

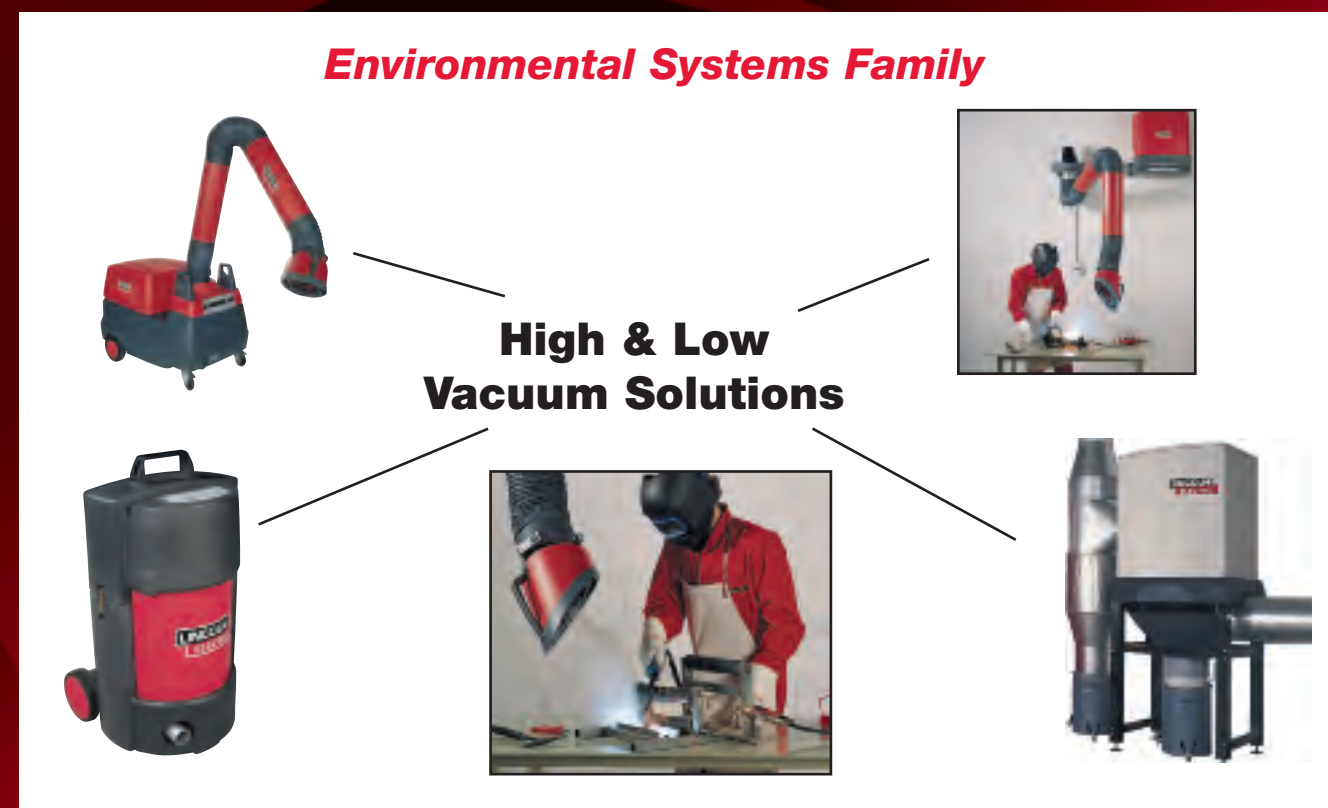


**Methods for Controlling the Employee's Route of Exposure**

Source	Pathway	Employee
		
<p><b>Substitution:</b></p> <ul style="list-style-type: none"> <li>• Process</li> <li>• Consumable</li> <li>• Gas</li> <li>• Procedure</li> <li>• Advanced Welding Technology</li> </ul>	<p><b>Isolation:</b></p> <ul style="list-style-type: none"> <li>• Automate and Ventilate</li> <li>• Regulated Work Area</li> </ul> <p><b>Ventilation:</b></p> <ul style="list-style-type: none"> <li>• Source Extraction</li> <li>• Local Exhaust Ventilation</li> <li>• General Shop Extraction and Ventilation</li> </ul>	<p><b>Personal Protective Equipment</b></p> <p><b>Medical Surveillance</b></p> <p><b>Housekeeping</b></p> <p><b>Clothing &amp; Hygiene</b></p>
Air monitoring- initial assessment to demonstrate potential fume exposure level below the applicable standard.	Air monitoring- periodic assessment of ventilation controls to demonstrate continued fume control below applicable standard.	Air monitoring- frequent personal monitoring to determine adequacy of respirator protection factor.
Training- Welding work practice controls.	Training- Welding and ventilation work practice controls.	Training- PPE training, operating work practices, personal hygiene, medical surveillance, hazard communication, record-keeping, etc.
Equipment maintenance	Ventilation equipment maintenance	PPE and respirator maintenance



# ARC WELDING SAFETY

## A Guide to Welding Fume Control

*New OSHA Hexavalent Chromium Standards*



**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 advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

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# Welding Fume Control Methodology

This information is abstracted from OSHA's document entitled "Small Entity Compliance Guide for the Hexavalent Chromium Standards", OSHA 3320-10N 2006. ([http://www.osha.gov/publications/osha\\_small\\_entity\\_comp.pdf](http://www.osha.gov/publications/osha_small_entity_comp.pdf))

Employers are responsible for providing a safe and healthful workplace for their employees. OSHA's role is to assure the safety and health of America's employees by setting and enforcing standards, providing training, outreach and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.

## Methods of Compliance: Engineering & Work Practice Controls (1)

Employers must use Engineering and Work Practice Controls as the primary means to reduce and maintain employee exposures for Cr(VI) to or below the PEL, unless the employer can demonstrate that such control measures are not feasible.

