

Overview: New OSHA Regulations For Hexavalent Chromium Exposure

OSHA's new regulation for employee exposure to hexavalent chromium (Cr(VI)) — a natural metal used in the manufacture of stainless steel — has significantly reduced the permissible exposure limit from 52 to 5 micrograms. The regulation (Volume 71, Number 39, 10099–10385) also includes provisions relating to preferred methods for controlling exposure, respiratory protection, protective work clothing and equipment, hygiene, medical surveillance, hazard communication, and record-keeping. Effective May 30, 2006, the new rule does not require the installation of engineered controls, including air filtration equipment, until May 30, 2010.

This standard applies to all manufacturing processes where hexavalent chromium is present including welding. While all types of welding could be affected, the highest concentration will be from the fumes generated in welding stainless steel. The major health effects associated with exposure to Cr(VI) include lung cancer, nasal septum, ulcerations and perforations, skin ulcerations, and allergic and irritant contact dermatitis.

This new regulation provides for greater employee protection against these health risks by lowering the permissible exposure limit (PEL) for hexavalent chromium, and for all Cr(VI) compounds, from 52 μg to a much more stringent 5 μg of Cr(VI) per cubic meter of air (5 $\mu\text{g}/\text{m}^3$) as an 8-h time-weighted average.

Welding Specifics in the New OSHA Hexavalent Chromium Regulations

Complete information and a copy of the 287-page regulation (Volume 71, Number 39, 10099-10385) can be found at the OSHA Web site: www.osha.gov/SLTC/hexavalentchromium/index.html.

Following are pertinent quotes from the regulation.

“OSHA concludes that engineering controls, such as local exhaust ventilation (LEV), process control, and process modification or substitution can be used to control exposures in most operations.” (Vol. 71, No. 39, 10334)

“OSHA has determined that the primary controls most likely to be effective in reducing employee exposure to Cr(VI) are local exhaust ventilation (LEV) and improving general dilution ventilation. ... This includes installing duct work, a type of hood, and/or a collection system.” (Vol. 71, No. 39, 10262)

“Paragraph (f) of the final rule, Methods of Compliance, establishes which methods must be used by employers to comply with the permissible exposure limit (PEL). It requires that employers institute effective engineering and work practice controls as the primary means to reduce and maintain employee exposures to Cr(VI) to levels that are at or below the PEL ... Engineering controls can be grouped into three main categories: 1) Substitution, 2) isolation; and 3) ventilation, both general and localized.” (Vol. 71, No. 39, 10345)

“Welding: The welding operations OSHA expects to trigger requirements under the new Cr(VI) rule are those performed on stainless steel, as well as those performed on high-chrome-content carbon steel and those performed on carbon steel in confined and enclosed spaces. ... OSHA has determined that engineering and work practice controls are available to permit the vast majority (over 95%) of welding operations on carbon steel in enclosed and confined spaces to comply with a PEL of 5 $\mu\text{g}/\text{m}^3$ OSHA has determined that the PEL of 5 $\mu\text{g}/\text{m}^3$ is also feasible for all affected welding job categories on stainless steel. ... The two most common welding processes, shielded metal arc welding (SMAW) and gas metal arc welding (GMAW), ... may require the installation or improvement of LEV. ... There are ongoing efforts to reduce the use of SMAW and replace it with GMAW for both of efficiency and health reasons. ... OSHA has revised its estimate of the percentage of SMAW welders that can switch to GMAW from 90% to 60%. ... For those stainless steel SMAW operations that cannot switch to GMAW and even some GMAW operations, the installation or improvement of LEV may be needed and can be used to reduce exposures. OSHA has found that LEV would permit most SMAW and GMAW operations to comply with a PEL of 5 $\mu\text{g}/\text{m}^3$, OSHA recognizes that the supplemental use of respirators may still be necessary in some situations.” (Vol. 71, No. 39, 10262-10263)