



# Hexavalent Chromium (CrVI) Standard

The bulletin is a summary prepared by Survivair of the Hexavalent Chromium standard as stated by OSHA. The information contained in this brief is meant to be a summary and is not intended to be comprehensive or take the place of the OSHA Hexavalent Chromium standard. Please read the Hexavalent Chromium standard for a complete understanding. This standard can be found at – <http://www.osha.gov/SLTC/hexavalentchromium/index.html>.

On May 30, 2006 OSHA published the Hexavalent Chromium (CrVI) Standard for General Industry (1910.1026), Construction (1910.1126) and Shipyards (1515.1026). The requirements are quite similar across industries and concern the occupational exposure to Chromium VI. The standard applies to all forms and compounds of CrVI with three source exceptions (see the appropriate OSHA Standard for specifics).

New evidence indicates that workers are at increased risk for developing lung cancer and other respiratory ailments from exposure to hexavalent chromium. (**Note: NIOSH considers all CrVI compounds to be potential occupational carcinogens.**) It is man made and used in many metallurgical, refractory and chemical industries. – Refer to the table below for a partial list of industries. Safety Officers should be alert for sources of hexavalent chromium used in the work place and should provide workers with adequate respiratory protection when appropriate. When respiratory protection is deemed appropriate, it is critical for businesses to have a comprehensive respiratory program in place. A good place to start looking for materials that contain hexavalent chromium would be the inventory of Material Safety Data Sheets (MSDS) provided by suppliers.

### POTENTIAL SOURCES

- Pigments in dyes, paints, inks and plastics
- Anti-corrosive agents in paints and other surface coatings
- Chrome plating
- Smelting ferro-chromium ore
- Welding or cutting stainless steel or nonferrous chromium alloys

### COMMON OCCUPATIONS

- Welders (*Stainless steel welding and cutting involves the greatest exposure to CrVI*)
- Painters (Automotive, Ship and Aircraft)
- Those who service or maintain copy machines or dispose of toner powders
- Battery makers
- Chemical industry (Used as a catalyst in pigments, chemical synthesis and metal plating)
- Candle makers
- Printers
- Rubber makers

## EXPOSURE TO Cr(VI) AND SOME POTENTIAL HEALTH EFFECTS

Exposure mainly occurs from breathing dusts, fumes or mists containing Cr(VI) or by physical contact with the skin. Other adverse health effects include dermal irritation, ulceration of the skin, contact dermatitis, occupational asthma, nasal damage (from irritation to perforated nasal septa), nasal cancer, sinus cancer, eye irritation and damage, perforated eardrums, kidney damage, liver damage, and lung problems. Workers in plating, pigment and chromate production industries have shown an increase in lung cancer. Additionally, permanent eye damage can occur as a result of direct contact with chromate dust or chromic acid.

## THE STANDARD

The standard reduces the **Permissible Exposure Limit (PEL)** and includes a number of provisions employers need to comply with. The employer shall ensure that no employee is exposed to an airborne concentration of Chromium (VI) in excess of 5 micrograms per cubic meter of air ( $5 \mu\text{g}/\text{m}^3$ ), calculated as an 8-hour time-weighted average (TWA). This represents a 10-fold reduction in previously allowable exposures.

The action level, or the level to which medical surveillance or additional monitoring may be required is a concentration of airborne chromium (VI) of  $2.5 \mu\text{g}/\text{m}^3$ . At this time, OSHA does not reference a short term exposure limit.

Notice the highlighted “shall” in the description of the PEL. The term “shall” establishes a regulatory requirement for the employer. There are a total of **Seventy-Three** “shalls” identified in the Hexavalent Chromium (CrVI) Standard.

## KEY POINTS OF THE STANDARD

Exposure Determination	Regulated Areas
Methods of Compliance	Respiratory Protection
Protective Work Clothing and Equipment	Hygiene Areas and Practices
Housekeeping	Medical Surveillance
Communication of Hazards to Employees	Recordkeeping
Duties	

Note: Employers who are not fully equipped to handle the complexities of regulatory compliance and potentially toxic exposures should seek professional advice for these requirements. Sources for professional advice may be found in the Protection, Compliance and Information section of this bulletin.

