce employee exposure either by removing or isolating the hazard or isolating the worker from exposure through the use of technology. Engineering measures include:

- **Exhaust ventilation** such as dust collection shrouds exhausted through a high-efficiency particulate air (HEPA) vacuum system. Welding, cutting/burning, and heating should have local ventilation.

  For abrasive blasting with full containment, the containment structure should be designed to optimize ventilation flow thereby reducing the lead concentration and improving visibility. The containment area must be under negative pressure to reduce lead dust escape.

  As necessary, you must evaluate the mechanical performance of your system in controlling exposure.

- **Enclosure/encapsulation** is an engineering alternative. Lead-based paint can be made inaccessible by: (1) encapsulation using a material that will bond to the surface such as an acrylic or epoxy coating, (2) enclosing the paint using materials such as gypsum wallboard, plywood panelling, or vinyl exterior siding, and (3) covering floors coated with lead-based paint using vinyl tile or linoleum flooring.

- **Material substitution** can include:
  - Zinc-containing primers.
  - Mobile hydraulic shears instead of torch cutting.
  - Surface preparation equipment, such as needle guns with multiple reciprocating needles completely enclosed within an adjustable shroud. This can substitute for abrasive blasting.
  - Chemical strippers instead of hand scraping using a heat gun. Chemical strippers generate less airborne lead dust.
- **Component replacement** is a permanent solution, i.e., replacing lead-based painted windows, doors, and trim with new lead-free components.
- **Process/equipment modification could include:** (1) brush or roller application of lead paints instead of spraying, (2) hydro- or wet-blasting and vacuum blasting (blasting techniques that are less dusty than abrasive blasting), and (3) using proper vacuum brushes of various sizes, crevice and angular tools enhancing the quality of the HEPA-vacuuming process.
- **Isolation** helps reduce the potential for exposure to lead. Keeping employees not involved in the operations as far away as possible reduces their exposures to lead.

Employee Training

You must institute a training program and ensure participation by all employees subject to lead exposure at or above the action level on any day. Engineering and work practice control methods associated with an employee's job assignment is a mandatory training requirement.

Training Tips

Use this Toolbox Talk as an outline to review your company's engineering controls prior to beginning a specific lead job. Inform those employees that are outside of the isolated lead areas of your specific engineering controls.

Where To Go For More Information

Construction regulatory text: §1926.62(e)(1)—Engineering and work practice controls

Construction regulatory text: §1926.20—General safety and health provisions

KELLER'S CONSTRUCTION TOOLBOX TALKS

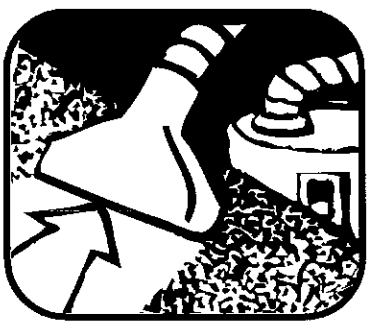
Occupational Health—Lead Operations—Engineering Controls

Engineering controls and good work practices are the major defense against employee exposure to lead.

When feasible engineering controls and work practices cannot reduce worker exposure to lead at or below the permissible exposure level (PEL) of 50 $\mu g/m^3$ over 8-hours, respirators must be used to supplement the engineering controls and work practices.

Engineering controls—Engineering controls reduce employee exposure either by removing or isolating the hazard, or isolating the worker from exposure through the use of technology. Engineering measures could include:

- **Exhaust ventilation** such as dust collection shrouds exhausted through a high-efficiency particulate air (HEPA) vacuum system.
- For abrasive blasting with full containment, the containment structure should be designed to optimize ventilation flow thereby reducing the lead concentration and improve visibility.
- **Enclosure/encapsulation** is an engineering alternative. Lead-based paint can be made inaccessible by: (1) encapsulation with a material that bonds to the surface, (2) enclosing the paint using systems such as gypsum wallboard or plywood panelling, and (3) covering floors coated with lead-based paint using vinyl tile or linoleum flooring.



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  - Mobile hydraulic shears instead of torch cutting.
  - Surface preparation equipment, such as needle guns with multiple reciprocating needles completely enclosed within an adjustable shroud.
  - Chemical strippers instead of hand scraping using a heat gun.
- **Component replacement** is a permanent solution, i.e., replacing lead-based painted windows, doors, and trim with new lead-free components.
- **Process/equipment modification** could include: (1) brush or roller application of lead paints instead of spraying, (2) hydro- or wet-blasting and vacuum blasting (blasting techniques that are less dusty than abrasive blasting), and (3) using proper vacuum brushes of various sizes, crevice and angular tools, enhancing the quality of the HEPA-vacuuming process.
- **Isolation** helps reduce the potential for exposure to lead. Keeping employees not involved in the operations as far away as possible reduces their exposures to lead.

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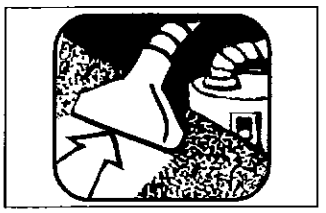


Occupational Health—Lead Operations—Engineering Controls Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Lead Operations—Engineering Controls at _____.
(company name)

The session covered:

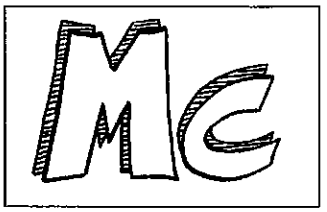
- Competent person.
- Engineering controls.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Occupational Health—Methylene Chloride

Overview of Topic

Methylene chloride (MC) is a solvent that is used to remove oils, fats, greases, waxes, resins, bitumen, rubber, and cellulose acetate. It is also used as an ingredient in adhesives, inks, or paint strippers. The most common uses for MC are paint stripping, metal cleaning, and furniture stripping. Workers who are exposed to MC are at significant risk of developing cancer, heart and liver problems, and central nervous system impairment, as well as eye, skin, and mucous membrane irritation.

OSHA implemented the MC rule (29 CFR 1926.1152) to reduce workers' risks from exposure to MC.

MC and its standard—Because of its hazards, OSHA published a standard in January 1997 to require the safe use of MC. The rule was revised in September 1998. The start-up dates for compliance with the various parts of the standard depend on the number of employees you have and the nature of your business. Some employers have until April 2000 to meet all of the regulation's requirements.

Physical hazards of MC—MC is a clear colorless liquid with a chloroform-like odor. It is only slightly soluble in water and mixes completely with most solvents. It evaporates very quickly. Its vapors are heavier than air.

MC's health hazards—The primary route of entry for MC into an employee's body is inhalation of its vapors. It can also be ingested or absorbed by the skin. Direct contact with the liquid is irritating to the eyes and skin. Health hazards can be either acute (short-term) or chronic (long-term).

Labeling procedures for MC—All containers of MC must have legible labels that include the hazards. The labels must comply with OSHA's hazard communication standard.

