

# Hexavalent Chromium

## Background

Hexavalent chromium ( $\text{Cr}^{6+}$  or  $\text{Cr(VI)}$ ) is a toxic form of the element chromium which is today recognised as a human genotoxic carcinogen. Individuals experiencing long term exposure to airborne hexavalent chromium particles have a significantly increased risk of developing respiratory cancers.

Other hexavalent chromium exposure health effects are nose, throat, lung and respiratory tract irritations when breathed at high levels, and irritation and damage to eyes and the skin if high concentrations of the particles comes into contact with these organs.

Hexavalent chromium compounds are synthetic and have been used across different industries for many years:

- ▶ Chromium metal is added to alloy steel including stainless steel to increase hardenability and corrosion resistance
- ▶ Used as an anticorrosive agent added to paints, primers and other surface coatings
- ▶ Used as pigments in dyes, paints, inks and plastics
- ▶ The hexavalent chromium compound chromic acid is used to electroplate chromium onto metal parts to provide a decorative or protective coating.

Work activities involving hexavalent chromium which can result in toxic levels of exposure include:

- ▶ Welding, cutting and hard-facing of stainless steel
- ▶ Manual metal arc welding of high chromium steels
- ▶ Chrome plating
- ▶ Refractory production
- ▶ Addition of cement to gravel and sand to make concrete
- ▶ Leather tanning
- ▶ Timber preservation using copper chrome arsenate
- ▶ Chromate use in the textile industry
- ▶ Chrome pigment use, such as in dyes, paints, inks and plastics.

## Regulation

Much of the Australian legislation and guidelines for the management of hexavalent chromium exposure is based on United States standards, where exposure health issues were first identified in California the 1980s. Standards produced by the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) and U.S. Environmental Protection Agency were and still are commonly referenced to in applicable Australian legislation, acts, standards, guidelines and procedures for hexavalent chromium management.

In the Australian Defence Force, hexavalent chromium is widely used as an aircraft surface finishing product due to its corrosion preventative properties, today prompting the Department of Defence to implement safe working practices to limit exposure to the particles. This led to a greater awareness in this country to the risks of exposure.

Key Australian standards and guidelines that industry refers to today for assessing the risks and in managing hexavalent chromium exposure includes:

- ▶ SafeWork Australia, Hazardous Chemicals Requiring Health Monitoring: Chromium (March 2013)
- ▶ NT WorkSafe Guide, Health Monitoring for Exposure to Hazardous Chemicals (March 2016)



*Hexavalent chromium was once used as an aircraft surface finishing product*

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## The McMahon Services Solution

McMahon Services has over 25 years of national experience managing hazardous waste across a variety of industries for a range of customers. Our specialisation and reputation requires a thorough understanding of both occupational health and safety (OHS) and environmental regulations, and a workforce that is trained, experienced and accredited in delivering safe and environmental sensitive hazardous waste services.

Our national teams have a comprehensive understanding of all State and Territory OH&S regulations, environmental regulations and a thorough understanding the Contaminated Land Audit system. We similarly maintain EPA Waste Transport Licences in all States and Territories.

Our team is supported by a large fleet of hazardous waste plant and equipment including:

- ▶ Negative air pressure decontamination enclosures
- ▶ HEPA vacuum systems
- ▶ Hazardous material emergency response decontamination units
- ▶ Modified excavators with positive air system
- ▶ Negative air picking lines and screening equipment
- ▶ Custom designed and fabricated portable hexavalent chromium enclosure
- ▶ Airlock and HEPA extraction system
- ▶ Dust suppression and stockpile management systems as well as use of dust suppression reagents.

McMahon Services can assist organisations undertaking high risk hexavalent chromium activities by implementing numerous risk mitigation and elimination strategies:

- ▶ Site inspections and auditing processes to determine the presence and location of hexavalent chromium materials
- ▶ Regular measuring of hexavalent chromium air concentrations and advising whether action level (AL) and permissible exposure limits (PEL) are within legislative requirements for any given worksite
- ▶ Developing ongoing monitoring and assessment regimes for high risk work areas
- ▶ Procuring and training in the appropriate use of personnel protective equipment (PPE) such as approved respirators, goggles, gloves, helmets and coveralls to reduce exposure in high concentration work areas
- ▶ Providing capital upgrade works such as installation of HEPA exhaust filter fans in work areas to reduce the concentration of hexavalent chromium particles in the air, separate storage change rooms for work clothes and street clothes, and washing facilities
- ▶ Installing appropriate industrial cleaning systems for PPE and other equipment that ensures hexavalent chromium particles do not become airborne during these processes
- ▶ Emergency spill management for hexavalent chromium containing materials using HEPA-filter vacuuming systems
- ▶ Collection, transport and disposal of hexavalent chromium contaminated material at approved EPA registered disposal sites.

