



Reducing natural leather wrinkles to maximise cutting yield

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Wrinkles are genetically programmed in any animal and appear as the breakdown of collagen occurs with age. The degradation is achieved by an immutable biochemistry that, over time, creates collagen-related aging compounds that are increasingly dry, weak and brittle. ATC Tannery Chemicals has developed a product for use in the beamhouse that it states can reduce natural animal wrinkles and help maximise cutting yields without having to perform heavy buffing and finishing processes. The company argues that this can improve uniformity from hide to hide or skin to skin.

The natural beauty of a piece of leather is what many customers and end users desire. Natural variability is seen as a positive feature in some leather products. However, in other leather products this natural variability is not wanted and the customer or manufacturer of the finished product would prefer that the leather article be more uniform in colour and appearance. This is especially so in the furniture and automotive industries, where the maximum cutting area is required; leather producers therefore strive to offer uniformity. Much of the “art” of leather retanning and finishing is concerned with trying to make a full batch of many hides or skins look uniform in appearance, colour, and grain pattern, so that during the cutting processes the amount of leather rejected for defects and inconsistencies is kept to a minimum. Damage to hides and skins from poor flaying, bacterial action and other natural defects can often be hidden during processing, but natural wrinkles from the animal itself are harder to hide.

ATC's Actidec Bio AW is a bio-reactive polymer that complexes aging compounds in the crosslinked collagen fibres within a hide or skin. After its use, released and uncrosslinked collagen regains its hydration characteristics by chemical fixation of ionised water within the structure, by physical fixation of free water within the fibre structure, and between groups of fibres themselves.

When used in a standard process, Actidec Bio AW allows collagen-wrinkled areas to regain their structural function within the hide or skin. This results in a significant improvement in the number and size of visible wrinkles, giving a more open and relaxed material with reduced wrinkle depth.

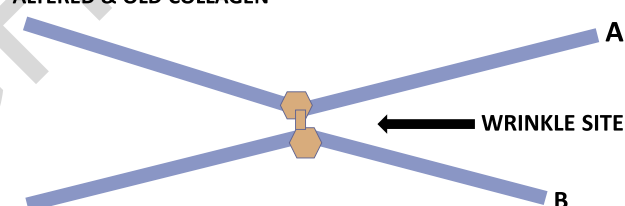
A valuable additional benefit of “flattening” the hides or skins is that the total area of the hide is increased. As leather is sold by area, any increase in yield is much sought after. ATC has demonstrated in industrial-scale trials that using its new product can show gains in yields of between 2% and 4%. Actual yield gains fluctuate according to the type of animal, its origin, age, original weight, thickness of the raw material and variations in the processing method utilised. In particular, certain mechanical processes, such as drying and toggling, have an important impact. However, when

Schematic chemical action. ALL CREDITS: ATC CHEMICALS

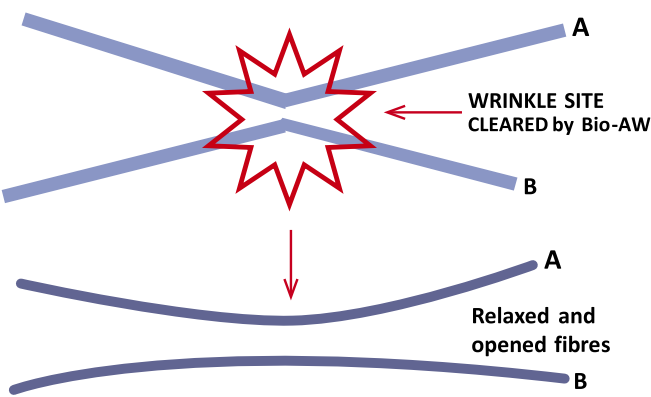
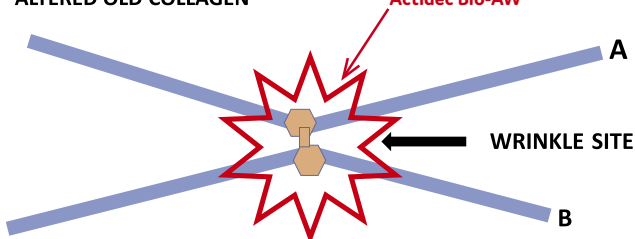
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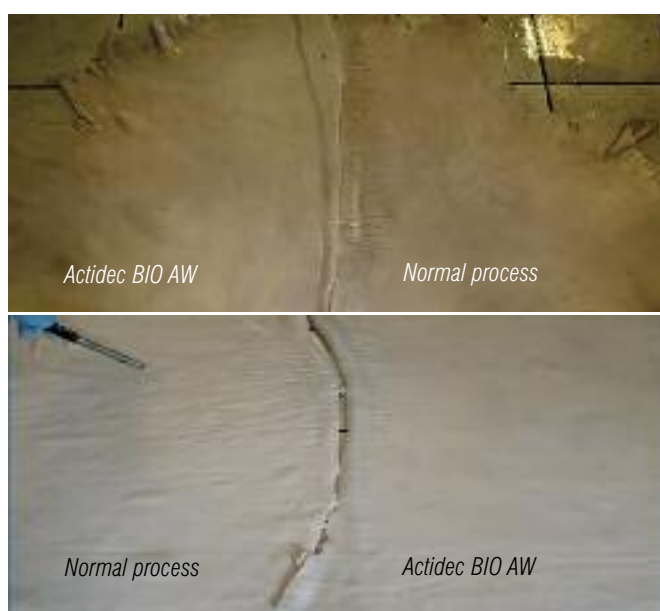