## RESPIRATORY PROTECTION

OSHA issued the same respiratory proactive protection measures for all three of the standards – General Industry, Construction and Shipyards. According to the standard, workers are required to wear adequate respiratory protection in the following circumstances whenever an employee exposure exceeds the PEL:

- Development of engineering and work practice controls
- Situations when workers are exposed above the PEL for fewer than 30 days per year and the employer has not elected to implement engineering or work practice controls
- Work situations whereby the worker conducts maintenance and repair activities for which engineering and work practice controls are not feasible
- Situations whereby all feasible engineering and work practice controls are implemented
- Emergencies

Currently, under standard 1910.134, there is no respirator selection guide for respiratory protection or other respiratory program requirements. The level of respiratory protection is determined by the working conditions and the level of hexavalent chromium exposure.

As a point of reference to respiratory protection, Survivair recommends the following for various levels of hexavalent chromium:

- N95 filters offer minimal protection and may be used where no oils are present
- R or P95 filters may be used where oil aerosols are present yet are required to be changed after one work shift
- A disposable respirator or half mask respirator with the appropriate filters may be used to 10X the PEL when a qualitative and quantitative fit test is administered
- A full face mask respirator with appropriate filters may be used to 10X the PEL with a qualitative fit test and up to 50X the PEL with a quantitative fit test
- A tight fitting, full face mask respirator with a SAR or PAPR system may be used to 1000X the PEL with a quantitative fit test
- A tight fitting SCBA system may be used at levels above 1000X the PEL with a quantitative fit test

For businesses to comply with the three standards for hexavalent chromium (CrVI), Survivair suggests the following respiratory products and programs. For a respiratory program that will comply with OSHA standards and with your business, contact your Bacou-Dalloz sales representative or for additional technical information contact Survivair Technical Service at 800-394-0410.

## **EXPOSURES UP TO 10 TIMES THE PEL**

- Program
  - OSHA Compliant Medical Evaluation
    - Survivair OSHA MedCert OSHA Compliant Medical Evaluation
  - OSHA Compliant Quantitative and Qualitative fit tests
    - Survivair Fit Test Video
    - Survivair Quantitative and Qualitative Fit Test Kits
- Masks
  - APR half mask with appropriate filters
    - Survivair Valuair Plus (“S” & “T”)
    - Survivair Blue 1 (“S”)
    - Survivair 2000 series (“S”)
    - Survivair Premier (“S” & “T”)
    - Survivair Premier Plus (“S” & “T”)
  - Willson disposable particulate respirators
    - N1105 – N95 protection
    - N1115 – N95 protection
    - N1125 – N95 protection
    - N1125-OV – N95 & Nuisance OV protection
    - N1139 – N99 protection
    - P1135-1 – P95 & Nuisance OV protection
    - P1130 – P100 protection
- Filters
  - Survivair N95 (“S” & “T”)
  - Survivair N99 (“S” & “T”)
  - Survivair R95 (“S” & “T”)
  - Survivair P100 (“S” & “T”)

## **EXPOSURES UP TO 50 TIMES THE PEL**

- Program
  - OSHA Compliant Medical Evaluation
    - Survivair OSHA MedCert OSHA Compliant Medical Evaluation
  - OSHA Compliant Quantitative and Qualitative fit tests
    - Survivair Fit Test Video

- Survivair Quantitative and Qualitative Fit Test Kits

- Masks

- Full mask with appropriate filters
  - Survivair Opti-Fit (“S” & “T”)
  - SurvivairMAX (“S” & “T”)
  - Survivair 4000 Series (“S” & “T”)
  - Survivair 4000 Series Welding Mask (“S”)

- PAPR

- Survivair PAPR with a half mask and appropriate filters
  - Survivair Blue 1 (“S”)
  - Survivair 2000 series (“S”)

- SAR

- Survivair SAR with a half mask and appropriate filters
  - Survivair Blue 1 (“S”)
  - Survivair 2000 series (“S”)

- Filters

- Survivair N95 (“S” & “T”)
- Survivair N99 (“S” & “T”)
- Survivair R95 (“S” & “T”)
- Survivair P100 (“S” & “T”)

- Cartridges – Protection from Organic Vapors – For proper protection, this filter must be worn with one of the aforementioned Survivair filters.