Exposure limits for MC—Exposures to airborne MC must be at safe levels. Exposures are given in parts per million (ppm)—the number of parts of MC per million parts of air. OSHA has set safe exposure limits as follows:

- 25 ppm as an 8-hour Time Weighted Average Permissible Exposure Limit (TWA/PEL).

- 125 ppm as a 15-minute Short Term Exposure Limit (STEL).

The standard also sets an action level of 12.5 ppm as an 8-hour TWA. The regulation has requirements for training, air monitoring, and medical surveillance when employee exposure is at or above the action level.

Respiratory protection—If the right type of respirator is not being used, employees are not being adequately protected. In most cases, the standard requires that atmosphere-supplying respirators be used. An atmosphere-supplying respirator provides your employee with a steady source of clean air. Respirator use must follow requirements in OSHA's standard on respiratory protection.

PPE required to prevent eye and skin contact—When protective equipment is required, it must be worn. Appropriate PPE can include: impervious chemical resistant clothing, gloves that are resistant to MC, splash-proof safety goggles, and face shields.

Appropriate first aid procedures—In the event of an emergency, institute the following first aid procedures and then get appropriate medical assistance.

- For eye contact—Flush with large amounts of clean water, and get medical attention immediately.
- For skin contact—Remove all contaminated clothing and flush the affected area with large amounts of clean water.
- For inhalation of large amounts of MC vapor—Move the employee to fresh air immediately (take precautions so you do not endanger yourself). Get medical attention as soon as possible. Keep the affected person warm and at rest. If breathing has stopped, perform rescue breathing/cardiopulmonary resuscitation.

Employee Training

The standard requires that all employees exposed to MC receive information and training as required by the hazard communication standard. The training requirements are found in §1910.1052(k)—Hazard communication.

Training Tips

Show trainees how you conduct air monitoring at your facility. Let them know the monitoring schedule and your procedures for employee observation.

Where To Go For More Information

29 CFR 1910.1052—Methylene chloride

KELLER'S CONSTRUCTION TOOLBOX TALKS

Occupational Health—Methylene Chloride

Methylene chloride (MC) is a widely used solvent in industry. Some of the most common uses for it include paint stripping, furniture refinishing, metal cleaning, and polyurethane foam manufacturing. It is a clear, colorless liquid with a chloroform-like odor. It may be mixed with other ingredients in a product. MC enters the body through inhaling its vapors. Direct contact or ingestion are two other possible routes of exposure.

Health Hazards—Make sure you read the Material Safety Data Sheet (MSDS) for any product you use that contains MC. The MSDS will tell you that product's health hazards.

Physical Hazards—MC evaporates very quickly. It will mix with most other solvents. Its vapors are heavier than air. When MC is heated, it can form flammable vapor/air mixtures. If it is involved in a fire, it decomposes into highly toxic and irritating chemicals. MC can cause hazardous reactions if it comes into contact with strong oxidizers, caustics, and chemically active metals (sodium, potassium, aluminum powder or magnesium powder).

Exposure Monitoring—Your employer must measure your exposure to airborne MC. To help keep you from being overexposed, OSHA has set exposure limits for MC. These exposure limits are: (1) 25 ppm as an 8-hour Time Weighted Average Permissible Exposure Limit (TWA/ PEL), or 125 ppm as a 15-minute Short Term Exposure Limit (STEL).

Regulated Areas—Whenever ME's exposure limits could be exceeded, the work area must be marked off to show that it is a regulated area. Only authorized personnel are allowed inside of a regulated area.

Work Practices and Engineering Controls—Proper work practices go a long way to reduce your exposure. Never eat, drink, or smoke, or keep food, beverages, or smoking materials where MC is used, stored, or handled. Engineering controls must always be used along with proper work practices. Engineering controls can include dilution ventilation, local exhaust ventilation, or enclosure of the operation.

Personal Protective Equipment—To protect yourself from eye and skin contact always wear the required protective equipment. This can include: (1) leakproof chemical resistant clothing, (2) gloves that are resistant to MC, (3) splash-proof safety goggles, and (4) face shields.

Medical Surveillance—Before you work where you are exposed to MC, you will be provided with medical screening if your exposure is: (1) at or above the action level (12.5 ppm as an 8-hour TWA) on 30 or more days per year, (2) above the 8-hour TWA PEL or STEL for 10 days or more per year, (3) above the 8-hour TWA PEL or STEL for any period of time if you have been identified as being at risk from cardiac disease or any other serious MC related health condition, or (4) due to an emergency involving MC.

You will also be provided with periodic follow-up medical screening. You will always be given a written medical opinion after the medical screening. In some situations where the physician or other licensed health care professional recommends that you be removed from MC exposure, your employer may provide you with temporary medical removal protection benefits or take other measures to protect you.

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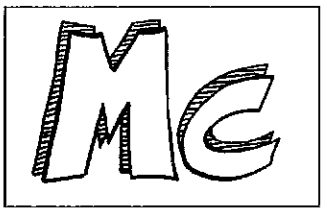

Occupational Health—Methylene Chloride Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Methylene Chloride at _____ .
(company name)

The session covered:

- Health and physical hazards of MC.
- Exposure monitoring.
- Signs and symptoms.
- Work practices and engineering controls.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**
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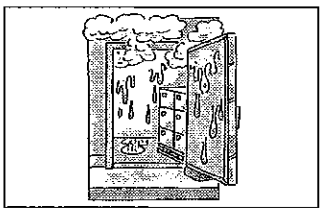
Supervisor's Signature



Occupational Health—Preventing Mold Growth

Overview Of Topic

The smell of mold is familiar, but many people don't understand how or why a mold problem occurs.

Mold 101

Molds can be found almost anywhere; they can grow on virtually any substance when moisture is present. Molds produce tiny spores to reproduce, just as plants produce seeds. These mold spores waft through the indoor and outdoor air continually.

When mold spores land on a damp spot indoors, they may begin growing and digesting whatever they have settled on. Molds can grow on wood, paper, carpet, foods, and even dynamite. When excessive moisture or water accumulates indoors, mold growth will often occur, particularly if the moisture problem remains undiscovered or unaddressed.

Eliminating all mold and mold spores in the indoor environment is not practical; the way to control indoor mold growth is to control moisture.

Construction mold damage

A construction jobsite is typically ripe for mold growth. Building materials that have been soaked with water, such as fiberglass insulation, wall board, ceiling tiles, and carpeting are excellent media for microbial growth.

Water leakage on furnishings or within building components can result in the proliferation of microorganisms that can release acutely irritating substances into the air. Usually, where microorganisms are allowed to grow, a moldy smell develops. This moldy smell is often associated with microbial contamination and is a result of VOCs released during growth on environmental substrates.

How mold affects people

Mold fungi can:

- Affect a person's immune system,
- Cause invasive disease,

- Release toxins.

