



MNOSHA Instruction **CPL 2-2.52A**

December 10, 2020

## **SUBJECT: Enforcement Procedure for Occupational Exposure to Formaldehyde.**

### **Purpose:**

This instruction provides uniform inspection procedures and guidelines to be followed when conducting inspections and issuing citations for workers potentially exposed to formaldehyde.

### **Scope:**

This instruction applies OSHA-wide.

### **References:**

1. Field Compliance Manual (FCM).
2. Federal OSHA Online Chemical Database <https://www.osha.gov/chemicaldata/>
3. Federal OSHA Instruction TED 01-00-015 "OSHA Technical Manual."  
[http://www.osha.gov/dts/osta/otm/o\\_Federal\\_OSHA\\_Instruction\\_TED\\_01-00-015A\\_tm\\_toc.html](http://www.osha.gov/dts/osta/otm/o_Federal_OSHA_Instruction_TED_01-00-015A_tm_toc.html)
4. Federal OSHA Instruction CPL 02-02-052 dated November 20, 1990: "Enforcement Procedure for Occupational Exposure to Formaldehyde" <https://www.osha.gov/enforcement/directives/cpl-02-02-052>
5. Federal OSHA fact sheet "Formaldehyde" dated April 2011.  
[https://www.osha.gov/OshDoc/data\\_General\\_Facts/formaldehyde-factsheet.html](https://www.osha.gov/OshDoc/data_General_Facts/formaldehyde-factsheet.html)

## **Cancellation:**

This instruction supersedes CPL 2-2.52, "Enforcement Procedures for Occupational Exposure to Formaldehyde", dated September 10, 2015.

## **Background:**

Following the publication of the final rule, the standard was challenged in the U.S. Court of appeals by both industry and labor. It was the court's belief that the standard was not set low enough to eliminate risk-to employees. In response to the court, an amendment to the final rule was issued by OSHA which reduced the permissible exposure limit to 0.75 parts formaldehyde per million parts of air (0.75 ppm) for the 8-hour TWA.

On November 22, 2006 federal OSHA published Assigned Protection Factors for respiratory protection in completion of the revisions to 1910.134. Included in the APF amendment were changes to the respiratory protection paragraphs of several substance-specific standards, such as 1910.1048(g).

## **Action:**

### **A. Occupational Exposure to Formaldehyde:**

Formaldehyde Uses. Formaldehyde is a reactive chemical with many uses.

1. The major consumers of formaldehyde are the manufacturers of compressed wood products. Formaldehyde is an ingredient in resins that are used as glues in the production of particle board, plywood, and fiberboard. These wood products in turn are used in the construction, furniture, and mobile home manufacturing industries.
2. The plastics industry is the second largest user of formaldehyde-based resins. Molding compounds containing melamine, phenolic, or acetyl resins are capable of releasing formaldehyde when subjected to heat and/or pressure in the molding process. The final product, however, contains little free formaldehyde and has little potential for depolymerization, so that potential exposure to formaldehyde from use of the plastic product is minimal. Plastics made from formaldehyde-based resins include lawn and garden equipment, plumbing fixtures, melamine tableware, and electrical insulation parts.
3. Formaldehyde-releasing resins are used to add wrinkle-free and durable press characteristics to synthetic and natural-fiber textiles. These resins leave residual formaldehyde in the product which

can result in exposure to formaldehyde in the apparel industry. A dimethyloldihydroxyethyleneurea (DMDHEU)-based resin system is most commonly used.

