



A NEW REVOLUTION IN TANNING?

In recent years, we have noticed a trend among some shoe manufacturers, who put their faith in veg-tanned leathers, to claim a green marketing tag for their product. That there are various methods of tanning is not disputed but to claim the moral high ground for veg-tanning is not necessarily accurate. Nor could it answer the demands of the global footwear market. Veg-tanning is too slow for the mass market, there are insufficient raw materials and the process produces as much of an environmental and waste treatment issue as tanning processes based on the conventional chemistry. Other producers would question why new tanning processes haven't been created for the 21st century. It seems that one chemical company may have come up with a totally new and appropriate process.

INTRODUCING EASYWHITE

The company that has launched a new method of tanning is Clariant, a major supplier of tanning chemicals and finishes to the world's tanners. It has also shown itself to be a major innovator over the years. Late last year it went public with its new process system called EasyWhite Tan that may well be the major breakthrough the industry has been praying for.

Based on Clariant's Granofin® Easy F-90, a self-reactive organic hybrid, it is a completely new white tanning system for producing leathers suitable for automotive, shoe upper and other traditional applications. It uses no chrome, phenols or aldehydes, and the pickle and basification/fixation stages

as used in conventional tannages are no longer required. The common salt normally used in the pickle stage has also been eliminated with significant implications in regard to clean technology and the wider environment.

Tanning has evolved over the centuries and, in recent times, a considerable number of attempts have been made to develop new tanning agents or improved processes based on existing tanning systems—chrome, vegetable and aldehyde-based. The main aims have been to reduce the overall environmental impact or an improvement of some or other specific characteristics in the final leather. All three tanning systems have their own characteristics, advantages and disadvantages. Chrome tanning can be used for a wide range of applications, while glutaraldehyde tanning has found its main application in the field of automotive leathers.

FOUNDATION OF A NEW TYPE OF LEATHER

The new tanning process produces a white leather with excellent light fastness. It also combines important advantages of the three traditional methods while avoiding their associated disadvantages.

The principal driver behind this new system was to reduce the environmental impact of leather production in a commercially viable tanning system, coupled with process evolution and simplification.

The first stage was to develop a tanning agent based on

substances that were not classified as toxic and dangerous to the environment. The focus was to develop one that was free of metal, phenol or aldehyde—such as formaldehyde or glutaraldehyde—but would also have good tanning properties.

A major process simplification was achieved by moving from the three normal stages of pickling, tanning and basification, to a single tanning one. The avoidance of an acidification stage also meant the elimination of common salt from the tanning process. This was of considerable environmental significance as the presence of salt in wastewaters is recognised as being a serious problem in many countries, where controls and restrictions on the salinity of tannery effluents already in place are likely to be increased. Furthermore, because of the pH profile of the tannage, the basification stage with its attendant chemical requirements and difficulties is no longer necessary.

The original development focused on the needs of the automotive industry with the aim of satisfying all its customers' physical and environmental requirements without compromising the typical characteristics which make leather a natural, unique and desirable product. The results, however, quickly showed that the potential was greater than just for use in automotive leather (*Figure 1*), so work commenced on shoe upper leathers. This, in turn, opened new horizons for metal-free shoe uppers, including white sport shoes and water repellent leathers (*Figure 2*).

THE PROCESS

Deliming does not need to be free of ammonium salts and both it and bating can be carried out conventionally. It must however be complete throughout the cross-section of the pelt, as any residual lime will affect the subsequent tanning process. Pelts are then washed at 30°C to 35°C prior to a short tanning float of between 10% and 30% based on the limed/split weight and dependent upon the thickness of the pelt and the mechanical action. Pickling is not necessary and, unlike any standard tanning system, no salt or acids are needed. The tanning product itself is added in one single dose and nothing further is required. Penetration takes between one to two hours with a complete running time of eight at which point the tanning agent is completely exhausted.

FIGURE 1 - COMPARISON OF DIFFERENT TANNING SYSTEMS

Article	Chrome Tanning	Glutaraldehyde Tanning	EasyWhite Tanning
Automotive	●	●	●
Upholstery	●	●	●
Vegetable Types	●	●	●
Sports Shoe	●	●	●
Garment	●	●	●
Waterproof Shoe Upper	●	●	●
Shoe Upper	●	●	●

● Excellent ● Recommended ● Not recommended

CREDIT: CLARIANT

COMPARISON WITH OTHER TANNING SYSTEMS

EasyWhite Tan offers significant advantages over existing systems which are of benefit both to the tanner and the environment:

- Three stages in the tanning process are eliminated
- One tanning agent replaces up to five
- Conventional dosing equipment can be used
- Less process control is required
- Tanning process is simplified and streamlined
- Between 25% and 30% faster
- 50% less water needed
- Up to 30% less weight of chemicals
- 80% less salt in the system.