All the facts regarding the harm people can suffer when exposed to molds are not fully understood.

What can you do?

Three conditions must exist in buildings before microbial contamination can occur:

- High humidity (over 60 percent);
- Appropriate temperatures (some molds like colder temperatures, some like warm or hot temperatures, and other molds don't care what the temperature is); and
- Appropriate growth media.

Employee Training

While there are no specific training requirements for training employees on how to handle mold growth on the construction site, an effective training program might include:

- Informing employees of the different types of materials and surfaces that could foster mold grow on the jobsite.
- Discussing the specific measures to take to control mold growth on the site (e.g., how to store material to keep it dry).
- Explaining how to inspect materials and surfaces for mold growth.
- Discuss what procedures to take if they discover mold growth or damage.

The OSHA regulations require in job site areas where harmful plants or animals are present, employees who may be exposed shall be instructed regarding the potential hazards, and how to avoid injury, and the first aid procedures to be used in the event of injury.

Training Tips

Show some pictures of mold damage on various types of surfaces and materials. Discuss types of mold damage that your company has had in the past. If you are going to have employees clean up mold damaged materials, talk about the safety precautions they will need to take.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Occupational Health—Preventing Mold Growth

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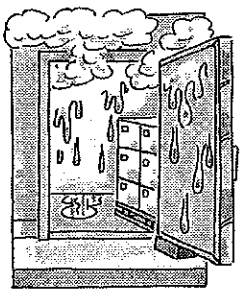

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- Release toxins.

All the facts regarding the harm people can be suffer when exposed to molds are not fully understood.

What can you do?

Three conditions must exist in buildings before microbial contamination can occur:

- High humidity (over 60 percent);
- Appropriate temperatures (some molds like colder temperatures, some like warm or hot temperatures, and other molds don't care what the temperature is); and
- Appropriate growth media.

Talk to your supervisor if you have any questions on controlling mold growth at your jobsite.

Handouts may be copied and distributed to workers for use during your training session. Please refer to HOW TO USE THIS MANUAL for restrictions.

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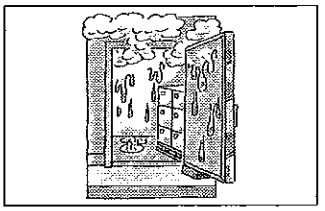

Occupational Health—Preventing Mold Growth Sign-Off Sheet

This sign-off sheet documents the employees at this company, _____, who have taken part in a training session on Occupational Health–Preventing Mold Growth. The session covered:

- What is mold and how does it grow and spread.
- Why a construction jobsite is typically ripe for mold growth.
- How mold affects people.
- What can you do?

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	Print Name Here

_____
Supervisor's Signature

Sign-off sheets may be copied and distributed to workers for use during your training session. Please refer to HOW TO USE THIS MANUAL for restrictions.

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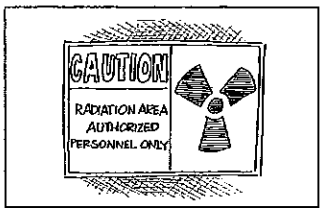


Occupational Health — Radiation

Overview Of Topic

There are two general types of radiation according to OSHA:

Radiation Type:	Radiation activities involve:
Ionizing	Alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles.
Nonionizing	Sound or radio waves, visible light, or infrared or ultraviolet light.

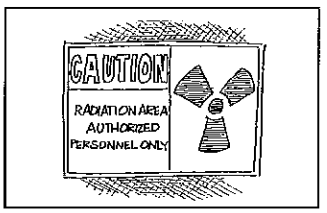
These radiation types are regulated under 29 CFR 1926.53, Ionizing Radiation, and 29 CFR 1926.54, Nonionizing Radiation. Both regulations have detailed requirements for construction sites where radioactivity is present. The most common source of radiation at construction sites is the nonionizing radiation produced when lasers are used.

For any radiation, there are personal protective equipment, warning signs and labeling, and other protective measures. See the regulations for exact requirements.

Employee Training

An effective radiation training program might cover:

- Locations of radioactive materials or radiation present at the site.
- Restricted areas, radiation areas, and high radiation areas.
- Safety problems associated with exposure to radioactive materials or radiation.
- Precautions or devices to minimize exposure and methods to protect employees from exposure.
- Personnel monitoring equipment (such as film badges, pocket chambers, pocket dosimeters, or film rings.
- Caution signs, labels, and signals.
- Immediate evacuation warning signal system.



Occupational Health — Radiation

- List of reports of radiation exposure which are available upon request.
- Availability of the operating procedures.

Training Tips

Take trainees on a tour of the restricted areas at your site. Point out the signs, entry requirements, and other rules. List the job titles or functions that can enter or work in these areas; Take trainees to the signaling system site, showing that it has the maximum practicable protection against fire, explosion, corrosion, or other extreme damage consistent with good performance. Demonstrate the signal in their areas.

Where To Go For More Information

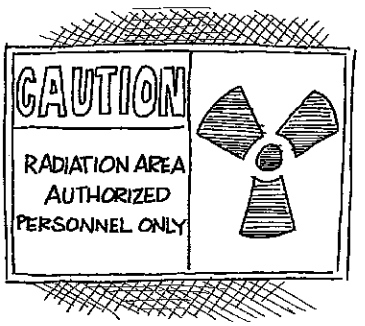
29 CFR 1910.1096 and 29 CFR 1910.97, Ionizing Radiation and Nonionizing Radiation

KELLER'S CONSTRUCTION TOOLBOX TALKS

Radiation In Construction

The term radiation often makes people think of danger and death, and it should. While the effect of exposure depends on the type of radiation, the energy, the dose, the quantity, and the part of the body that is exposed, health effects from exposure include nausea, vomiting, diarrhea, weakness, shock, and death. In addition, long-term exposure contributes to an increase in the risk of cancer. However, if you are protected and trained, radiation technology can safely help you do your job. There are two types of radiation:

Radiation type:	Includes:
Ionizing	Includes alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons, high-speed protons, and atomic particles.
Nonionizing	Sound or radio waves, visible light, or infrared or ultraviolet light.



At most construction sites, the only radiation that is used is nonionizing radiation produced by laser equipment. Lasers have been helping the construction industry for many years now, especially in the area of leveling and alignment applications. New technologies are being developed all the time, with many coming in the area of controlling the blades on bull dozers and road graders for precision cutting and grading. However, lasers on jobsites must be operated only by workers trained in the use of the laser equipment, and you may not be exposed over certain intensities.