4. Formaldehyde-bearing resins are used in the coating industry primarily as modifiers in alkyd and acrylic coating systems. Urea-formaldehyde resins are used in clear coating for wood furniture, primer coats for automobiles, baked enamels for appliances, and can coatings. Melamine-formaldehyde resins are generally used where outdoor exposure or contact with detergents requires improved chemical resistance. Melamine-formaldehyde resins also have some application where corrosion resistance is important.
5. Paper products may be treated with formaldehyde derivatives (e.g., melamine- or urea-formaldehyde) to add a desired finish or wet-strength quality. Melamine resins can be inactivated by a high sulfate concentration, and this problem is overcome by addition of excess formaldehyde.
6. Formaldehyde is an important constituent of embalming and preserving fluids because it performs two essential functions--disinfection and preservation. In mortuaries, embalming fluids may be injected in concentrated form to preserve the organs in the visceral and thoracic cavities. Arterial fluids are prepared by diluting the concentrate and are injected into the arterial system through a hose. Formaldehyde's properties as a tissue preservative also account for its use in anatomy, histology, and pathology laboratories. Although the term formaldehyde describes various mixtures of formaldehyde, water, and alcohol, the term "formalin" is used to describe a saturated solution of formaldehyde dissolved in water, typically with another agent, most commonly methanol, added to stabilize the solution. Formalin is typically 37% formaldehyde by weight (40% by volume) and 6-13% methanol by volume in water.
7. Formaldehyde-based chemicals are used in textile waterproofing, as accelerators in the production of rubber products, and in photographic developing. Foundries use formaldehyde-based resins in molds in the production of ferrous and non-ferrous goods.
8. Formaldehyde is used in the production of industrial chemicals including pentaerythritol 1,4-butanediol, and trimethyl-o-propane.
9. Some detergents, fertilizers, explosives and abrasive products are also manufactured with formaldehyde. Because formaldehyde is an effective bactericide, it is contained in cosmetic products, shampoos, and hair sprays. It is used in the manufacture of some pharmaceutical products and germicides, and it is used to clean dialysis equipment.

## **B. Formaldehyde Exposure:**

1. Formaldehyde exposure can occur in three ways:

- a. Exposure to liquid or solid formaldehyde (paraformaldehyde) and the accompanying vapors (inhalation and skin absorption);
  - b. Exposure to formaldehyde during primary processing of formaldehyde resins and other chemicals manufactured from formaldehyde; and
  - c. Exposure to formaldehyde released from products that contain formaldehyde-based resins.
2. Occupational exposures to formaldehyde can occur during heat and/or pressure processing of products made from or including formaldehyde bearing resins. Examples of such exposures include the pressing of wood products, extrusion or injection molding of plastics, heat-setting of pleats on apparel, and casting of molds in foundry processes. In addition, healthcare professionals, medical lab technicians, mortuary workers as well as teachers who handle biological specimens preserved with formaldehyde or formalin are at high risk of exposure.
  3. Occupational exposures to formaldehyde occur when a finished product contains residual formaldehyde or when hydrolysis--that is, the chemical break-down of formaldehyde-containing materials to produce formaldehyde gas prompted by warm and humid work environments--occurs. The EPA has described this phenomenon as "pseudoconsumptive use" of formaldehyde; i.e., chemical identity is changed but not irreversibly. Examples of "Pseudoconsumptive" uses are:
    - a. urea-formaldehyde resins in fiberboard, particleboard, plywood, laminates, urea-formaldehyde foams and insulation products, molding compounds, and protective coatings;
    - b. urea-formaldehyde concentrates used to produce time-release fertilizers; and
    - c. hexamethylenetetramine.

### **C. Operations:**

Specific operations that cause employee exposure to formaldehyde include:

1. Formaldehyde transfer operations,
2. Reactor or vessel cleaning,
3. Fugitive emissions in chemical plants,
4. Exposure to articles that have been treated with formaldehyde-based resins before curing,
5. Exposure to articles containing cured resins during transit from curing operations to storage or further processing,

6. Exposure to stored articles containing cured resins, and
7. The application of formaldehyde-based resins.

NOTE: Short-term exposures occur during batch operations such as mixing and during periodic cleaning and maintenance activities. Concentrated formaldehyde solutions (37% or greater) are often diluted for sale or use by chemical distributors or end-users, such as hospitals. In addition, short-term exposures occur in mortuaries and laboratories (anatomy, histology, pathology, environmental testing, and school biology).

