SATRA SPOTLIGHT

Chromium VI in leathergoods and toys

Testing for the presence of chromium VI is essential to determine if leather products meet stringent European legislation.

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Chromium is a transition metal, and its sulphate salt is widely used to tan leather. Chromium is an element that can exist in a number of oxidation states ('valencies'). In tanning salts for commercial leather, it is present in the chromium III (trivalent) oxidation state. Chromium III is stable, and is not known to pose any significant hazard to human health or the environment.

On rare occasions, some leather may contain significant levels of chromium in the chromium VI (hexavalent) oxidation state. Chromium VI is more reactive than chromium III and is a known dermatological irritant. If present in leather, it is a health hazard. The World Health Organisation (WHO) and the United States Environmental Protection Agency (EPA) have deemed chromium VI to be a carcinogen when inhaled. It is also classed as mutagenic and toxic for reproduction.

Chromium VI can be present in small quantities as an impurity in tanning salts, or it can be formed when chromium III is oxidised to chromium VI. Certain circumstances – such as high temperatures, exposure to ultraviolet (UV) light, low humidity and strongly alkaline conditions – can encourage this oxidation from chromium III to chromium VI. As chromium-tanned leather is naturally acidic, this reduces the likelihood of

conversion to chromium VI in finished leather.

Legislation

Chromium VI is restricted as part of the European REACH Regulation (EC) No 1907/2006 Annex XVII entry number 47, and is restricted to less than 3mg/kg in leather articles that come into contact with the skin.

In Germany, the presence of chromium VI is forbidden under the 18th amendment to the Regulation of the German Ordinance on Commodities (BGVO). This came into effect in August 2010 and explicitly mentions clothing, furniture and bags.

The methods available for the detection of chromium VI are EN ISO 17075 parts 1 and 2. Part 1 uses ultraviolet/visible (UV/VIS) spectrophotometric detection technique, whereas part 2 uses high performance liquid chromatography with a diode array detector (HPLC-DAD). EN ISO 17075 part 2 is SATRA's recommended procedure, as dyed leather can interfere with the detection of chromium VI when testing is carried out to part 1.

Chromium VI and toys

The chemical requirements in the European Toy Directive 2009/48/EC enacted in July 2013 specified the maximum extractable amount of chromium VI from toy materials as 0.2 mg/kg in category III materials. This category includes the types of materials commonly present in toys – for example textiles, plastics and leather. However, the maximum extractable amount of chromium VI was reduced to 0.053 mg/kg on 18th November 2019. Analytical procedures using Liquid Chromatography with Inductively Coupled Plasma and Mass Spectrometry (LC-ICP-MS) are required in order to achieve this new, lower level of detection.

All chromium-tanned leather items where the leather has the potential to come into contact with the skin should be tested for the presence of chromium VI to show compliance with the appropriate legal requirements and SATRA's chemistry laboratory can help with this analysis.

How can we help?

15 PER CENT DISCOUNT ON FIRST SATRA TEST – please click here.

Please email chemistry@satra.com for further information on testing for the presence of chromium VI in leathergoods and toys.