



OSHA Hexavalent Chromium Standards

Engineering controls must be implemented by May 31, 2010

Arc Welding Safety
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OSHA Hexavalent Chromium Standards

OSHA's Standard

On February 28, 2006, the Occupational Safety & Health Administration (OSHA) issued a new standard relating to occupational exposure to hexavalent chromium, also known as Cr(VI). Chromium is a natural metal that may be used in a wide variety of industrial activities, including the manufacture of stainless steel, **arc welding**, painting and pigment application, electroplating, and other surface coating processes. OSHA determined that the new standard is necessary to reduce health risks posed by occupational exposure to Cr(VI).

The standard lowers OSHA's permissible exposure limit (PEL) for hexavalent chromium, and for all Cr(VI) compounds, to **5 micrograms of Cr(VI)** per cubic meter of air as an **8-hour time-weighted average**. (this is the same as .005 milligrams per cubic meter). The new PEL is one-tenth of the old PEL.

Industries to which the Standard applies: The standard covers occupational exposure to hexavalent chromium (Cr(VI)) in general industry, construction and shipyards. Cr(VI) regulations have been issued for each industry.

Requirements. The new standard requires industries to control worker exposures to Cr(VI) so the new PEL is not exceeded. This may be done through engineering and work practice controls or through the use of respirators, if controls are not sufficient. Other requirements include worker Cr(VI) exposure determinations, protective work clothing and equipment, house keeping, medical surveillance and communication of hazards and training.

Effective date for all provisions, except engineering controls:

The requirements were phased in as follows:

Employers with 20 or more employees:
November 27, 2006

Employers with less than 20 employees:
May 30, 2007

This period is designed to allow employers sufficient time to complete initial exposure assessments, obtain appropriate work clothing and equipment, and comply with other provisions of the standard.

Exposure Assessments: Employers must determine what the exposures are for its employees. Some employers may have a safety or industrial hygiene department capable of performing that determination. Employers may need to contact a certified industrial hygienist to help them do this. (For assistance, see <http://www.aisa.org/Content/AccessInfo/consult/consultantsearch.htm>)

In general, employers must perform an initial assessment to determine what worker exposures are and perform follow up monitoring if the exposure is above an action level which is

one-half of the PEL or if there is a change, for example to the workplace, work practices, materials or processes involved, which may affect exposure.

"Each employer who has a workplace or work operation covered by this section shall determine the 8-hour TWA exposure for each employee exposed to chromium (VI) . . ."

⁽¹⁾ 29CFR1910.1026(d)(1)

"Scheduled monitoring option.

The employer shall perform initial monitoring to determine the 8-hour TWA exposure for each employee on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area. Where an employer does **representative sampling** instead of **sampling all employees** in order to meet this requirement, the employer shall sample the employee(s) expected to have the highest chromium (VI) exposures. . . ."

⁽¹⁾ 29CFR1910.1026(d)(2)

"Performance-oriented option.

The employer shall determine the 8-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 chromium (VI)."

⁽¹⁾ 29CFR1910.1026(d)(3)

Exemption: "Where the employer has objective data demonstrating that a material containing chromium or a specific process, operation, or activity involving chromium cannot release dusts, fumes, or mists of chromium (VI) in concentrations at or above 0.5 µg/m³ as an 8-hour time-weighted average (TWA) under any expected conditions of use. . . ."

⁽¹⁾ 29CFR1910.1026(d)(4)

Respirators: If the use of work practice controls does not control exposures to the PEL, employers may use respirators, provided other requirements for respirators are met (29CFR1910.134). The use of engineering controls to control exposures is encouraged, but not required until May 31, 2010.

After May 31, 2010, in general, respirators can only be used to comply with the PEL if feasible engineering and work practice controls are unable to reduce exposures to levels at or below the PEL and the employer has implemented engineering and work practice controls to reduce exposures to the lowest levels achievable, or the employer can demonstrate that the 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)

Start-up date for engineering controls: Engineering controls must be implemented by all employers by May 31, 2010. Feasible engineering controls to control exposures must be in use by this date, even if respirators must also be used to control worker exposure.

