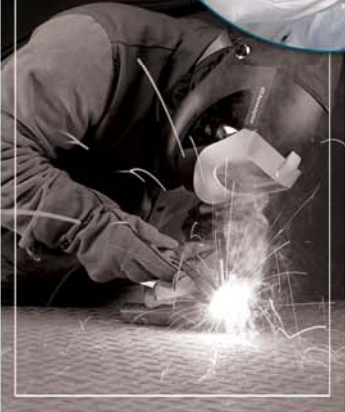


Welding...  
Painting...  
Plating...



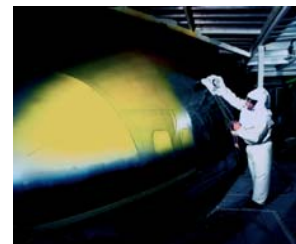
# Hexavalent Chromium Update

From



Occupational Health and  
Environmental Safety Division

December 6, 2006



# Hexavalent Chromium Standard

- On February 28, 2006 the Occupational Health and Safety Administration (OSHA) published the final Hexavalent Chromium Cr(VI) Standard
- There are three versions – General Industry (1910.1026), Construction (1926.1126) and Shipyards (1915.1026)
- On October 30, 2006 OSHA published a minor amendment to its final rule
- A copy of the final standard can be viewed at [www.osha.gov](http://www.osha.gov)

# What is hexavalent chromium Cr(VI)?

Chromium is a metal that exists in several oxidation states ranging from Cr(-II) to Cr(+VI). The valence (+VI) is a measure of a molecule's ability to react with other substances.

Cr(VI) has a valence of six which causes it to behave differently than chromium (0) or chromium III

- Cr(VI) is a strong oxidizer (it has the ability to gain electrons from other elements)
- Cr(VI) is more soluble in water and more readily absorbed by biological systems than trivalent chromium. Therefore, it is more toxic than chromium III.

# Hexavalent Chromium Standard

- Most impacted industries and applications:
  - electroplating
  - welding
  - painting
  - producers of chromates
  - paint and coating production
  - wood preserving
  - chromium metal production
  - steel mills
  - iron foundries
  - steel foundries

# Potential Health Effects

The primary health effects from workplace exposure to Cr(VI) are lung cancer, asthma, nasal tissue ulcerations and nasal septum perforations.

Reference: OSHA Preamble to the Hexavalent Chromium Standard, [www.osha.gov](http://www.osha.gov)

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# Start Up Dates

- Employers with 20 or more employees - November 27, 2006
- Employers with 19 or less employees - May 30, 2007
- Feasible engineering controls must be in place - May 31, 2010



# Exposure Exceptions

- Cr(VI) exposure from any source is covered except the following:
  - Portland cement
  - Exposures that occur in the application of pesticides regulated by the Environmental Protection Agency (EPA) or another federal government agency (e.g. treatment of wood with preservatives (exposures from the sawing and grinding of this treated wood are covered)
  - Where the employer has objective data demonstrating that a material containing Cr(VI) or a specific process, operation, or activity involving Cr(VI) cannot release particles in concentrations at or above  $0.5 \mu\text{g}/\text{m}^3$  as an eight-hour TWA under any expected conditions of use



# New Permissible Exposure Limit

- The permissible exposure limit (PEL) for all industries is 5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) calculated as an eight-hour time-weighted average (TWA).
- The action level, or the level at which requirements of the standard such as medical surveillance may be required, is an eight-hour TWA of  $2.5 \mu\text{g}/\text{m}^3$ .

# Exposure Determination

- To select the proper respirator, the employer must determine the eight-hour TWA exposure for each employee. The standard permits this to be done in two ways:
  1. “Scheduled Monitoring Option”
  2. “Performance-Oriented Option”



# Exposure Determination (cont.)

- The scheduled monitoring option: The employer shall perform initial monitoring to determine the eight-hour TWA exposure for each employee.
- Where the employer does representative sampling instead of sampling all employees, the employer shall sample the employees expected to have the highest Cr(VI) exposures.



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# Exposure Determination (cont.)

- If initial monitoring indicates that **employee exposures are below the action level**, the employer may **discontinue monitoring** (for those employees whose exposures are represented by the monitoring)
- If monitoring reveals **employee exposures to be at or above the action level**, the employer shall perform **periodic monitoring at least every six months**.
- If monitoring reveals **employee exposures to be above the PEL**, the employer shall perform **periodic monitoring at least every three months**.



# Exposure Determination (cont.)

- If periodic monitoring indicates that employee exposures are below the action level, and the result is confirmed by results of another monitoring, the employer may discontinue monitoring (only for those employees whose exposures are represented by the monitoring).
- The employer shall perform additional monitoring when there has been any change in the production process, raw materials, equipment, personnel, work practices or control methods that may result in new or additional exposures to Cr(VI)

– OR –

- When the employer has any reason to believe that new or additional exposures have occurred.