#### **D. Health Effects:**

Based on the best available evidence in the agency's record on formaldehyde, Federal OSHA determined that formaldehyde is genotoxic, showing properties of both a cancer initiator and promoter. When inhaled, formaldehyde is a carcinogen in rats. In humans, formaldehyde exposure has been associated with cancers of the lung, nasopharynx and oropharynx, and nasal passages.

1. Formaldehyde is highly irritating to the upper respiratory tract and eyes. Concentrations as low as 0.1 to 2 ppm may irritate the eyes, nose, and throat of some individuals. Formaldehyde has an odor threshold of less than 1 ppm. Concentrations of 3 to 5 ppm cause tearing of the eyes, and the severity of the effects becomes intolerable to some persons. Concentrations of 10 to 20 ppm cause difficulty in breathing, burning of the nose and throat, coughing, and heavy tearing of the eyes. Concentrations over 25 ppm can cause severe respiratory tract injury that can lead to pulmonary edema and pneumonitis. OSHA considers a concentration of 100 ppm as immediately dangerous to life or health (IDLH) for formaldehyde. NIOSH considers 20 ppm to be IDLH.
2. Some persons have developed asthma or bronchitis following exposure to formaldehyde; usually a single exposure to high concentrations of formaldehyde as the result of an accidental spill appeared responsible for the onset of symptoms.
3. Formalin (37% formaldehyde) is a skin irritant and sensitizer. Formalin solutions splashed in the eye have resulted in blindness. Less concentrated solutions can also injure the eyes and skin. The severity of the effect depends on the concentration of formaldehyde in solution and whether the affected tissue is flushed with water immediately after the accidental splash. Contact with formalin causes a white discoloration, pain, drying, cracking, and scaling of the skin. Prolonged and repeated contact can cause numbness and a hardening or "tanning" of the skin.
4. Previously exposed persons may react to exposure with an allergic eczematous dermatitis or hives. Employees in industries where there is direct skin contact with formaldehyde-releasing resins (e.g.,

textiles) tend to have a higher than normal incidence of dermatitis. When patch tested, these persons sometimes show sensitization to formaldehyde.

## **E. Clarifications of the Formaldehyde Standard (29 CFR 1910.1048):**

### **1. Paragraph (a) Scope and Application.**

- a. Formaldehyde refers solely to the chemical defined by Chemical Abstracts Services Registry Number 50-00-0. This chemical is formaldehyde gas which, per se, is not available commercially. Most exposures are to formaldehyde gas which is emitted at various concentrations from numerous products made from formaldehyde-bearing resins. Various mixtures of formaldehyde, water, and alcohol (sometimes referred to as "formalin") are also included in CAS #50-00-0. Paraformaldehyde, a solid polymeric form of formaldehyde, also serves as a source of formaldehyde gas.
- b. The formaldehyde standard applies to all occupational exposures to formaldehyde. This includes general industry, and by cross-reference, maritime and construction. The scope of the formaldehyde standard is not affected in most cases by the laboratory standard. The laboratory standard, 29 CFR 1910.1450, specifically does not apply to formaldehyde use in histology, pathology, and human or animal anatomy laboratories; however, if formaldehyde is used in other types of laboratories which are covered by the laboratory standard the employer needs to comply with 29 CFR 1910.1450.

### **2. Paragraph (c) Permissible Exposure Limit.**

The 8-hour TWA permissible exposure limit is 0.75 parts formaldehyde per million parts of air (0.75 ppm).

Where the OSHI has documented employee exposure above the PEL or the STEL, 1910.1048(c)(1) or (2) should be cited, grouped with 1910.1048(f) engineering controls.

