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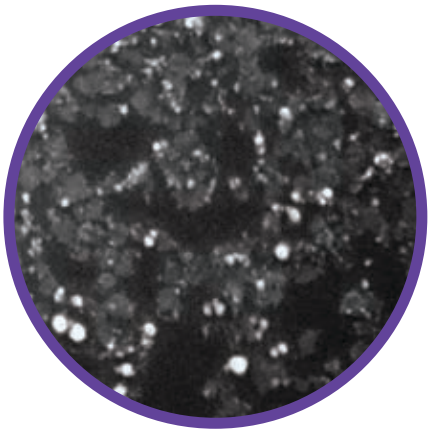
# Beyond the sparks and flame

## *Helping keep your lungs safe from Manganese and Hexavalent Chromium*

As a welder, you're trained to know exactly what to do to keep yourself safe from heat and sparks. But what about the microscopic and potentially toxic airborne elements that cling to your lungs with time?

That's why we've spent decades keeping you informed on potential risks and improving respiratory protection products that keep your lungs out of harm's way. For welders, two of the elements that can pose a serious threat are: Manganese and Hexavalent Chromium. Here's an overview of what you need to know in order to help minimize risk.



*Magnification of Manganese*

## What is Manganese?

Manganese is a naturally occurring metal that is commonly added to steel to promote hardness and durability. In the workplace, it is commonly found in welding rods and filler metals. But don't mistake natural for harmless. When manganese is heated and reacts with oxygen in the air, it forms dangerous manganese oxide fumes. These tiny particles can be easily inhaled.

## How could it affect me?

Workplace exposures to manganese can result in irritation to the nose, throat and lungs. It can also result in "metal-fume fever". Exposures have also been linked to Manganism, a disease with symptoms similar to Parkinson's that can result in weakness, lethargy, tremors and even paralysis. Manganese is also what we call an ototoxic agent, which means it can be equally harmful to your hearing.

## When am I at risk?

Manganese has a good chance of showing up any time you cut, weld, grind or polish metal. While occupational exposure limits may vary from province to province, long-term exposures to any level of Manganese could eventually take its toll. That's why we'll always encourage you to be safe.

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## What is Hexavalent Chromium?

Chromium is an element naturally found in the earth's crust. Chromium can be found in a number of different forms, but it is the hexavalent form that is a major health concern.

During stainless steel welding it can be found in the tiny fumes that are produced. It is also found in a myriad of paints, pigments, dyes, plastics and more.

## How could it affect me?

Studies have found an important correlation between Hexavalent Chromium exposure and lung cancer. When in prolonged contact with your skin, it can also cause irritation, ulcers and allergic reactions.

## When am I at risk?

Airborne Hexavalent Chromium is usually present whenever you're welding stainless steel. You may also be at risk when you're spray painting, sanding, grinding or abrasive blasting.

As with Manganese, occupational exposure limits may vary from province to province. Long-term exposures at even very low levels may negatively impact your lungs and overall health.

# What can I do to protect myself?

## Stay informed

Talk to your employer about the occupational exposure limits enforced within your province and what's being done on-site to ensure proper ventilation and acceptable exposure levels. New information and data are constantly being published about the potential impacts of these harmful elements and the different ways in which you can keep yourself safe – so make sure you're up-to-date on the latest news.

## Get the equipment you need

From low-exposure disposable respiratory protection products to heavy-duty battery-operated respiratory helmets, 3M has a range of protective gear that can help keep your lungs safe. We use advanced electrostatic media in our filters that let in clean air while capturing harmful particulate, dust or fumes. Take a look at our entire line of respiratory protection products to see which suits your environment best.

You can also get in touch with one of our respiratory experts for personalized guidance on the kind of respiratory protection you need. Because at the end of the day, our job is to simplify yours and let you focus on what matters most – your craft, your health and your family.

## Did you know?

In 2013, American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV-TWA) for manganese changed. In fact, after considering studies that revealed important risks even at low exposure levels, the ACGIH recommended a significant reduction that's since been accepted by many states and provinces across the continent. The previous TLV-TWA® of 0.2 mg/m$^3$ was decreased to 0.1 mg/m$^3$ for the inhalable fraction and 0.02 mg/m$^3$ for the respirable fraction.

**550,000**
Workers (Est.)

**Manganese**
Exposure in
**Canada**

| Four Largest Exposure Groups By Industry | Number Exposed |
|---|---|
| Welding | **261,000** |
| Mechanics | **233,000** |
| Mining | **30,000** |
| Industrial painting & metal finishing | **13,000** |

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