Your employer may use engineering controls to reduce your exposure. If such controls are not feasible, you must use personal protective equipment. Follow these general requirements and safety precautions for laser equipment:

- Look for standard laser warning placards posted in areas in which lasers are used.
- Set up operating laser units above the heads of employees when possible.
- Use beam shutters or caps, or turn the laser off, when laser transmission is not required.
- Turn off the laser during lunch hour, overnight, or at the change of shifts.
- Use only mechanical or electronic means for guiding the internal alignment of the laser.
- Look for a laser equipment label which indicates maximum output.
- Never direct the laser beam at workers.
- When it is raining or snowing, or when there is dust or fog in the air, do not operate laser systems or keep workers out of range of the target during such weather conditions.
- Use antilaser eye protection if you are working in an area where a potential exposure to direct or reflect laser light greater than five milliwatts exists.

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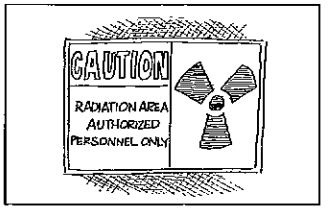


Occupational Health — Radiation Sign-Off Sheet

This sign-off sheet documents the employees who have taken part in a training session on Occupational Health — Radiation at _____.
(company name)

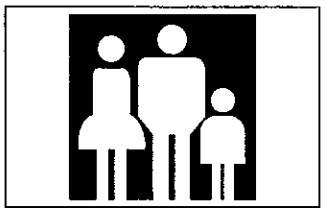
The session covered:

- The negative health effects of radiation.
- Lasers as the primary source of radiation on construction sites.
- Caution signs, labels, and signals.
- Good work practices to employ when working with or around lasers.

The space below is for each individual who has been trained on this topic to sign his/her names.

Date of Training: **Job Location:**

Employee Signature	**Print Name Here**



Occupational Health—Reproductive Hazards

Overview of Topic

Reproductive hazards in the workplace is an increasing health concern. A large number of workplace chemicals, physical and biologic agents, can damage the reproductive systems of both male and female workers. Occupational exposure can produce a wide range of effects on reproduction. The effects of parental exposure before conception include reduced fertility, unsuccessful fertilization or implantation, an abnormal fetus, reduced libido, or menstrual dysfunction. Maternal exposure after conception may result in prenatal death, low birth weight, birth defects, developmental or behavioral disabilities, and cancer.

OSHA is developing an action plan to reduce worker exposure to reproductive hazards but is not currently initiating rulemaking.

What chemicals are reproductive hazards?

Of those chemicals in the 1994 Register of Toxic Effects of Chemical Substances (RTECS) that are identified as reproductive hazards, workers were found to be exposed to 1,132 of these chemicals. Some of the chemicals, as well as physical and biologic agents, are in widespread use at work, including: various heavy metals such as lead and cadmium, organic solvents (glycol ethers), chemical intermediates (styrene and vinyl chloride), and some anti-cancer drugs. Most of the 70,000 chemicals in commercial use have never been tested for reproductive effects.

OSHA's reproductive hazard standards

Information about reproductive damage has rarely been used in setting workplace exposure levels. There are no general standards governing reproductive hazards. Four OSHA standards acknowledge and provide at least partial protection from reproductive risks. The standards provide the following information:

Dibromochloropropane—Acknowledges exposure hazards to reproductive health, provides guidelines for surveillance and preventive considerations.

Lead—Describes guidelines for hazard protection from lead exposures including reproductive hazards.

Cadmium—Provides information for medical surveillance.

Ethylene oxide—Describes guidelines for safe handling for ethylene oxide including reproductive health hazard protection.

The above chemicals are substance specific chemicals found in the construction regulations. Exposure to these chemicals requires you to follow the requirements in the construction regulations for each chemical.

Hazard Communication requirements

In compliance with the hazard communication rule, all personnel involved in any aspect of the handling of covered hazardous chemicals (physical or health) must receive information and training to appraise them of these hazards in the work area.

A health hazard means a chemical for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, or reproductive toxins.

Employee Training

Training requirements for the HazCom standard (29 CFR 1910.1200(h)) cover all training requirements for reproductive hazards except for the OSHA substance specific chemicals mentioned in this Toolbox Talk. In those cases, the requirements of those rules apply.

Training Tips

If you have any known reproductive hazards at your jobsites, identified by the MSDS sheets received from suppliers, ensure that you point them out during this Toolbox Talk. Discuss the MSDS for the reproductive hazards.

Where To Go For More Information

29 CFR 1926.55—Gases, vapors, fumes, dusts, and mists.

29 CFR 1910.1200—Hazard communication.

29 CFR 1926.1144—Dibromochloropropane.

29 CFR 1926.62—Lead.

29 CFR 1926.1127—Cadmium.

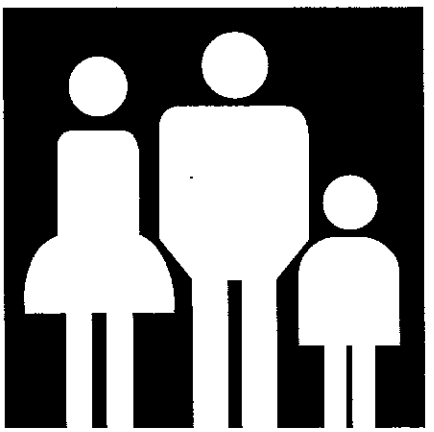
29 CFR 1926.1147—Ethylene Oxide.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Reproductive Hazards

Reproductive hazards in the workplace are an increasing health concern. A large number of workplace chemicals, physical and biological, can damage male and female reproductive systems. Occupational exposure can produce a wide range of effects on reproduction.

The effects of parental exposure before conception include reduced fertility, unsuccessful fertilization or implantation, an abnormal fetus, reduced libido, or menstrual dysfunction. Maternal exposure after conception may result in prenatal death, low birth weight, birth defects, developmental or behavioral disabilities, and cancer. OSHA is developing an action plan to reduce worker exposures to reproductive hazards.



What chemicals are reproductive hazards?

Of those chemicals in the 1994 Register of Toxic Effects of Chemical Substances (RTECS) that are identified as reproductive hazards, workers were found to be exposed to 1,132 of these chemicals. Some of the chemicals, as well as physical and biologic agents, are in widespread use at work, including: heavy metals such as lead and cadmium, organic solvents (glycol ethers), chemical intermediates (styrene and vinyl chloride), and some anti-cancer drugs.

Most of the 70,000 chemicals in commercial use have never been tested for reproductive effects.

OSHA reproductive hazard standards

There are no general OSHA rules for governing reproductive hazards. Four OSHA standards acknowledge and provide at least partial protection from reproductive risks.

The four standards provide the following information: (1) *Dibromochloropropane*—Acknowledges exposure hazards to reproductive health, and provides guidelines for surveillance and preventive considerations, (2) *Lead*—Describes guidelines for hazard protection from lead exposures including reproductive hazards, (3) *Cadmium*—Provides information for medical surveillance, (4) *Ethylene oxide*—Describes guidelines for safe handling guidelines for ethylene oxide including reproductive health hazard protection.

