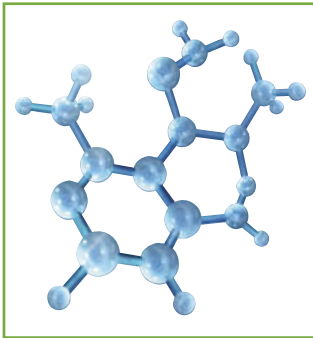


# To chrome or not to chrome?

The drive towards eco products is as topical as ever, with many suppliers of leather, retailers and brands keen to provide an eco-offering either directly or at least with some assurance of the green credentials of the product life cycle.

This article, supplied by BLC – Leather Technology Centre looks at the use of chromium in tanning as part of the product life cycle



The manufacture of leather does have an environmental impact, in as much as in the manufacturing process not all the inputs end up in the leather. Also when leather is disposed of the product becomes a waste material. What seems to have happened is that the gauge of a leather's 'eco-ness' is measured by the absence of certain restricted chemicals or the method of tannage rather than any consideration of the real environmental impact. This push is fuelled by legislation and risk assessment processes but also more recently by environmental pressure groups, eco labels, high street retailers and brands or those seeking to gain competitive advantage through product positioning.

Whilst by no means the only consideration in defining or measuring an eco-leather, the type of tannage does have an influence on the environmental

footprint. In a study commissioned by BLC, using a specialist company Ecobilan S.A.I, there was no significant difference between the overall environmental life cycle between chromium, vegetable and aldehyde tannages. This said, chromium is still very much in the spotlight in terms of its suitability as a green tannage.

The safety of chromium salts has become a fiercely debated subject and as a result there is much inaccurate information in circulation regarding the use of chromium salts and their associated safety for the tanning of leather. In addition there is pressure within the supply chain to investigate alternatives to chromium, based on the fact that the chrome salts used in tanning do have a propensity under very specific conditions to convert to hexavalent chromium.

Chromium remains a vitally important chemical in the global production of leather with at least 80% of global leather production being tanned with safe chromium III salts. It is a highly effective tanning agent producing leather with a flexible range of properties making it suitable for many end uses. Chromium is a transition metal that can exist in a number of different oxidation states, each with distinctive properties.

## Metallic chromium

This is a steel grey, hard metal found as chromite ore (it does not occur in the metallic state naturally). It is used to harden steel, to manufacture stainless steel, and to form alloys. It is also used in plating to produce a hard corrosion resistant surface.

## Trivalent chromium (Cr III)

Trivalent chromium compounds occur naturally in the environment and are also the most abundant form of chromium, highlighting that nature favours the formation of low toxicity salts. They are found in rocks, soil, plants and volcanic emissions. Chromium salts are present in foodstuffs and are a necessary nutrient for the human body as trivalent chromium is required for the normal metabolism of fats and sugars. Nutritional supplements are currently on sale containing chromium picolinate. Chromium (III) sulphate is considered safe to use in leather manufacture.

## Hexavalent chromium (Cr VI)

Hexavalent chromium is the hazardous form of this element. It can be formed when trivalent chromium is oxidised. This usually occurs in the presence of oxygen combined with other factors such as extremes in pH. The salts have a characteristic yellow colour and are classified as carcinogens. Chromium VI is not used in the tanning of leather.

Despite the overwhelming body of evidence to support the safety of trivalent chromium,

the potential for the conversion to the less stable chrome VI remains. Leather is a reductive matrix which naturally supports the more stable trivalent form. If manufactured in a responsible way using appropriate process control and using chemicals from reputable sources then the chance of chrome VI being detected is negligible.

There is a recognised test method for assessing the amount of chrome VI present in leather (EN ISO 17075). This method has a current detection limit of 3ppm and leathers should have no detectable chrome VI present within them. It is the view of BLC that this test method is a suitable test to determine risk to consumer health.

Aside from safety considerations, there has been much debate over the environmental credentials of chromium as a tanning material. Work carried out previously at BLC investigating the life cycle of three tanning materials, (chromium, aldehyde based tanning materials and vegetable tanning systems), determined that each of these materials has specific advantages and disadvantages in terms of their life cycle and were comparable in terms of environmental profile. In view of this, recent work has focused on the management of these tanning materials within the leather production process as a key measure of environmental performance.

Further information on this can be found at [www.leatherworkinggroup.com](http://www.leatherworkinggroup.com)

VB	23	24	25
<sup>3</sup> F <sub>2</sub>	<b>V</b> Vanadium 50.9415 [Ar]3d <sup>3</sup> 4s <sup>2</sup> 6.7462	<b>Cr</b> Chromium 51.9961 [Ar]3d <sup>5</sup> 4s 6.7665	Manga 54.9
<b>Ti</b> tanium 47.867 [Ar]3d <sup>2</sup> 4s <sup>2</sup> 8.281	41	42	43
	<sup>6</sup> D <sub>1/2</sub>	<b>Mo</b>	<sup>7</sup> S <sub>3</sub>

## CONTACTS

For further information on the safe use of chromium and appropriate testing protocols contact BLC Leather Technology Centre: [info@blcleathertech.com](mailto:info@blcleathertech.com) or +44 (0)1604 679 999

and synthetic sulphited fatty matter and has excellent physical properties and versatility.