A. Engineering Controls: include substitution, isolation and ventilation.

B. Work Practice Controls: involve adjustments in the way a task is performed, as well as the periodic inspection and maintenance of engineering control equipment. In many cases, work practice controls complement engineering controls in providing employee protection.

C. Personal Protection Equipment: When engineering and work practice controls cannot reduce employee exposure to within the PEL, employers must provide respirators. OSHA's Methods of Compliance states that:

*"If feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, then the employer must use them to reduce the exposure to the lowest level achievable before using respirators. Respirators must then be used to reduce employee exposure to or below the PEL."* (2)

Respirators are required during the period necessary to install or implement feasible engineering controls (by May 31, 2010) and during maintenance, repair and emergency situations.

No one solution will fit all applications. Solutions frequently involve one or more methods of control to properly and adequately control employee exposure.

**Note (1): Small Entity Compliance Guide for the Hexavalent Chromium Standards, Pages 9, 10 and 11, OSHA 3320-10N 2006**

**Note (2): a) November 27, 2006 for employers with 20 or more employees.**

**b) May 31, 2007 for employers with 19 or fewer employees.**

## Welding Fume Control Methodology

To thoroughly explore your welding fume control options, you should clearly identify and assess your actual needs and operating conditions. The following Welding Fume Control Methodology, along with your Lincoln Electric Technical Sales Representative, can help you through this process, as he or she can bring expertise and resources to assist you as you go through this process.

### A. Engineering Controls

#### 1. Substitution:

Is it feasible and practical to modify or replace your current welding process, consumable, gas, welding procedure or equipment technology with an alternative process, consumable, gas, welding procedure or equipment technology that generates less welding hexavalent chromium.

#### 2. Isolation

Is it feasible and practical to isolate and separate your welding operation by moving it to a regulated area, by automating/ventilating the welding process and/or by placing a barrier between the employee and the source?

#### 3. Ventilation:

Is it feasible and practical to control the welding fume path between the source and the worker through source, local and/or general shop extraction/ventilation equipment?