The above chemicals are substance specific chemicals found in the construction regulations. Exposure to these chemicals requires your company to follow the requirements in the construction regulations for each chemical.

Hazard communication requirements

Harmful health hazards include carcinogens, toxic or highly toxic agents, and reproductive toxins. These harmful substances can enter your body by inhalation, contact with your skin, or ingestion if you do not properly wash your hands before eating, drinking or smoking after working with harmful substances, i.e., lead. If you use any substance designated as a harmful substance, know what you and your company have to do to protect you, the worker.

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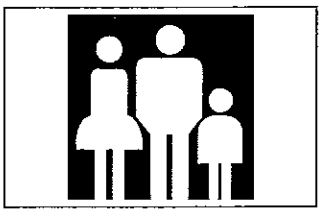


Occupational Health—Reproductive Hazards Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Reproductive Hazards at _____ .
(company name)

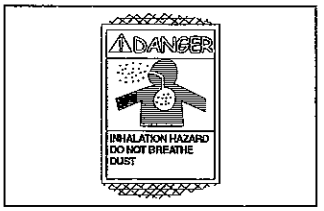
The session covered:

- Reproductive hazards, what are they?
- OSHA reproductive hazard standards.
- Hazard communication requirements.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	Print Name Here



Occupational Health — Silicosis

Overview Of Topic

While OSHA currently has a permissible exposure limit (PEL) for crystalline silica, over 30 percent of OSHA-collected silica samples from 1982 through 1991 exceeded that PEL. According to 29 CFR 1926.55, construction employers must implement a respirator program when engineering, administrative, and good work practices are not enough to keep the permissible exposure limit (PEL) for respirable dust containing crystalline silica (quartz) below (250 mmpcf)/(% silica + 5). This equation is the PEL for an 8 hour time-weighted average (TWA).

However, recent studies suggest that this current PEL is insufficient for protecting against silicosis, lung damage caused by breathing dust containing extremely fine particles of crystalline silica. About 300 deaths are attributed to silicosis annually. Therefore, in the fall of 1996, the U.S. Department of Labor, jointly with the American Lung Association, the National Institute for Occupational Safety and Health (NIOSH), and the Department of Health and Human Services (DHHS), launched the silicosis prevention effort, "If It's Silica, It's Not Just Dust."

According to OSHA, an effective silicosis prevention program will include:

- An ongoing personal air monitoring program.*
- An ongoing medical surveillance program.
- Training and information to workers on crystalline silica.*
- Availability of air and medical surveillance data to workers.*
- An effective respiratory protection program.*
- Hygiene facilities and clothing change areas.
- Appropriate recordkeeping.*
- Personal exposures below the PEL or an abatement program that also provides for interim worker protection.
- A housekeeping program.*
- A construction safety and health program.*

- Regulated areas.

  * Required by specific OSHA standards if an overexposure to crystalline silica exists.

Employee Training

Effective training might include these elements:

- Information about the potential health effects of exposure to crystalline silica including material safety data sheets.
- Instruction about the purpose and setup of regulated areas.
- Information about safe handling, labeling, and storage of toxic materials.
- Discussion about the importance of substitution, engineering controls, work practices, and personal hygiene in reducing crystalline silica exposure.
- Instruction in the use and care of appropriate protective equipment (protective clothing and respiratory protection).

Training Tips

You may want to show a complete set of silicosis PPE. Demonstrate donning and doffing of the equipment.

Where To Go For More Information

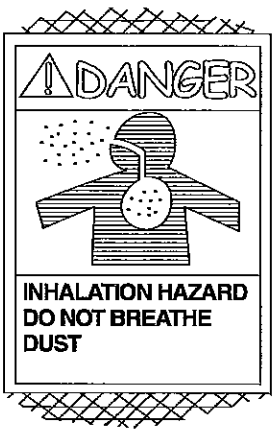
Documents that may be helpful include *Preventing Silicosis and Deaths in Construction Workers* (Pub. No. 96-112) by NIOSH and *Special Emphasis Program (SEP) on Silicosis* by OSHA. A free package of materials on how to prevent silicosis is available by calling NIOSH toll-free at (1-800-35-NIOSH).

KELLER'S CONSTRUCTION TOOLBOX TALKS

It's Not Just A Little Dust. It's Silica!

Crystalline silica (SiO2) is found in materials such as concrete, masonry, and rock. Most crystalline silica comes in the form of quartz. Common sand can be as much as 100% quartz. When these materials are made into a fine dust and suspended in the air, the fine particles produced can cause lung damage, lung cancer, heart failure, and tuberculosis. Lung damage associated with silica dust is called silicosis. About 300 deaths a year are attributed to silicosis, so OSHA regulates silica. Silicosis can be "acute," meaning it can develop after short periods of exposure, or it can be "chronic," meaning it can occur after ten or more years of exposure to lower levels of the dust.

In construction, there are a number of activities in which silica dust presents itself, including:



- Sandblasting to remove paint and rust.
- Jack hammering, chipping, hammering, drilling, crushing, loading, hauling, and dumping rock.
- Mixing, chipping, hammering, drilling, sawing, grinding, and demolition of concrete and masonry.
- Dry sweeping or pressurized air blowing of concrete or sand dust.
- Repairing or replacing of linings of rotary kilns and cupola furnaces.
- Setting, laying, and repairing railroad track.

Keeping dust from getting into the air is the number one way of preventing silicosis. This can be accomplished by simply using a water hose to wet dust down where and when it is created. Other protection methods include:

- Measuring dust levels in the air and using dust collection systems on dust generating equipment.
- Using a saw that provides water to the blade when sawing concrete or masonry, and using water through drill stems to reduce the amount of dust in air when rock drilling.
- Using local exhaust ventilation to prevent dust from being released into the air and using good work practices to minimize exposures to nearby workers.
- Using abrasives containing less than 1% crystalline silica during abrasive blasting to prevent harmful quartz dust from being released in the air.
- Using a respirator when required.
- Changing into disposable or washable work clothes at the worksite and showering and changing into clean clothing before leaving the worksite.
- Not eating, drinking, smoking, or applying cosmetics in dust containing areas, and washing your hands and face before eating, drinking, smoking, or applying cosmetics.

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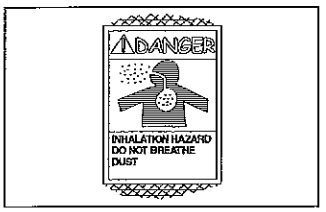
KELLER'S CONSTRUCTION TOOLBOX TALKS



Occupational Health — Silicosis Sign-Off Sheet

This sign-off sheet documents the employees who have taken part in a training session on Occupational Health — Silicosis at _____.
(company name)

The session covered:

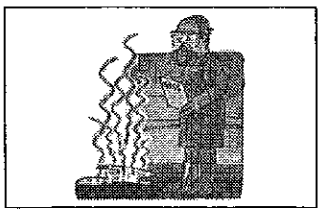
- The potential health effects of exposure to crystalline silica.
- The importance of substitution, engineering controls, work practices, and personal hygiene in reducing crystalline silica exposure.
- The use and care of appropriate protective equipment (including protective clothing and respiratory protection).

