

FACT SHEET

March, 2003

Hexavalent Chromium

Chromium (VI)

Hexavalent chromium is a known human carcinogen, which also can cause allergic reactions in some people. Hexavalent chromium may be deadly if exposure is at high levels or if the person being exposed to even low levels has sensitivities to chromium compounds. Chromium (VI) is used as an anti-corrosive in chrome plating and is an ingredient in some paints. The U.S. Department of Health and Human Services estimates that more than 305,000 U.S. workers, including painters, battery makers, printers, rubber makers, stainless steel welders, and cement workers are occupationally exposed to chromium (VI) or other chromium compounds.

Health Effects

Hexavalent chromium is a known human carcinogen and sensitizer. Hexavalent chromium may be deadly if exposure is at high levels or if the person being exposed to even low levels has sensitivities to chromium compounds. Others can experience allergic reactions or occupational asthma following exposure. Those who work directly with chromium (VI) in chrome plating, paint or cement production and in construction are of particular concern due to potentially high exposure levels.



Several studies on humans who were acutely and chronically exposed to chromium (VI) have demonstrated that exposure causes irritation to the skin (dermatitis), respiratory tract, heart, and gastrointestinal tract (hemorrhage, ulcer, diarrhea, vomiting). It also can damage the liver and kidneys. Chromium (VI) also has induced neurological and immunological effects in humans acutely exposed and cases of permanent loss of vision, severe burns of the eyes and skin, and asthma have been reported following exposure.

Common Uses

Chromium (VI) is used for its anti-corrosive properties and as a pigment in chrome plating, spray painting, and in chrome pigment manufacturing. Chromium can be intentionally added to cement as a pigment or may be a trace contaminant in the raw materials used to manufacture cement. More than 11.7 million pounds of chromium and chromium compounds were used by Massachusetts manufacturing firms in 2000. 9.1 million pounds of chromium were used in metal products. Use of chromium (VI) is not reported separately from other chromium compounds.



Alternatives

Several alternatives for hexavalent chromium in electroplating are being competitively sold on the market or tested as replacements. These alternatives include trivalent chromium (which is less toxic than hexavalent chromium); nickel-iron-cobalt, zinc-nickel, and zinc-cobalt alloys; other high performance topcoats; electroless nickel; electroplated nickel; and nickel-tungsten plating.

Several large U.S. automakers, including Ford, GM and DaimlerChrysler, and companies in the plating industry, have taken steps to replace hexavalent chromium with less toxic compounds due to increasing disposal costs and potential harm to the health of workers and the environment.

A recent directive will prohibit most uses of hexavalent chromium in electronic equipment in the European Union by 2006.

References

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Additional Resources

Agency for Toxic Substances and Disease Registry (ATSDR): <http://www.atsdr.cdc.gov/toxpro2.html>

Automotive Finishing: <http://www.afonline.com>

International Agency for Research on Cancer (IARC): <http://www-cie.iarc.fr>

U.S. Department of Labor: <http://www.osha.gov>