Where there are measurable concentrations of other regulated contaminants which affect the same body systems as formaldehyde, citations should be issued per MNOSHA STD 1-4.1 "Citation Guidelines for Air Contaminant Overexposure", paragraph (B)(2). This instruction references paragraph 29 CFR 1910.1000(d) of the Air Contaminants standard for use in cases where there are potential additive and synergistic effects. The Air Contaminants standard, 29 CFR 1910.1000(d), contains a formula which has the effect of proportionally reducing the PEL of each regulated toxic element of the multiple exposures. Paragraph (d) requires employers to meet these adjusted PELs

where there is an exposure to a mixture of air contaminants regulated by Subpart Z. The body system primarily affected by formaldehyde is the respiratory system (upper and lower). The immune system may also be affected. (Formaldehyde is a sensitizer which provokes an IgE (immunoglobulin) mediated response.) The OSHA Technical Manual contains guidance for calculating the adjusted PELs and SAEs (sampling and analytical errors). The adjusted PEL should apply only to enforcement of paragraphs (c) Permissible Exposure Limit and (f) Methods of compliance. The STEL and AL should not be adjusted for mixtures for compliance evaluations.

### **3. Paragraph (d), Exposure Monitoring.**

Paragraph (d) of the formaldehyde standard requires employers to determine their employees' exposure to formaldehyde if any mixture or solution present in the workplace contains 0.1 percent or more of formaldehyde, or if materials capable of releasing formaldehyde into the workplace air result in employees being exposed to formaldehyde at concentrations reaching or exceeding 0.1 ppm. The OSHI should verify the employee exposure via bulk or air samples. If the employer is required to conduct employee monitoring but did not do so, cite the appropriate subpart of 1910.1048(d).

- a. **Objective Data.** The exposure determination must consist of actual measurements unless the employer can produce objective data to document that no employee will be exposed to formaldehyde at concentrations exceeding the 0.5 ppm (TWA) action level (AL), or the 2 ppm STEL under foreseeable conditions of use. Industry-wide studies or generic exposure estimates may be a source of objective data; however, the use of such data must accurately characterize actual employee exposures. For exposures less than the AL or STEL, area samples may also be used as the basis for exposure determinations, if they represent those exposures.
- b. **Medical Complaints.** Regardless of employee exposure level, if there are employee health complaints, the employer is required to take action to determine employee exposure.
- c. **Exception.** If mixtures or solutions composed of 0.1 percent or less of formaldehyde are used, employee exposure is below 0.1 ppm, and there are no employee health complaints then an employer should not be cited for not monitoring. (See 29 CFR 1910.1048(d)(1)(ii) (A).)
- d. **Repeat Monitoring.** If there is a change in production, equipment, process, personnel, or control measures, which may result in a new or additional exposure to formaldehyde, the initial monitoring shall be repeated. For example, apparel manufacturers and other producers/users of formaldehyde resin finished fabrics may need to repeat initial determinations with different fabric lots.

- e. **Sampling Methods.** As long as the method selected for sampling and analysis meets the criteria for precision and accuracy set out in the formaldehyde standard, the employer is free to choose from many methods available for monitoring exposure to formaldehyde.

Among the methods available are the gas chromatographic methods which collect formaldehyde in a specially prepared tube, passive diffusion badges, and handheld monitors.

#### **4. Paragraph (e), Regulated Areas**

Regulated areas must be established where exposure to formaldehyde exceeds either the TWA or the STEL. Signs must be posted at all entrances to this area and only people trained to recognize the hazards of formaldehyde may enter this area. On multi-employer worksites the location of any regulated area must be communicated to the other employers on the site.

Cite the appropriate subpart of 1910.1048(e) if there are deficiencies.

#### **5. Paragraph (f), Methods of Compliance**

Engineering and work practice controls shall be used to reduce employee exposure below the TWA or STEL. If the feasible engineering controls are not adequate to reduce the employee exposure below the TWA or STEL, they must still be implemented to reduce employee exposure to the extent possible. If, after implementing feasible engineering controls the exposure still exceeds the TWA or STEL, the employees shall be provided with appropriate respiratory protection.