The space below is for each individual who has been trained on this topic to sign his/her names.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Occupational Health—Solvents

Overview of Topic

A solvent is a chemical that dissolves another substance forming a solution. Thousands of construction workers are exposed daily to paints, varnishes, lacquers, and paint removers; all containing solvents. Commonly used solvents are alcohol, mineral spirits, petroleum distillates, turpentine, benzene, toluene, xylene, methyl ethyl ketone, gasoline, and kerosene.

Health hazards associated with solvent exposure include nervous system toxicity, reproductive damage, liver and kidney damage, respiratory impairment, cancer, and dermatitis.

Material Safety Data Sheets (MSDS) are the documents that list specific health hazard data for every solvent you have at your jobsites. You must have the MSDS for each solvent your employees use.

Workplace solvent exposure levels vary widely. A review of OSHA's enforcement data base found exposure levels for various solvents ranging from trace amounts to levels in the upper explosive limit range (10,000 parts per million [PPM] and higher).

A recent OSHA records review revealed eight worker deaths between 1975 and 1992 from over-exposure to a single solvent, trichloroethylene. Many workers who are exposed to solvents below permissible limits are endangered because the limits are inadequate (e.g., methylene chloride). In other cases there are no permissible exposure limits (PEL) at all.

OSHA requirements

While many individual solvents or groups of solvents have unique properties, there are also common chemical, physical, and biological features shared by many. This makes it possible and wise to: (1) develop and implement control strategies, and (2) set up your hazard communication program to recognize solvents in general.

Permissible Exposure Limits

OSHA has established PEL's for over 100 solvents, including those most commonly used. Most of these (found in 29 CFR 1926.55) were established in 1971 and are considered to be out-of-date and do not adequately protect workers. Many companies use the cur-

rent American Conference of Governmental Hygienists (ACGIH) threshold levels or other internal and more protective limits because they are more stringent than OSHA's PELs.

Gases, vapors, fumes, dusts, and mists—§1926.55

This standard, along with the hazard communication standard (§1910.1200), gives you the requirements for controlling hazardous substances at your jobsites. Your MSDS's and labels give you initial warning of hazardous substances. Instructions for preventing inhalation, ingestion, skin absorption, or contact with materials above the threshold limit values of airborne contaminants are presented in §1926.55.

Administrative or engineering controls (i.e., ventilation) must first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures must be used to keep the exposure of employees to air contaminants within the limits prescribed in §1926.55.

Employee Training

Training requirements for the HazCom standard (§1910.1200(h)) cover the training requirements for solvents. Additional training requirements are required if a worker must use respiratory protection.

OSHA state-plan-states: Remember that certain states have more stringent regulations that go above and beyond the OSHA standards.

Training Tips

Using solvents found at your jobsites, go over the hazard communication requirements (i.e., MSDS, labels, etc.) If you have particular solvents you must monitor using the requirements of §1926.55, go over the requirements for these hazards as well.

Where To Go For More Information

29 CFR 1926.55—Gases, vapors, fumes, dusts, and mists.

29 CFR 1926.94—Ventilation.

29 CFR 1910.1200—Hazard communication.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Occupational Health—Solvents

Thousands of construction workers are exposed daily to materials that contain solvents such as paints, varnishes, and lacquers. At other times workers use solvents such as alcohol, mineral spirits, petroleum distillates, turpentine, benzene, toluene, xylene, methyl ethyl ketone, gasoline, and kerosene directly to perform a specific task.

The health hazards associated with exposure to solvents include nervous system toxicity, reproductive damage, liver and kidney damage, respiratory impairment, cancer, and dermatitis. The Material Safety Data Sheet (MSDS) for each solvent at your jobsite is the document that gives specific information on the health hazards associated with a solvent. Your employer must provide an MSDS for each solvent you use at your job.

Internal exposure to a solvent occurs mostly through breathing. However, a solvent can also enter your body by passing through your skin, and eating food or drinking liquids contaminated with the solvent.

Workplace solvent exposure levels vary widely. A review of OSHA's enforcement documents found exposure levels for various solvents ranging from trace amounts to levels in the upper explosive limit range (10,000 parts per million [PPM] and higher).

A recent OSHA records review revealed eight worker deaths between 1975 and 1992 from over-exposure to a single solvent, trichloroethylene. Many workers who are exposed to solvents below permissible limits are endangered because the limits are inadequate (e.g., methylene chloride). In other cases there are no permissible exposure limits (PEL) at all.

OSHA requirements

OSHA has established PEL's for over 100 solvents, including those most commonly used. Most of these (found in 29 CFR 1926.55) were established in 1971 and are considered to be out-of-date and do not adequately protect workers. Many companies use the current American Conference of Governmental Hygienists (ACGIH) threshold levels or other internal and more protective limits because they are more stringent than OSHA's PELs.

Gases, vapors, fumes, dusts, and mists

Direction for preventing inhalation, ingestion, skin absorption, or contact with materials above the threshold limit values of airborne contaminants is presented in §1926.55. MSDS's and labels give you initial warning of hazardous substances. Administrative or engineering controls (i.e., ventilation) must first be tried whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures must be used to keep your exposure to air contaminants within the limits prescribed in §1926.55.

Once again, the MSDS provides information on precautions for safe handling and use, and control measures to be implemented.

Handouts may be copied and distributed to workers for use during your training session. Please refer to HOW TO USE THIS MANUAL for restrictions.

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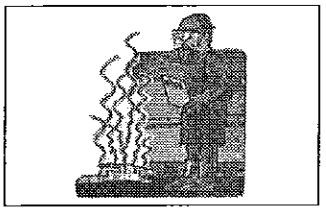

Occupational Health—Solvents Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Occupational Health—Solvents at _____ .
(company name)

The session covered:

- Overview of the subject including: examples of solvents, health hazards, and MSDS's.
- OSHA requirements.
- Material safety data sheets (MSDS).
- Gases, vapors, fumes, dusts, and mists—1926.55.
- Training requirements.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	Print Name Here

Sign-off sheets may be copied and distributed to workers for use during your training session. Please refer to HOW TO USE THIS MANUAL for restrictions.
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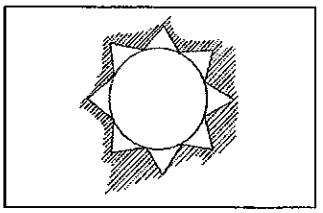


Occupational Health—Sun Exposure

Overview Of Topic

Sun exposure can do major damage—sunburn, skin cancer, and cataracts. While the rays of the sun are more damaging during summer months and between 11 a.m. and 1 p.m., sunburns can occur during a cloudy day, other seasons, and other times of the day.