# Recordkeeping

- The employer must maintain an accurate record of all air monitoring conducted to comply with the requirements of this standard. The record must include:
  - Date of measurement for each sample taken
  - The operation involving exposure to Cr(VI) that is being monitored
  - Sampling and analytical methods used and evidence of their accuracy
  - Number, duration and the results of samples taken
  - Type of PPE, such as respirators worn
  - Name, social security number and job classification of all employees represented by the monitoring, indicating which employees were actually monitored



# Exposure Determination

- The performance-oriented option: The employer shall determine the eight-hour TWA exposure for each employee on the basis of any combination of air monitoring data, historical monitoring data, or objective data sufficient to accurately characterize employee exposure to Cr(VI).

# Recordkeeping

- Where the employer has relied on historical monitoring data to determine exposure to Cr(VI), the employer must establish and maintain an accurate record of the historical monitoring data relied on. The record must include information that reflects the following conditions:
  - The data were collected using methods that meet the accuracy requirements of paragraph (d)(5) of the standard.
  - The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which exposure is being determined.
  - The characteristics of the Cr(VI)-containing material being handled when the historical monitoring data were obtained are the same as those on the job for which the exposure is being determined.

## Recordkeeping (cont.)

- Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined
- Other data relevant to operations, materials, processing or employee exposures covered by the exception

## Recordkeeping (cont.)

- The employer must maintain an accurate record of all objective data relied upon to comply with the requirements of this section. The record must include at least the following:
  - The Cr(VI)-containing material in question
  - The source of the objective data
  - The testing protocol and results of testing, or analysis of the material for the release of Cr(VI)
  - A description of the process, operation or activity and how the data support the determination
  - Other data relevant to the process, operation, activity, material or employee exposures

# Respiratory Protection

- Unlike other substance specific standards there is no respirator selection table. The standard refers to 1910.134 for respirator selection and all other respiratory program requirements.

# Respiratory Protection (cont.)

- Respiratory protection requirements are the same in all three standards. Respirators are required in the following situations whenever exposure levels exceed the PEL:
  - While engineering and work practice controls are being developed and are still not sufficient to reduce exposures to or below the PEL
  - During maintenance and repair activities for which engineering and work practice controls are not feasible

# Respiratory Protection (cont.)

- Respiratory protection requirements cont.
  - When all feasible engineering and work practice controls are implemented and are still not sufficient to reduce exposures to or below the PEL
  - When employees are exposed above the PEL for fewer than 30 days per year and the employer has not elected to implement engineering and work practice controls
  - Emergencies

# Respiratory Protection (cont.)

- Consistent with current respirator selection  
3M recommends the following:
  - N95 filters when oil aerosols are not present
  - R or P95 filters when oil aerosols are present  
(refer to packaging for time use limitations)

# Respirator Selection

- Consistent with current respirator selection  
3M recommends the following:
  - Filtering facepiece respirators and half facepiece respirators with appropriate filters may be used to 10 X PEL of  $5\mu\text{g}/\text{m}^3$  when quantitatively or qualitatively fit tested



## Respirator Selection (cont.)

- Consistent with current respirator selection  
3M recommends the following:
  - Full facepiece respirators with appropriate filters may be used up to 10 X PEL of  $5\mu\text{g}/\text{m}^3$  when qualitatively fit tested and may be used up to 50 X PEL of  $5\mu\text{g}/\text{m}^3$  when quantitatively fit tested



# Respirator Selection (cont.)

- Consistent with current respirator selection 3M recommends the following:
  - Loose fitting facepieces may be used up to 25 X PEL of  $5\mu\text{g}/\text{m}^3$  with appropriate supplied air or powered air purifying respirator systems



## Respirator Selection (cont.)

- Consistent with current respirator selection 3M recommends the following:
  - Tight fitting full facepieces, hoods and helmets may be used up to 1000 X PEL of  $5\mu\text{g}/\text{m}^3$  with appropriate supplied air or powered air purifying respirator systems



## Regulated Areas (Construction & Shipyard Employees Exempt)

- Regulated Areas (*This section does not apply to construction and shipyard employees*)
- The employer shall establish a regulated area wherever an employee's exposure to airborne concentrations of Cr(VI) is, or can reasonably be expected to be, in excess of the PEL
- Regulated areas shall be demarcated from the rest of the workplace in a manner that adequately establishes and alerts employees of the boundaries of the regulated area.
- Access to regulated areas shall be limited

# Methods of Compliance

- **Methods of Compliance:** The employer shall use engineering and work practice controls to reduce and maintain employee exposure to Cr(VI) to or below the PEL unless the employer can demonstrate those controls are not feasible
- Wherever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer shall use them to reduce employee exposures to the lowest level achievable and supplement them by the use of respiratory protection.