- Organic Vapors Cartridge (“S” & “T”)

## **EXPOSURES UP TO 1000 TIMES THE PEL**

- Program

- OSHA Compliant Medical Evaluation
  - Survivair OSHA MedCert OSHA Compliant Medical Evaluation
- OSHA Compliant Quantitative and Qualitative fit tests
  - Survivair Fit Test Video
  - Survivair Quantitative and Qualitative Fit Test Kits

- PAPR

- Survivair PAPR with a full mask and appropriate filters
  - Survivair Opti-Fit (“S”)
  - Survivair 4000 Series (“S”)
  - Survivair 4000 Series Welding Mask (“S”)

- SAR

- Survivair SAR with a full mask and appropriate filters

- Survivair Opti-Fit (“S”)
- Survivair 4000 Series (“S”)
- Survivair 4000 Series Welding Mask (“S”)

- Filters

- Survivair N95 (“S” & “T”)
- Survivair N99 (“S” & “T”)
- Survivair R95 (“S” & “T”)
- Survivair P100 (“S” & “T”)

- Cartridges – Protection from Organic Vapors – For proper protection, this filter must be worn with one of the aforementioned Survivair filters.

- Organic Vapors Cartridge (“S” & “T”)

## **EXPOSURES ABOVE 1000 TIMES THE PEL**

- Program

- OSHA Compliant Medical Evaluation
  - Survivair OSHA MedCert OSHA Compliant Medical Evaluation
- OSHA Compliant Quantitative and Qualitative fit tests
  - Survivair Fit Test Video
  - Survivair Quantitative and Qualitative Fit Test Kits

- SCBA

- Survivair Cougar

## **EXPOSURE ASSESSMENTS AND MONITORING**

Every employer who has a workplace or work operation covered by the Hexavalent Chromium Standard shall determine the 8-hour TWA exposure for each employee exposed to chromium (VI). The determination shall be made in accordance with one of the two options (Scheduled Monitoring Option or the Performance Oriented Option) discussed in detail in the standard -See 1910.1026 (d)(2) and (d)(3). There are three monitoring methods for hexavalent chromium: 1) NIOSH Method 7604 ion chromatography; 2) NIOSH Method 7600 visible absorption spectrophotometry; or, 3) OSHA Method ID-215 as stated in the hexavalent chromium standard. When performing these samples, it is critical that sampling be properly conducted and analyzed. It is recommended that an American Industrial Hygiene Association (AIHA) laboratory be consulted for these samples and analysis.

Regardless which determination Option is selected, the employer must notify employees in writing of the results within 15 working days if the PEL is exceeded. Further, the employer must describe in writing the corrective action that will be taken to reduce employee exposure to or below the PEL.

## **KEY COMPLIANCE DATES**

Employers with 20 or more employees must be in compliance by November 27, 2006.

Employers with fewer than 20 employees must be in compliance by May 30, 2007.

Feasible engineering controls must be in place by May 31, 2010.

## **PROTECTION, COMPLIANCE AND INFORMATION RESOURCES**

Survivair offers a complete line of disposable, half mask and full facepiece respirators. Go to <http://www.survivair.com/> for product information.

For consulting help go to the American Industrial Hygiene Association at [www.aiha.org](http://www.aiha.org) (select consultants).

The full text of the Hexavalent Chromium(CrVI) Standard for General Industry (1910.1026), Construction (1910.1126) and Shipyards (1515.1026) may be found at <http://www.osha.gov/> (click on standards).

Detailed information about Hexavalent Chromium may be obtained from the National Institute for Occupational Safety and Health, NIOSH, at <http://www.cdc.gov/niosh/topics/hexchrom/>

For a respiratory program that will comply with OSHA standards and with your business, contact your Bacou-Dalloz sales representative or for additional technical information contact Survivair Technical Service at 800-394-0410.