Melanoma (skin cancer)

OSHA addresses worker exposure to the sun's radiation indirectly under 29 CFR 1926.95(a) pertaining to personal protective equipment (PPE). Basically, the regulation requires employers to protect such employees against overexposure to the sun's radiation. Employers are to use effective forms of protection such as wide-brim hats and long-sleeve clothing. The rule does not necessarily require employers to use sunscreen to protect their employees. However, sunscreen must be used if a situation should exist where it is the only effective means of protection.

OSHA is committed to requiring that employees overexposed to the sun's radiation be protected, however establishing an overexposure is difficult. OSHA does not have established exposure limits for radiation from the sun. In order to document overexposure OSHA must show that the exposure violates the General Duty Clause at Section 5(a)(1) of the OSH Act of 1970. An exposure that violates the General Duty Clause is one that could cause death or serious physical harm.

Sunburn

29 CFR 1926.28(a) requires protection against all known and recognized hazards. Considering the potential for sunburn, a shirt is considered PPE in the same manner as goggles and respirators. The employer could be cited for failure to require and enforce the use of PPE including shirts as protection against "bareback" injuries.

Cataracts

Although OSHA has not mentioned eye cataracts specifically, both Sections 1926.28(a) and .95(a) could be used to enforce the use of sunglasses with an appropriate UV rating.

Employee Training

While OSHA does not require training specifically on sun exposure, it does require training to recognize and avoid unsafe conditions at worksites and to understand the regulations applicable to the work environment to control or eliminate the hazards (Sec. 1926.21(b)(2)). Here is a list of possible training topics:

- Melanoma symptoms, detection, prevention, and treatment.
- Eye cataracts prevention.
- Types of work clothing you expect workers to wear and where to obtain this clothing.
- Types and protection capability of sunscreen your company provides, if any, where it is stored, and how to properly apply it.
- UV protection sunglasses you expect workers to wear.
- Limitations of work clothing, sunscreen, and sunglasses.
- The UV index and when to use protection methods.
- The dangers of artificial UV radiation (like tanning beds and sunlamps).
- First aid for sunburns.

Training Tips

During sun exposure training you may want to show slides of melanoma and cataracts, practice applying sunscreen, and talk about how you expect workers to combat both sun exposure and heat stress at the same time.

Where To Go For More Information

29 CFR 1926.95—Personal protective equipment—General requirements.

USDHHS, National Skin Cancer Prevention Education Program: At-A-Glance, 1997.

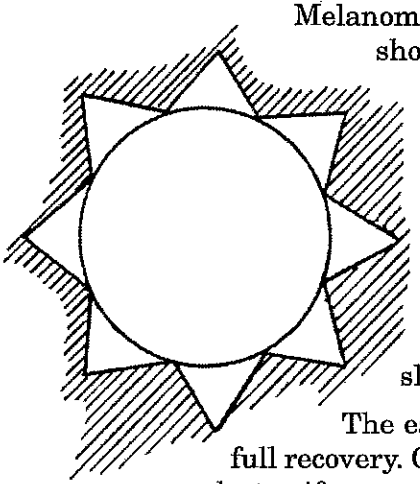
KELLER'S CONSTRUCTION TOOLBOX TALKS

Sun exposure: Be aware of the dangers

Melanoma (skin cancer)

Healthy skin cells grow, divide, and replace themselves in an orderly way. However, sometimes certain cells may divide too rapidly and grow without any order. Too many cells are produced, and tumors begin to form. Some tumors are not cancer (benign). Unfortunately, some tumors are cancer (malignant) invading and destroying nearby healthy tissues and organs. Skin cancer developing in the pigment cells is called melanoma. It may spread to other parts of the body. Two other skin cancer types, basal cell cancer and squamous cell cancer, are much more common and rarely spread.

Most of the moles on your body are perfectly harmless. They may be brown, tan, or black; flat or raised; and round or oval. However, a change in a mole's size, shape, or color is a sign that you should see your doctor. Look for asymmetrical moles; moles with ragged, notched, or blurred edges; unevenly-colored moles; and moles that have changed in size.



Melanoma in men occurs most often on the trunk (the area between the shoulders and hips), the head, and the neck. In women, melanoma is often found on the arms and lower legs. It is found most often in people with fair skin. People with dark skin are more likely to have melanomas on the palms of the hands and soles of the feet.

Ultraviolet radiation from the sun is a risk factor that increases the chance of getting melanoma. Reduce your risk by avoiding or limiting sunlight exposure from 11 a.m. to 1 p.m. Gradually build up exposure to sunlight. Also, wear a hat, long sleeves, and sunscreen.

The earlier melanoma is detected, the better a person's chances for a full recovery. Check your skin regularly for new growths or other changes. See your doctor if any areas look suspicious. Your doctor will remove part or all of the growth for examination. If melanoma is found, your doctor will determine the best treatment—surgery, drug therapies, or radiation. For more information, contact the Cancer Information Service, at 800-4-CANCER.

Cataracts

This is a condition in which the eye's lens fogs up so no matter how the eye tries to focus, it can't see through the foggy area. Age is a factor in developing cataracts, but so is exposure to ultraviolet radiation from the sun over time. Eye drops, avoiding glare, proper prescription glasses can help, but usually surgery is the most effective treatment.

Sunburn

Prolonged exposure to ultraviolet radiation from the sun can produce sunburn. Symptoms include red, sensitive, inflamed skin, even blisters. To relieve the pain, soak sunburns in cold water, dry the area, apply ointment, and cover. Seek medical treatment for severe sunburn. The only way to prevent sunburn is to avoid sun exposure (wear a hat, long sleeves, and sunscreen).

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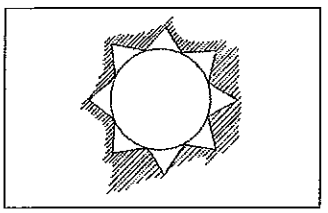


Occupational Health—Sun Exposure Sign-Off Sheet

This sign-off sheet documents the employees at this company, _____, who have taken part in a training session on Occupational Health—Sun Exposure. The session covered:

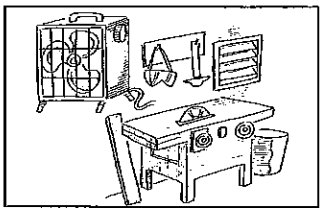
- Melanoma symptoms, detection, prevention, and treatment.
- Eye cataracts prevention.
- Types of work clothing expected and where to obtain this clothing.
- Types and protection capability of sunscreen provided, if any, where it is stored, and how to properly apply it.
- UV protection sunglasses expected.
- Limitations of work clothing, sunscreen, and sunglasses.
- The UV index and when to use protection methods.
- The dangers of artificial UV radiation (like tanning beds and sunlamps).
- First aid for sunburns.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Occupational Health — Ventilation

Overview Of Topic

Whenever hazardous substances such as dusts, fumes, mists, vapors, or gases exist or are produced in construction work like those listed below, their concentrations must not exceed the limits of 29 CFR 1926.55(a):

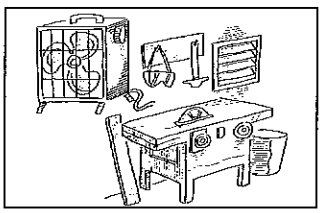
- Abrasive blasting (i.e., sandblasting).
- Grinding, polishing, and buffing.
- Spray finishing in spray booths.
- Open surface tanks (immersion of materials in liquids for cleaning or finishing the material).