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Engineering Controls

No one solution will fit all applications. Solutions frequently involve a combination of the following:

Advanced Welding Equipment, Consumables and Nextweld® Technologies

- Equipment and Consumable Products
- Nextweld® Technologies
- Robotics / Automation Solutions
(<http://www.lincolnelectric.com/>)

Environmental Solutions - Fume Extraction Equipment

- Environmental Equipment Selection Guide - Lincoln Electric MC05-138
- Miniflex® – Lincoln Electric E13.11
- Mobiflex® 200-M – Lincoln Electric E13.12
- Mobiflex® 400-MS – Lincoln Electric E13.13
- Statiflex® 200-M – Lincoln Electric E13.14
- Statiflex® 400-MS – Lincoln Electric E13.15
- Extraction Arms – Lincoln Electric E13.16
(<http://www.lincolnelectric.com/safety>)

Arc Welding Assessment

Because the chromium (VI) PEL is much lower, it will be important for employers to determine if there is an exposure in all arc welding applications, not just if welding with stainless or hardfacing consumables. Electrodes and the base metal may contain chromium as an alloying ingredient for strength or on the base metal as a plating or coating. Chromium is also present in many steels as a "tramp" ingredient. For this reason, an exposure assessment is needed in arc welding and cutting applications involving even mild and low alloy steels to ensure that exposures do not exceed the action level or the PEL.

Lincoln Electric Material Safety Data Sheet (MSDS) Updates – Hexavalent Chromium Standard

- Hardfacing Consumable Updates
- Stainless & High Alloy Consumable Updates
- Low Alloy and Other Consumable Updates
- All Lincoln Material Safety Data Sheets (MSDS)
- To keep organizations up-to-date on all changes to Lincoln's Material Safety Data Sheets, Lincoln has an on-line notification program that will e-mail you weekly with a list of MSDS sheets that have been updated. Go to the below link to signup for this service and to download the above MSDS documents where appropriate.
(<http://www.lincolnelectric.com/products/msds/>)

Industry Resources

Industry information on Safety & Health Topics are available from organizations such as The Lincoln Electric Company, American Welding Society (AWS), National Institute of Occupational Safety & Health (NIOSH) and Occupational Safety & Health Administration (OSHA). The following are some informative websites and data resources.

A. OSHA - Safety & Health Topic: Hexavalent Chromium

- OSHA News Release: OSHA Issues Final Standard on Hexavalent Chromium
(http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=12038)
- OSHA Final Rule: Occupational Exposure To Hexavalent Chromium
(http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=FEDERAL_REGISTER&p_id=18599)
- OSHA Safety & Health Topic: Hexavalent Chromium
(<http://www.osha.gov/SLTC/hexavalentchromium/index.html>)
- OSHA Small Entity Compliance Guide for Hexavalent Chromium Standard
(http://www.osha.gov/Publications/OSHA_small_entity_comp.pdf)
- OSHA Home Page (<http://www.osha.gov>)

B. Arc Welding Safety

- Arc Welding Safety Brochure - Lincoln Electric E205
(<http://www.lincolnelectric.com/safety>)
- Arc Welding Safety Poster – Lincoln Electric E201
(<http://www.lincolnelectric.com/safety>)
- Safety and Health Fact Sheets – American Welding Society
(<http://www.aws.org/technical/facts/>)
- Safety in Welding, Cutting and Allied Processes Document – AWS/ANSI Z49.1
(<http://www.aws.org/technical/facts/>)

C. Additional Welding & Safety Resources

- OSHA Website – Safety & Health Topics / Hexavalent Chromium
(<http://www.osha.gov/SLTC/hexavalentchromium/index.html>)
- NIOSH Website – Safety & Health Topics / Hexavalent Chromium
(<http://www.cdc.gov/niosh/topics/hexchrom/>)
- AIHA Website – Industrial Hygienist Consultant Search
(<http://www.aiha.org/Content/AccessInfo/consult/consultantsearch.htm>)
- AWS Website – Safety & Health Fact Sheets
(<http://www.aws.org/technical/facts/>)
- Lincoln Electric Website – Arc Welding Safety
(<http://www.lincolnelectric.com/safety>)

(1) Citation is made to the OSHA General Industry Regulations. Similar regulations apply to the Construction Industry 29CFR1926.1126 and Shipbuilding Industry 29CFR1915.1026

The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company® is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

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