



Zero formaldehyde resin retanning agents*

Chris Tysoe, Lanxess Deutschland GmbH



There is a clear definition for a genuine resin retanning agent. It is a product that selectively fills the loose and empty parts of hides and/or skins, so that there is a significant increase in cutting yield. In general, these products are based on dicyandiamide or melamine resin. However, loosely applied definitions are a problem within our industry, and there are many products which are called resin retanning agents that neither provide selective filling nor have this chemistry base.

There is also some confusion regarding low or formaldehyde-free resins. To date, all known resin products involve the use of formaldehyde somewhere in their manufacture. This means that they cannot be certified as 100% free. In addition, when new low formaldehyde containing melamine resins have been used, their selective filling properties have been seriously retarded.

Zero formaldehyde resins

For the vast majority of leather applications the traditional melamine based resins are perfectly suited. However, in certain fields, such as the automotive sector, a demand for especially low detectable limits has arisen that can only be provided by a new resin retanning agent where the resin is entirely free from formaldehyde in its manufacture. In this event, as there is no use of formaldehyde as a raw material in the resin, it can be firmly stated that the final resin fulfils the demand for zero formaldehyde, according to the accepted test methods⁽¹⁾. Furthermore, it has been shown that, despite the absence of formaldehyde in the manufacturing process, the properties of a genuine resin—that is to say, high selective filling—remain.

This selective filling is the single most important requirement, so that the

structural differences between the looser and tighter areas become more even across the whole hide or skin. And a relatively low astringency ensures that the grain is kept tight, smooth and fine pored.

These qualities not only ensure good buffing properties for plain corrected grain production, but are also important for full grain leather too. And with a uniform filling, if the leathers are to be embossed the print will be well maintained. Furthermore, as is typical with genuine resins, good grain elasticity is maintained. This is especially important when leathers are subjected to considerable stretch, especially in automotive leather production or the lasting of shoe uppers.

The mechanisms of resin retannage

As a function of an anionic charge, bonds are formed with the corresponding cationic charged protein groups and the chrome tanned fibre, of course. We know that resins have a special character that enables them to coat the leather fibrils, and when examined under an electron microscope this can be seen quite clearly. In effect, this coating makes the fibres thicker, and partly explains why the nap is so short and uniform when the leathers are corrected. Conversely, chrome tanned fibrils alone, without the resin, are 'clean' and the bands are clearly visible.

The molecular weight also plays an important role and, in the case of genuine resins, the molecular weight is very high. This leads to a physio-chemical predominance of the product in the loose and empty structured parts of the hide and/or skin, rather than the already adequately dense parts.

Flexibility of application is also a key requisite. The resistance to heat yellowing and light must be high so that it remains suitable for even non-pigmented (aniline) leather. For firmer waterproof leathers, this form of retannage is now well proven. 

(1) Test method for formaldehyde as described in: 'Formaldehyde-free leather'—a realistic objective? R.Meyndt, H-P Germann, Lederinstitut Gerberschule Reutlingen (LGR) Germany, World Leather, June/July 2005, p23-27

*Legend

Retingan ZF: Zero Formaldehyde retanning resin: Lanxess

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LAMEBO
LAMEBO SRL

10099 San Mauro Torinese (TO) Italy - P.O. Box 11
Tel. +39 0118223161-8221562 - Fax +39 0118223722
E-mail: lamebo@lamebo.it - HTTP://www.lamebo.it