# Methods of Compliance - Aerospace Industry Exception



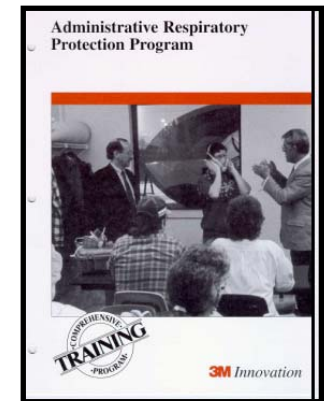
- Where painting of aircraft or large aircraft parts is performed in the aerospace industry, the employer shall use engineering and work practice controls to reduce and maintain employee exposure to Cr(VI) to or below  $25\mu\text{g}/\text{m}^3$  unless the employer can demonstrate that such controls are not feasible. The employer shall supplement engineering and work practice controls with the use of respiratory protection to achieve the PEL of  $5\mu\text{g}/\text{m}^3$ .

# Methods of Compliance – General Exceptions

- Where the employer can demonstrate that a process or task does not result in any employee exposure to Cr(VI) above the PEL for 30 or more days per year (12 consecutive months), the requirement to implement engineering and work practice controls to achieve the PEL does not apply to that process or task
- Rotation of employees to different jobs to comply with the PEL is not permitted

# Respiratory Protection Program

- Where respirator use is required the employer must institute a respiratory protection program in accordance with 29 CFR 1910.134. This applies to all aspects of respiratory selection, use and care.



# Protective Work Clothing and Equipment

- Where a hazard is present or likely to be present from skin or eye contact with Cr(VI), the employer must provide appropriate personal protective clothing and equipment at no cost to employees, and shall ensure that employees use it.



# Medical Surveillance

- Employers must make medical surveillance available at no cost to the employee, and at a reasonable time and place for all employees:
  - Those who are or may be occupationally exposed to Cr(VI) at or above the action level for 30 or more days a year
  - Experiencing signs or symptoms of the adverse health effects associated with Cr(VI) exposure
  - Exposed in an emergency



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## Medical Surveillance (cont.)

- All medical examinations and procedures must be performed by or under the supervision of a physician or licensed health care professional (PLHCP)



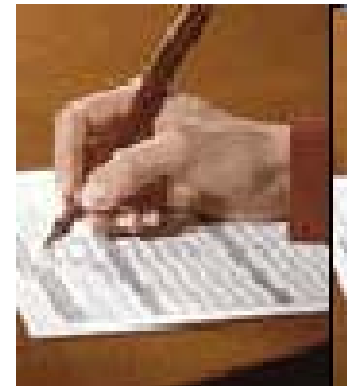
# Medical Surveillance (cont.)

- Employer must provide the PLHCP
  - A copy of the hexavalent chromium standard
  - Description of the affected employee's former, current and anticipated duties as they relate to the employee's occupational exposure to Cr(VI)
  - The employee's former, current and anticipated levels of occupational exposure to Cr(VI)
  - Description of any PPE used or to be used by the employee, including when and for how long the employee has used that equipment



## Medical Surveillance (cont.)

- The employer must obtain a written medical opinion from the PLHCP which contains
  - Any recommended limitations on the employee's exposure to Cr(VI)
  - Any recommended limitations on the use of PPE such as respirators



# Medical Surveillance - Recordkeeping

- The employer must establish and maintain an accurate record for each employee covered by medical surveillance under paragraph (k) of the standard. The record must include the following information about the employee:
  - Name and social security number
  - A copy of the PLHCP's written opinions
  - A copy of the information provided to the PLHCP as required by paragraph (k) of the standard.

# Communication of Hazard

## Communication of Cr(VI) Hazards to Employees

- In addition to the requirements of the Hazard Communication Standard, 29 CFR 1910.1200, employers must ensure that each employee can at least demonstrate knowledge of the contents of this standard and a purpose and description of the required medical surveillance program.

# Recordkeeping

- All records must be maintained and made available in accordance with 1910.1020

# Amendment

- On October 30, 2006 OSHA published a minor amendment to its final rule
- Creates an optional, alternative compliance timetable for metal- and surface-finishing operations

- On February 28, 2006 the Occupational Safety and Health Administration (OSHA) published the final rule on regulating workplace exposures to Hexavalent Chromium. This presentation was prepared by 3M OH&ESD and focuses primarily on the respiratory protection aspects of the standard. It does not represent an official nor legal nor necessarily complete interpretation of the standard. If specific questions arise, the standard itself should be reviewed and relied on, rather than this summary.



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