#### **6. Paragraph (g), Respiratory Protection**

The employer shall provide appropriate respiratory protection as described in Table 1 of 29 CFR 1910.134(d)(3)(i)(A) when employee exposure exceeds the TWA or STEL and in emergency situations. The employer must comply with all elements of 1910.134 except paragraph (e) medical surveillance, because this is addressed in 1910.1048 (l).

If an employer provides an air purifying respirator with canisters or cartridges, the canisters or cartridges must be changed:

1. in accordance with its end of service life indicator (ESLI), or
2. if no ESLI, according to the employer's change out schedule as described in 1910.134 (d)(3)(iii), or at least daily, as described in 1910.1048 (g)(2)(ii).

Cite relevant part of 1910.1048(g)(1)(i-v) if respirator should be required per (g) but is not supplied or not required to be worn by employer. Cite 1910.1048(g)(2)(i) if the employer does not have a

respirator program or has a program with multiple deficiencies. Cite appropriate part of 1910.134 if one part of the program is missing.

## **7. Paragraph (h), Protective Equipment and Clothing.**

This section addresses the selection and maintenance of protective equipment and clothing, including aprons, goggles, face shields, and suits. The OSHI should evaluate potential formaldehyde hazards and use professional judgment in enforcing the general requirements of 29 CFR 1910.132 and 29 CFR 1910.133, which are incorporated into the formaldehyde standard by reference. Violations of these general requirements should be cited under 29 CFR 1910.1048(h). Some PPE requirements are specified by the formaldehyde standard, and violations of these requirements should be cited under 29 CFR 1910.1048(h)(1).

- a. Solutions containing greater than 1-percent formaldehyde are damaging to the skin and severely damaging to the eyes. Consequently, protective equipment adequate to prevent contact with such solutions must be provided to employees, and the equipment must be kept in good repair and free of formaldehyde contamination.
- b. Some solids that release formaldehyde and solutions that contain less than 1-percent formaldehyde can also pose a hazard to employees. Paragraph (h)(1)(iii) requires the employer to provide protective clothing or equipment, as needed, in accordance with the general standards for protective equipment and clothing (29 CFR 1910.132 and 29 CFR 1910.133) to prevent contact with irritating or sensitizing materials.
- c. Formaldehyde gas poses little hazard from dermal contact, although there are a few reports in the literature that indicate sensitization from high airborne concentrations. At the IDLH concentration, the standard requires whole body protection, essentially equivalent to Level A protection, to prevent potential sensitization.
- d. Butyl and nitrile glove materials provide the greatest permeation protection. Greater thicknesses of other materials (natural rubber, PVC, polyethylene) may be suitable for shorter immersion periods, but gloves may have to be changed more frequently due to degradation. All these materials are generally suitable for splash protection. [Appendix B](#) of the federal directive summarizes the permeation data available for formaldehyde. Barrier creams are not regarded as effective protection for formaldehyde, since there is no data demonstrating their efficacy.

## **8. Paragraph (i), Hygiene Protection.**

- a. Emergency Showers. Because of the severe dermal effects that can occur when employees have skin contact with concentrated solutions of formaldehyde and because of the relative

- irreversibility of dermal sensitization to formaldehyde, the employer is required to provide conveniently located quick drench showers for employees who become splashed with solutions of 1 percent or greater formaldehyde as the result of equipment failure, improper work practices, or other emergencies. Whether or not the employee is wearing protective clothing does not affect the need for quick drench showers since the employee must be able to remove PPE splashed with formaldehyde in a safe manner. The availability of emergency showers should also help to lower a potentially serious inhalation hazard when an employee has been splashed with a formaldehyde solution.
- b. **Eye Wash Facilities.** Liquid formaldehyde can also cause severe damage to the eyes. Thus, the standard requires employers to provide appropriate eye wash facilities within the immediate work area for emergency use by any employee whose eyes are splashed with solutions containing 0.1 percent or more of formaldehyde.
  - c. The degree of sophistication of the emergency shower and/or eyewash station varies with the size of the potential splash. The use of portable units or hand-held fixtures should be carefully evaluated. Such use should be limited to small spills (generally less than 8 oz.), provided that all possible affected body parts can be flushed continuously for 15 minutes. (For this reason, bottle-type eyewashes are not acceptable.)
  - d. Cite the appropriate part of paragraph (i) if there are deficiencies.

