

Hexavalent Chromium - FAQ's

What is Chrome/Cr6?

Chrome, or Chromium plating as it is also known, is a term to describe the process of electroplating a thin coating of chromium onto a metal object, usually steel, giving it a shiny, smooth, reflective finish. There are fundamentally two types of chrome plating: trivalent and hexavalent.

Hexavalent Chrome plating (Cr6), most commonly used in the DIY/Hardware/Ironmongery industries to create a decorative finish, involves chromium trioxide which is a known carcinogenic.

How is Chrome produced?

During the process of electroplating the material being coated is passed through a large activation bath which contains a specific mixture of harsh chemicals. As electroplating takes place these chemicals are heated up causing toxic gasses to be emitted.

Why is Chrome harmful?

ALL chrome plating chemicals are highly toxic. However hexavalent chrome (Cr6) is higher in toxicity than trivalent.

The gasses emitted from the activation baths are carcinogenic. Legislation has long been passed in Europe and the US to ensure that anyone working in an environment where chrome products are produced are provided with protective clothing, breathing equipment and ventilation. The by-products of the process are contained and have to go through filtration before disposal to prevent contamination of water supplies and soils.

The Registration, Evaluation, Authorisation and restriction of Chemicals (REACH) directive has been in place in Europe since 2007 and hexavalent chrome has been included on their list of hazardous substances since 2004.

In September, 2017 stricter regulations were placed on the use of hexavalent chromium coatings in an attempt to protect human and environmental health. These regulations have made it extremely difficult for European manufacturers that use Cr6 to carry on producing their traditional metal finishes. Anyone who goes against these regulations face harsh penalties. In the US hexavalent chrome is seen as an outdated, unnecessary substance and is essentially obsolete, apart from limited exceptions.

Exposure to Cr6 can lead to a multitude of health problems including:

- Cancer of the Lungs, and Oesophagus
- Nose bleeds, nasal irritation and perforations of the nasal septum
- Skin abnormalities and ulcers
- Kidney and Liver damage

Just to name a few.

Why is hexavalent chrome (Cr6) still being produced?

Unfortunately, although almost banned in Europe and the US, hexavalent chrome is still legally being produced in other parts of the world. China and India currently being the biggest exporters of chrome plated products. Neither of these countries are held to European or US REACH regulations.

Once manufacturers were placed under strict legislation, as outlined previously, production was moved overseas to dodge these restrictions and avoid a loss of earnings. Not only could they continue to produce chrome products, but produce them at lower costs and increase profits. The reason these products are so cheap to produce overseas is because there is little, or no, safety legislation in place to protect the workforce or the wider environment.

Why are the Chinese factories not protecting their workers?

Chinese factories are not under the same legislation as passed by European law. The Chinese government do not place penalties on manufacturers using Cr6 because the factories exporting these products worldwide are boosting the Chinese economy.

Protective apparatus, ventilation and new safety regulations put in place would be costly to manufacturers and factory owners. This would not only increase costs but in instigating these changes workers would realise the dangers that are posed on their health. Anyone suffering from cancers or conditions caused by exposure to this extremely toxic substance would have grounds for litigation. A risk that factory owners would rather avoid by keeping their workers in the dark, and more importantly, in danger.

Is Chrome dangerous to consumers?

No. Chrome is not harmful to consumers. Exposure during the chrome plating process or to waste materials from the activation baths is a danger to health, but once the product has been plated it bears no risk.

Hexavalent chrome can become harmful if brought into contact with a drinking water source. This was brought to public knowledge by activist Erin Brockovich in 1993, when she successfully brought legal action against Pacific Gas and Electric after producing findings that they had used hexavalent chromium in a cooling tower to fight corrosion in Hinkley, California. This had percolated into the surrounding ground water for a 2-mile radius. The case, settled in 1996 for \$333million, remains the highest direct-action law-suit settlement in US history.

Is there an alternative?

There are certainly alternatives to chrome that are not harmful to the environment or to the individuals working in close proximity to it during production. One of the best alternatives is to replace chrome with stainless steel. This outperforms chrome as it is rust resistant and can be used for both outdoor and indoor use. Powder coatings or high build up systems can also be used such as Krome, recently developed by Rothley Ltd. There is also the relatively new science of Nano-plating, that coats metals using

nanometric particles. It has been proven to outperform chrome under mechanical stress tests and takes less time and energy to produce, making it a more environmentally friendly option.