

Preservation of metal-free and glutaraldehyde-free tanning systems



The leather making process

Leather has been used for thousands of years, and the leather making process remains a complex and multi-step process. It consists of three main stages: tanning, retanning and finishing.

The first and probably most important stage of the leather making process is tanning, which involves the chemical transformation of raw animal hides into stable leather. Hides must be tanned to prevent them from decomposing, but also to provide them with the desired characteristics of leather, such as flexibility, durability and resistance to water and other elements.

An overview of standard tanning types

There are three main technologies used to make leather: vegetable tanning, chrome tanning and chrome-free tanning.

1. Vegetable tanning is the oldest tanning method and involves using natural extracts from plants, such as oak bark or chestnut, to tan the hides. This method is known for producing leather with a natural and rustic look but it is also more time-consuming and expensive than other methods.

2. Chrome tanning is the most common technology, accounting for around 90% of leather production. In this method, chromium Cr(III) is used as the tanning material, which results in a more uniform and flexible leather that is suitable for a wide range of products.

Chrome tanning is also faster and more cost-effective than vegetable tanning, making it the preferred method for mass production. However, chrome tanning could come under pressure due to limits on chrome (VI), which is a carcinogenic substance that can be released during the production process.

3. All other tanning technologies are summarised under the term chrome-free tanning. The most common technology uses glutaraldehyde as the tanning material. Recently, glutaraldehyde has come under pressure due to an upcoming SVHC classification in Europe. The SVHC (Substances of Very High Concern) is a list of hazardous substances that are subject to EU regulation.

New tanning technologies

In response to the above-mentioned new classifications on existing tanning agents, the chemical industry has already developed alternative chrome-free and glutaraldehyde-free tanning systems: organic tanning agents based on polycarbamoyl sulfonate or triazin compounds as well as aluminium-based or triose-based tanning systems have been developed.

Preservation of tanning systems

Regardless of the tanning method used, intermediate products must be protected from deterioration when stored or transported. For the main “old” tanning processes, such as chromium, vegetable and glutaraldehyde tanning, it is well-known which biocides are used in which quantities in order to achieve optimal protection. When using new alternative tanning technologies however, it is still a challenge to ensure the protection and quality of intermediate products.

Chrome-free leather tends to absorb water more readily than chrome-tanned wet-blue leather. Increased water absorption can create a favourable environment for microbial growth, making the leather more susceptible to microbial attacks. The presence of residual protein and organic materials in chrome-free tanned leather can provide nutrients for microbes, increasing the risk of bacterial or fungal colonisation. To counteract this, higher amounts of biocides are often required to inhibit microbial growth and prevent degradation.

Preventol® products for newer tanning processes

While Preventol® products are a leading solution for the main “old” tanning processes, various studies, field trials and applications in tanneries have shown that Preventol® products are also extremely effective in any of these “newer” tanning processes. Preventol® products provide a long-term protection, particularly due to the use of membrane-active biocides. These biocides fight mold and are not deactivated, but released unchanged, so they can repeat their action over and over again – a truly regenerative biocide ensuring long-term protection. Furthermore, they have the ability to penetrate the cross-section of a hide. Unlike electrophilic active substances that protect the surface, these active ingredients can penetrate deep into the hide. This way, they protect leather from microbial contamination and in a particular mold, no matter what tanning system is being used.

Conclusion

In conclusion, there are various tanning technologies used in the leather industry. Chrome tanning and glutaraldehyde tanning have come under pressure due to regulatory classifications in Europe. That is why alternative chrome-free and glutaraldehyde-free tanning systems as mentioned above have been developed.

Preventol® products are well-known for their long-term protection and are extremely effective in any of the standard systems as well as these newer tanning processes. |

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