## **9. Paragraph (k), Emergencies.**

Paragraph (k) ensures that the employer will prepare for any situation where equipment failure, spill or rupture of containers, or failure of control equipment would result in an uncontrolled release of formaldehyde that could result in injury or loss of life. If such circumstances could occur in an accident, the employer must establish procedures for evacuation and access to emergency medical care, obtain needed equipment for evacuation and reentry into the area, and establish procedures for equipment repair, spill cleanup, decontamination, and waste disposal. Paragraph (k) violations should be grouped with any applicable violations under 29 CFR 1910.120. The threshold quantity for formaldehyde for evaluation of catastrophic potential under 29 CFR 1910.119 Process Safety Management is 1000 lbs. (See OSHA Instruction CPL 2-2.45.)

- a. There is not a specific exposure level that triggers the emergency provisions. When determining if there is a need to provide for emergencies, the employer should consider whether employees' lives or health could be jeopardized in the worst reasonably predictable accident (i.e., the worst outcome of any possible scenario) unless employees are promptly evacuated from the area.

- b. A 30-minute exposure to 100 ppm is potentially fatal, and pulmonary edema has been seen after exposures of 50 ppm. These levels can be generated by relatively small spills (a pint or less), even in ventilated areas.

## **10. Paragraph (I), Medical Surveillance.**

- a. The provisions of paragraph (I) establish an approach to medical surveillance based on an employee's exposure potential.
  - 1. All employers with employees who are exposed to formaldehyde at concentrations at or above the AL or exceeding the STEL must make medical surveillance available to these employees which includes a medical disease questionnaire, such as the optional form contained in [Appendix D](#) to the formaldehyde standard, on an annual basis. (Note: The employer is required to make the questionnaire available, a process which is required to be under the supervision of a licensed physician and involves assisting the employee as necessary to complete the questionnaire.) Per physician's decision, these employees may then be offered a physical examination and a pulmonary function test.
  - 2. All employees who are exposed to formaldehyde at concentrations between the action level and the 0.75 ppm TWA limit (but not over the STEL) must be given the opportunity to participate in a medical surveillance program on an annual basis by filling out a medical disease questionnaire. If an employee exposed between the action level and the 0.75 ppm TWA limit is showing signs and symptoms that may be formaldehyde-related, the employer must administer to the employee a medical disease questionnaire without delay. If the physician determines, on the basis of the medical disease questionnaire, that it is necessary to examine the employee, the employee would then be sent to the physician for further examination.
  - 3. If exposures are less than 0.5 ppm but the employee is showing signs and symptoms that may be formaldehyde-related, the employee must be evaluated via a medical disease questionnaire, and further surveillance would be conducted on the basis of the physician's determination, as it is for concentrations between 0.5 and 0.75 ppm.
- b. Paragraph (I)(3)(ii) requires the physician to make a determination, based on evaluation of the medical disease questionnaire, as to whether additional medical surveillance specified in paragraph (I)(4); i.e., a medical examination, is necessary to ensure the employee is not being placed at increased risk of material impairment of health from exposure to formaldehyde. In some cases, the physician will require additional information from the medical examinations before a final written opinion can be given. When the physician does not require additional information to reach a determination about the employee's health, the determination made in

paragraph (l)(3)(ii) must be provided to the employer in writing, and a copy given to the employee within 15 days of its receipt by the employer.

- c. Emergencies pose a very different situation from routine surveillance. If the employer has determined that an emergency situation could occur, then there must be a prior arrangement with a physician or hospital to ensure that any employee acutely exposed to formaldehyde in an emergency receives proper medical intervention, as required by paragraph (k). The emergency plan must also specify what information should be given to emergency care providers, per the requirements of paragraph (l)(6), and how it is to be transmitted.
- d. Cite the appropriate part of paragraph (l) if there are deficiencies.