LEATHER CHARACTERISTICS

In appearance, the grain is white and very flat with fine, closely spaced hair follicles. This flatness is partly due to the absence of pickling. There is also a noticeable absence of neck wrinkles or growth marks which will assist pairing yield for shoemakers on cut uppers. It is also quite different in one other respect from other organically tanned materials in that it is cationic in character. This cationic charge makes the leather fill out and behave in a way that is closer to chrome tanned leather than to other organic tannages and makes it suitable for a wide range of applications as shown in *Figure 1*. Its inherent flatness and tightness also means less retanning agents are required

FIGURE 2 - EASYWHITE TAN TEST RESULTS FOR SPORT SHOE UPPER LEATHER

TEST	METHOD	REQUIREMENT	RESULTS
Tear strength	DIN EN ISO 3377-1	>= 30 N	57 N
Stitch	DIN EN ISO 23910	>= 60 N	97 N
Elongation at break	DIN EN ISO 3376	40-70%	52%
Lastometer	IUP / 9	8	8.5
Formaldehyde	VDA 275 HPLC	<= 70 mg/kg	n.n
Formaldehyde	DIN EN ISO 17226-1 HPLC	<= 70 mg/kg	n.n
Thickness in mm	DIN EN ISO 2589	1.2 - 1.4mm	1.35mm

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“...as a matter of interest...”

INESCOP SEEKS OTHER ALTERNATIVES

As recently reported on *footwearbiz.com*, Inescop, Spain's technology institute for footwear and related industries has published details of the initial findings of its project to find alternatives to chrome as a tanning agent.

Spanish tanner Incusa and footwear brand Fluchos have worked with Inescop on a project to use titanium as an alternative to chrome in the tanning process and test the suitability of the leather produced in footwear applications. As a result, Incusa is expected to begin production of up to 1.2 million square feet of titanium tanned leather per year under the trade name of Sanotan. The leather will initially be used to make a range of shoes to demonstrate its suitability for general footwear

manufacture and both will be on display at industry events in the coming months. In a completely separate exercise, Inescop has also been working with tanneries and shoe manufacturers in Spain to test the viability of using oxazolidine to tan leather as a further alternative to chrome III with its potential to convert into toxic chrome VI. The institute has said that its tests have so far shown that both titanium and oxazolidine could be used produce finished leather of the right quality for commercial use but without any risk of toxicity. It has also said that, in its view, leather tanned using titanium was also more biodegradable than chrome-tanned leather and produced waste that was easier to manage, with less contaminants in wastewater and in sludge.

when compared with other organic systems.

The leather also exhibits a high light fastness and is suitable for the production of a wide range of colours that include pastel shades and, most especially, white. It is in fact very readily dyed and it is easy to achieve full penetration through the cross-section of the substrate. However, dye build-up is much stronger when compared to other organic tanning systems, which means 20% to 30% less anionic dyestuffs are needed for any shade at a given intensity.

The development of this new tanning system has taken a number of years of closely guarded work by Clariant's chemists and the system has been trialled in various tanneries around the world.

One of those selected was ECCO in the Netherlands. "I was intrigued when Clariant called me to say that they had created a brand new tanning process that essentially combined all the benefits of the various traditional methods without any of the negatives," says MrPanos Mytaros, the managing director of ECCO Leather BV.

"ECCO has always been recognised as an innovative company—we have our own extensive R&D facility based in Dongen, Netherlands—and EasyWhite Tan seemed to provide many of the solutions the tanning industry has been hoping for."

"ECCO Leather was very happy to see, finally, an innovation in tanning. Our worry in past years has been that the industry has been stuck in a traditional way of working and did not seek any innovation. Clariant proves that tanning can be different too.

"I remember my grandfather when they went from traditional chrome free tanning to chrome; a lot of scepticism and resistance but great results after. It is again time that the

leather industry broke away from the 'it is always like that' or 'can not' mind-set.

"Not only is water consumption reduced, but the time process is shorter and simpler compared to the traditional tanning materials. We are also impressed with the salt reduction in the wastewater; this is a major plus of the system."

TICKING ALL THE BOXES

Based on all the evidence so far, EasyWhite Tan would appear to be the answer to several problems which tanners and shoemakers have been under increasing pressure to resolve. Finding a practical alternative has therefore become increasingly imperative and EasyWhite Tan would certainly appear to be a timely and effective response.

Alternatives to existing processes often seem to be relatively obvious until the snags appear. Most have limitations in one way or another, whether from availability, cost, environmental aspects or questions of suitability for certain types of finished product. EasyWhite Tan would also appear to possess the versatility needed to become a general purpose tanning agent that could be used for virtually any conventional leather application.

As regards environmental and health concerns, it scores in both cases. It produces less wastewater and, at the same time, uses less water during the tanning process when the latter is likely to become an increasingly scarce global resource.

And, lastly, there is the question of cost. In addition to all these advantages, Clariant claims that EasyWhite Tan offers efficiency gains in terms of chemicals consumed and reduced throughput times without any need for extra capital investment. Are we about to witness a new and far reaching revolution in tanning? 