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comparing processes, including mechanical processes, the use of Actidec Bio AW in a formulation will show a significant area gain over an identical process without the product.

Application method

A further benefit of the product is its simplicity of use. A small addition of the product to a tannery's existing process is all that is required for optimal results. It is not necessary to change any other part of the process and therefore it avoids any potential knock-on effects or formulation compromises.

Actidec Bio AW is applied at the very beginning of the main deliming process at the application rate of between 0.5% to 2%, based on limed weight. The duration of the deliming process would normally be approximately 90 minutes, but by increasing the contact time of the product with the deliming hides, further improvement in wrinkle reduction and area yield can be seen. An optimum process time of 120 minutes has been found to give excellent, consistent results.

The other variable to consider is the application percentage and ATC's industrial trials have shown that quantities lower than 0.5% show no significant improvements in the wrinkles. However additional application quantities, greater than 2% can, in some cases, show more pronounced results, but the cost effectiveness of any addition must be considered. Most of ATC's customers have concluded from trials that an application rate of 1.2% to 1.5% is ideal for optimisation of results.

Although it is possible to use the new bio-reactive polymer at other stages in the tanning process, such as in the liming and tanning stages, it is thought that when used in the deliming process the Bio AW will give the best results for reduction in appearance of wrinkles, reduction in the depth of the wrinkles and maximisation of area yield increase. This is primarily because at this stage of leather processing the collagen is purer and the stabilisation process seen during deliming, pickling and tanning has not yet started to crosslink the collagen into position and permanently embed the wrinkles into the leather.

In addition to using Bio AW in conventional deliming

systems it has been demonstrated that it can be used in conjunction with special ecological processes such as using it within low nitrogen formulations; it must also be noted that the product is totally biodegradable and is non-toxic.

Industrial trials have shown that the product helps reduce natural wrinkles on all animals: bull, cow, goat, sheep and so on, and it has even been shown to improve wrinkles on very young animals, such as in calf leather production. In this particular process, the reaction of Bio AW does not occur at the level of the aging compounds that crosslink within the collagen, but at the level of the fibre structure compounds between the actual fibres and fibre bundles.

Other uses of ATC's Bio-reactive polymer are as a softening agent on some speciality products that are prone to hardness and lack of flexibility, such as crocodile and alligator leathers. Using similar quantities in the deliming process as used in more traditional leather production results in a marked improvement in the overall flexibility of the finished leather, reducing the problem of grain cracking which is particularly problematical with these heavy vegetable-tanned leathers.

Often in the leather industry small improvements are difficult to see and judging whether a new product has actually worked or not can be difficult. With ATC's product it is simple to demonstrate actual improvements. Just cut a hide or skin in half and process one half in a normal process and the other half with the addition of Bio AW. At the end of processing, put the two halves back together and the results will be obvious, as illustrated above.

Conclusion

When an improvement in the uniformity of leather is a major goal, and the substrate contains many wrinkles that have been genetically imprinted within the fibre structure of the animal itself, using Actidec Bio AW has been shown to reduce these wrinkles. A significant secondary effect of using this technology is that the surface area of the leather is increased.

It is a simple to use, non-hazardous, biodegradable product, which does not require any change to an existing formulation to get the benefits. ☺