### B. Safe Work Practice Controls

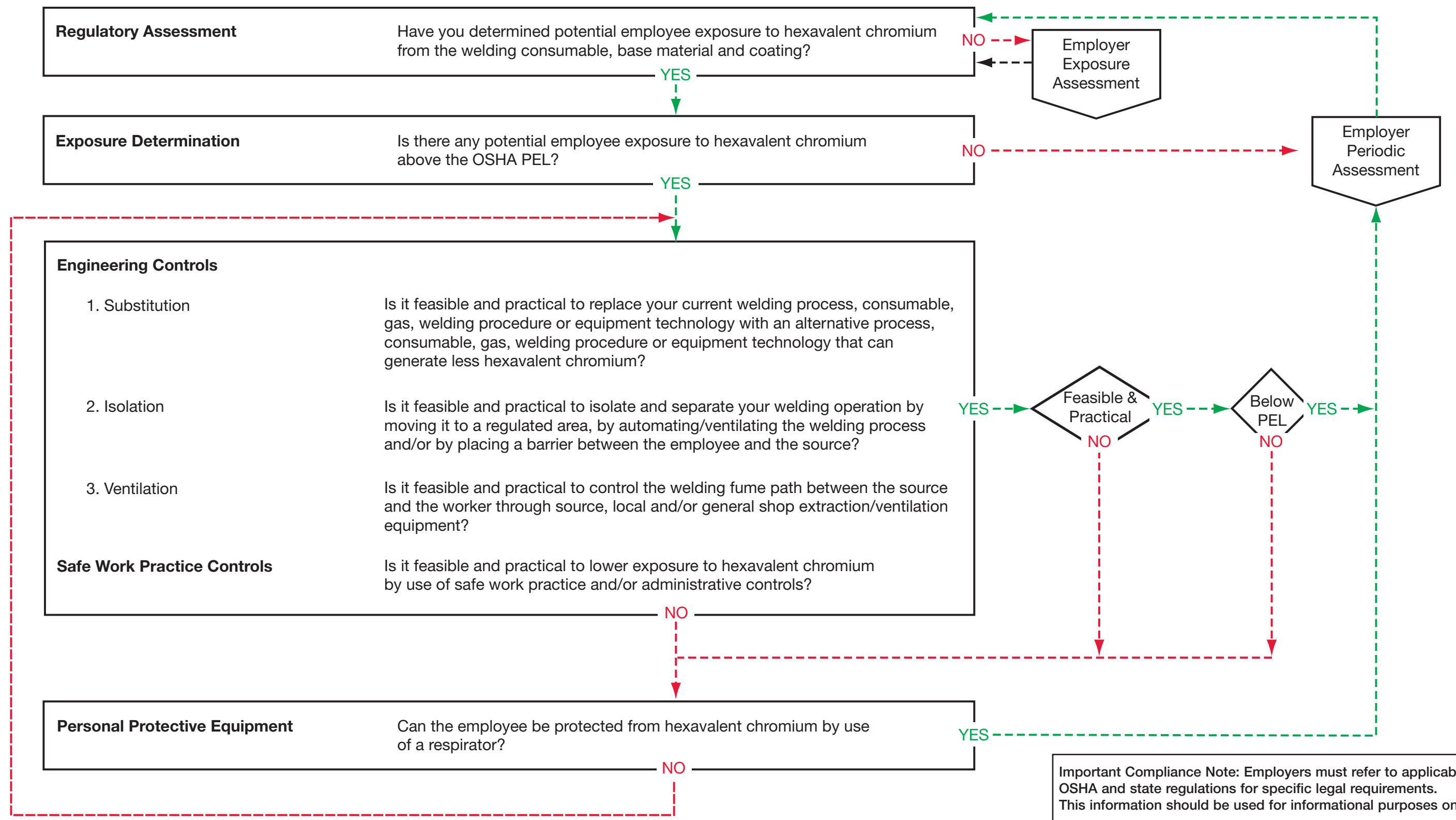
Safe work practices complement each level of Engineering Controls and are designed to control the manner in which work is performed. These practices include such areas as safe welding habits (keeping your head out of the fumes, keeping fumes and gases away from your breathing zone and proper training & use of fume extraction equipment) as well as general housekeeping and general administrative procedures such as performing maintenance off shift to minimize potential exposure.

### C. Personal Protective Equipment (PPE)

An important method of protecting employees in certain situations can be the use of PPE, including respirators; which require an initial employee medical evaluation, more frequent evaluation of worker exposure levels, training and recordkeeping. In addition, the OSHA PPE evaluation may determine the need for additional personal protection practices, including specific requirements for additional work clothing & equipment, as well as the need for a separate change room, shower and laundering service. (3)

**Note (3): see Small Entity Compliance Guide for the Hexavalent Chromium Standards OSHA 3320-10N 2006 for further details and references regarding compliance.**

## Lincoln Electric's Suggested Welding Fume Control Methodology





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