When ventilation is used as an engineering control method to achieve those limits, your company must comply with the installation and operation requirements of 29 CFR 1926.57. This rule covers each one of the above bulleted items, providing specific requirements for the construction, installation, inspection, and maintenance of proper ventilation systems; appropriate personal protective equipment, including respirators; and operational procedures.

Employee Training

An effective training program might include coverage of:

- The activities or operations which produce dusts, fumes, mists, vapors, or gases.
- The hazards of each of these operations at the site, such as the splashing of chemicals used, wet floors, and equipment failures.
- Hazards of the substances used.
- Personal protective equipment (PPE) that is required, such as respirators; goggles; face shields; and boots, gloves, aprons, coats, jackets, sleeves, and other garments made of rubber or materials impervious to liquids.
- Emergency procedures for air contaminant levels above the desired levels or the oxygen level below 19.5 percent.
- Safe work practices for confined spaces, including how the



Occupational Health — Ventilation

attendant should maintain communication with those working within confined spaces and what rescue procedures he or she should use in an emergency.

Training Tips

As a trainer, you may want to:

- Use Hazard Communication Training to cover substance hazards.
- Address PPE training during your PPE training program which covers 29 CFR 1926.95 through .107 requirements. Explain the use of gloves which are selected for the type of liquid used in the process. Talk about proper length of the gloves to prevent liquid from entering the glove. Describe the limitations of the PPE to be used.
- Instruct workers that they are required to wear respirators to reduce their exposure and/or provide adequate oxygen.
- State that respirators are stored in a suitable cabinet to protect them from hazardous substances. Inform workers that respirators must be readily accessible.
- Go over respirator training under your respirator training program which covers 29 CFR 1926.103 requirements.
- Discuss the use of respirators such as a self-contained breathing apparatus (SCBA) and a hose mask with blower for entering a tank containing a hazardous atmosphere including oxygen deficiency. Include information on an air-purifying mask when oxygen concentration is normal.
- Explain the use of protective clothing to protect against the absorption of hazardous substances through the skin.
- Inform trainees that they should use a lifeline for confined space rescue and the attendant must be able to haul the worker out of the confined space in an emergency.

Where To Go For More Information

29 CFR 1910.94—Ventilation.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Is Something In The Air You Breathe?

Construction work can pose all kinds of contaminants in the air. It's the nature of activities like sandblasting, grinding, polishing, buffing, spray finishing, and working over open surface tanks to clean or finish material. The following table lays out various types of contaminants:

Dusts are solid particles generated by handling, crushing, grinding, rapidly impacting, detonating, or heating materials such as rock, cement, metal, coal, or wood. Most construction dusts consist of particles that vary greatly in size, with small particles outnumbering the large ones. When dust is noticeable in the air, there are probably more invisible dust particles present than are visible ones. These dusts, especially the smallest ones which are considered respirable, can cause difficulty in breathing and over long-term exposures, respiratory illnesses and death. Silica is a good example of a dust that causes the respiratory illness called silicosis.

Fumes are formed when material from a solid condenses in cool air. The solid particles that make up a fume are extremely fine and breathable and potentially harmful. Painting, welding, and other operations involving vapors from molten metals may produce fumes that can be harmful under certain conditions. Because fumes from some of these operations may be toxic, headaches are common symptoms of fume contamination.

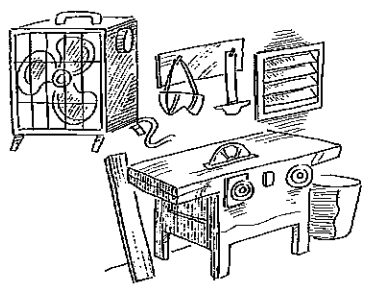
Mists are suspended liquid droplets generated by breaking up a liquid into a dispersed state by splashing or spraying. Sources include oil mists from cutting and grinding operations, acid mists from electroplating, and spray mist from spray finishing operations.

Fibers are solid particles several times longer than their diameter. Examples include asbestos, fibrous talc, and fiberglass. These are major contributors to breathing difficulty and respiratory diseases from long-term exposure.

Gases are formless fluids which expand to fill the space to which they are confined. Gases include arc-welding gases, engine exhaust gas (such as from dump trucks and forklifts), and air.

Vapors are normally solid or liquid at room temperature and pressure. Evaporation changes a liquid to a vapor. Solvents vaporize easily. Solvents with low boiling points can form vapors easily at room temperatures.

Your employer uses various forms of ventilation like exhaust fans, jets, ducts, hoods, separators, etc. to control contaminants beneath OSHA-specified limits. However, where limits are still exceeded after ventilation techniques, appropriate respirators are a must. Do the following to protect yourself from contaminants:



- Know the locations of hazards. These may include open surface tanks, welding areas, and sandblasting areas. Also recognize the warning signs of a contaminant problem.
- Use a respirator to reduce and/or provide adequate oxygen. Store it for ready access. Know how to don, fit, and doff it. Use only NIOSH-approved respirators.
- Wear other proper personal protective equipment. Use rubber boots; gloves designed for the job; goggles and face shields for chemical splashing; aprons, coats, jackets, sleeves, or other garments made of rubber or materials impervious to liquids.
- Have a standby person outside a tank in the nearest uncontaminated area, with a suitable respirator, ability to communicate with employees in the tank, and a lifeline so the standby person can rescue the employee inside.

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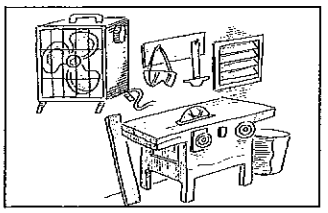

Occupational Health — Ventilation Sign-Off Sheet

This sign-off sheet documents the employees who have taken part in a training session on Occupational Health — Ventilation at _____.
(company name)

The session covered:

- The activities or operations which produce dusts, fumes, mists, vapors, or gases.
- Hazards of the substances used.
- Personal protective equipment (PPE) that is required, such as respirators; goggles; face shields; and boots, gloves, aprons, coats, jackets, sleeves, and other garments made of rubber or materials impervious to liquids.

The space below is for each individual who has been trained on this topic to sign his/her names.

Date of Training: **Job Location:**

Employee Signature	**Print Name Here**