**Seroil G** is an ideal fatliquor for upholstery or gloving leather.

**Seroil SPE** and **Seroil SF4** are paraffin and phosphoric ester based products offering high exhaustion and other high performance characteristics.

**Schill + Seilacher**

**Lipsol RND** is a liquid, pumpable fatliquor for all types of soft leathers, with a light and fluffy character and a soft mellow touch to the grain. Lipsol RND provides excellent penetration and a strong binding to the leather fibres and gives very good results when used in combination with Lipsol EA or Neopristol EWK.

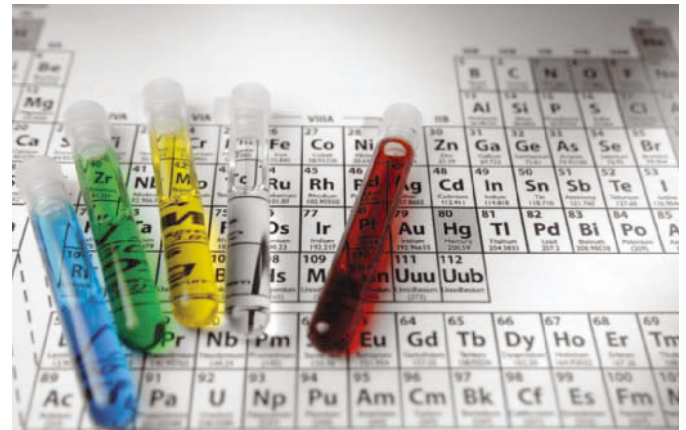
**Lipsol EA** is a very economical fatliquor with excellent chrome-stability. It can be used as a pre-fatliquor, alone or in combination with any anionic fatliquor-mixtures.

**Lipsol QR** is a polymer fatliquor for all types of leather, especially for the production of economic, tight-grain shoe-upper leather. Lipsol QR shows excellent results on all types of raw materials.

**Silvateam**

**Kurtalicker 805** is a new fully synthetic fatliquor concept meant to replace fish oil based fatliquors without imparting the negative characteristics of the latter to the leathers such as bad smell and high specific weight. Being totally synthetic Kurtalicker 805 gives high heat and lightfastness properties compared with average fish oil based products.

**Kurtalicker 902** is a special compound of natural and synthetic sulphited oils with excellent penetrating and softening characteristics. It can be used with any kind of chrome tanned, vegetable tanned or with mixed tannage process. It imparts excellent softness and a pleasant touch and is very competitively priced.



Courtesy of BLC Leather Technology Centre

**Kurtaminlicker 1155** is a product based on natural phosphated lipids and synthetic compounds which gives the leathers a very soft feel with low specific weight characteristics which are especially required on articles such soft nappa or garment.

**Sintoil 88** is a sulphated fatliquor which can be considered as a universal fatliquor as it can be used as the base product in the production of any kind of chrome or vegetable tanned leathers, imparting good softness without affecting colour shades.

**Keusol LA** is a combination of lanolin with synthetic oils with excellent softening and filling power which imparts a slightly greasy touch to the leathers.

Used in highly vegetable retanned leathers it enables good shine when polishing, improving the grain resistance, too. On suede articles Keusol LA improves the writing effect and the shininess of the colours.

The excellent performances are combined to very good price competitiveness.

**Prodotto 1585** is a sulphated fatliquor, based on a blend of natural and synthetic oils in combination with emulsified waxes and it has been especially developed to obtain a burnished effect on the final leather although this product is added during the wet-end process.

**Kurtalicker Q2** is a sulphited marine oil which imparts to the leather very good softness, and medium lightfastness. Due to its special oxidation and sulphitation system Kurtalicker Q2 does not give off an

unpleasant smell that sometimes occurs with similar oils.

**Kurtalicker 60** is an oxidised, sulphited vegetable oil which produces leathers with good softness and a low specific weight. These properties make it suitable for the production of garment and gloving leathers and it does not impart any unpleasant odour to the leather. Despite its good performance Kurtalicker 60 has a very good quality/price ratio.

**Kurtalicker 815** is a special compound of natural and synthetic sulphited oils and synthetic esters which have excellent penetrating and softening characteristics. It can be used in any kind of chrome tanned, vegetable tanned or mixed tannage leathers, where it imparts an excellent softness and pleasant touch. The very good performances are combined with a very good competitiveness.

**Smit & Zoon**

**Synthol SF 838** is a fatliquor that combines the strengths of sulphited and sulphated natural oils in just one product.

The fatliquor combines excellent softness, uniform tightness and a warm touch which are requirements for premium quality shoe upper and nappa. In the past you needed a balanced blend of several sulphited and sulphated natural products, but no more. Combining Synthol SF 838 with just synthetic fatliquors is enough to make leathers even better and processing easier. SF 838 is a general fatliquor that can be used for a wide range of leathers, although its main strength can be found when applied to shoe uppers and nappas.

*Continued on p15*



Automotive leather. Courtesy of Clariant

POST-TANNING