#### **11. Paragraph (m), Hazard Communication.**

Paragraph (m) references the Hazard Communication standard. Most subparagraphs may be cited as described below.

- a. (m)(1)(i, ii, iii) – cite 1910.1200
- b. (m)(1)(iv, v) – informational, do not cite
- c. (m)(2)(i) – cite if labels do not comply with 1910.1200(d), or do not contain the hazard statement: “May Cause Cancer”
- d. (m)(2)(ii) – cite if there are label deficiencies

#### **12. Paragraph (n), Employee Information and Training.**

- a. All employees exposed to formaldehyde at concentrations at or above 0.1 ppm or to solutions containing greater than 0.1 percent or more of formaldehyde must receive initial training upon hire.
- b. All employees exposed at or above the action level or the STEL must be trained annually.
- c. [Appendix A](#) to the formaldehyde standard provides general information which is appropriate for a training program. This outline would need to be supplemented by plant specific information.
- d. If training is required as listed above and not conducted, cite the appropriate part of paragraph (n).
- e. If employees are exposed to formaldehyde at levels below the action level or STEL and formaldehyde is not included in the annual Employee Right to Know training (ERTK), cite 5206.0700(1)(g).

## **F. Inspection Procedures:**

The following procedure shall be followed in addition to the guidance in the FCM:

Authorization to Review Limited Medical Information. Appropriately qualified compliance personnel are authorized to review medical disease questionnaires and medical opinions mandated by the formaldehyde standard when the appropriate limitations and procedures are followed. See FCM, Ch. 1 for further discussion on obtaining permission to view medical information.

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For the MNOSHA Management Team

Appendix A: Triggering Events

Distribution: OSHA Compliance and WSC Director

NOTICE: Minnesota OSHA Directives are used exclusively by MNOSHA personnel to assist in the administration of the OSHA program and in the proper interpretation and application of occupational safety and health statutes, regulations, and standards. They are not legally binding declarations and they are subject to revision or deletion at any time without notice.

## Appendix A Formaldehyde Standard Triggering Events

### Part I: Airborne Levels

- A. Below AL and STEL But Above 0.1 ppm.
  - 1. Exposure Determination.
  - 2. Recordkeeping.
  - 3. Training (initial & annual).
  - 4. Medical Surveillance for Signs and Symptoms.
  
- B. Above AL or STEL.
  - 1. Initial Monitoring.
  - 2. Periodic Monitoring.
    - a. At or Above AL ... Every 6 months.
    - b. At or Above STEL ... Once a year.
  - 3. Medical Surveillance.
  - 4. Training (annual).
  - 5. Applicable provisions in A. above.
  
- C. Above TWA or STEL.
  - 1. Regulated Areas.
  - 2. Methods of Compliance.
  - 3. Respiratory Protection.
  - 4. Applicable provisions are in A., B. above.
  
- D. Greater than 100 ppm.
  - 1. Full Body protection.
  - 2. Applicable provisions are in A., B., and C. above.

### Part II: Eye or Skin Contact.

- A. Greater than or Equal to 1% Formaldehyde Solution.
  - 1. PPE – eye or skin.
  - 2. Hygiene protection.
    - a. Change Rooms.
    - b. Quick Drench Shower.
  
- B. Greater than or Equal to 0.1% Formaldehyde Solution.
  - 1. Eye Wash Facilities.

- C. Irritating or Sensitizing Formaldehyde Materials.
  - 1. PPE.
  - 2. Change Rooms.

**Part III: Liquid or Gas.**

- A. Housekeeping
  - 1. Leak Detection.
  - 2. Preventative Maintenance.
  - 3. Spill Clean-up.

**Part IV: Possibility of Emergency.**

- A. Emergencies
- B. Respiratory Protection.
- C. Medical Surveillance.
- D. Training.