Packer brings K-leather to life and to sports

For the last few years the outcry from the world's tanning industry has been largely one of complaint about the deterioration of the raw material available. So it is unusual to see one material that has become a cause for support and promotion.

With the recent move by the State of Victoria to join Western Australia, New South Wales, Queensland, and South Australia the scene is set for strong promotion of the kangaroo as an advanced material for sports leathers. These Australian states have all agreed that to protect the environment selected species of kangaroo must be subject to a controlled and licensed cull, and that as a consequence they will support stronger moves to put kangaroo skins into the industrial chain as a raw material.

The sports industry has been aware of the value of kangaroo for some time, as it has featured strongly in footwear for soccer and for sprinting. Packer has played the lead in this arena for many years and as a medium sized tannery just outside Brisbane has punched very much beyond its weight on the world scene.

There have been two clear reasons for this success. The first lies in the dedicated market orientation which lies at the heart of all that happens in the Packer organisation, as opposed to the more common product orientation which characterises most of the rest of the leather industry.

The second reason lies in the raw material. With recent studies linking the fibre structure of the kangaroo to a variety of prehistoric fibre structures and even to that of mions (birds), science is beginning to give us reasons why kangaroo skins provide such strong leather. Is this a fibre structure that time forgot? One that has evolved from nature's need to survive in the harshest environments and against the toughest predators.



Firefighting. Military. Motorcycling. All areas where durability is a prime requirement.

Packer

Science

Scanning Electron Micrograph pictures show the highly organised main fibre bundle structures, which have a secondary fibre mesh in support of the bundles. It is this combined with the low angle of weave, low fat content and a surface-to-main

network ratio that provides the superior strength compared to cabretta, goat and bovine at similar thickness levels. These particular attributes are explained further below, and are the prime reasons for why it is the preferred choice for athletic leathers in lightweight designs:

The kangaroo fibre structure is aligned almost in parallel to the surface of the leather, and is formed from very long threadlike molecules of proteinous collagen twisted together. This is termed as having a low angle of weave (<30°), and differs significantly to bovine (cow) that typically has weave angles in excess of 60° or goat and cabretta leathers which range between 45–60°. The flat fibre structure can be analogous with a rope that has a network of fibres all running in the same direction and results in exceptional strength.

The environment in which the animal lives often determines the fat content of the skin structure. The diet of the kangaroo is generally quite poor combined with the extreme heat in which they live, thus resulting in virtually no fat within the fibre structure. In comparison a cabretta or goat leather has anywhere between 5-8%, and bovine is much more variable. Ultimately fat takes up space in the cross-section of the skin and when it is removed during tanning "voids" are left which can cause a reduction in strength per unit thickness.

Most animals have two distinct layers in the cross-section of the skin – the grain or surface and the corium which is the main fibrous network below the surface. The majority of the strength comes from the corium where the fibre bundles are much more dense. However, on certain animals, in particular bovine substrates, a large amount of the corium is shaved off to gain a lightweight thickness, resulting in dramatically reduced strength characteristics. However, kangaroo has a very thin grain layer and its thickness can easily be reduced without detriment to the strength of the final leather.

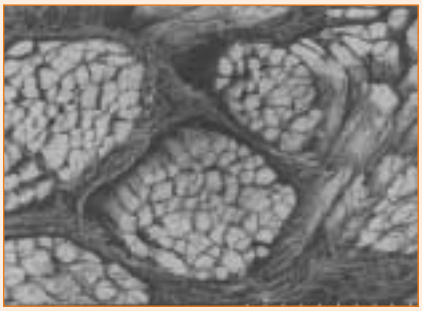
Confidence

With the attitude now being taken by the Australian authorities being much more uniform, the confidence in kangaroo as an environmentally correct and stable supply for the leather and leather using industries has been confirmed, and with this unusual set of properties we can see why tanners are keen to cast their spell on the material.

For Packer this has been a process of many years and has led them into exciting market areas, particularly those of world sports. The technology to which the kangaroo skin has been subjected is also more akin to space suits than traditional leather processing. This is an exciting area for a family business that has been involved in leather in Brisbane since 1891, although one that has an industry reputation for very high levels of investment in the most modern plant and machinery. This has not only allowed them to control costs via increasing efficiency but has permitted development and consistent production of these highly advanced technologies.







Electron micrographic scans show the highly organised structures of the main fibre bundles in kangaroo leather.

Packer

Menu

The menu on offer from Packer is just that: a complex mix of material adjustments that allow the purchaser to choose the elements that suit the end use requirements they have in mind. These include:

- Kool Leather using biomimicry to absorb the sun's infra red rays
- MicrobloK, to kill those unwanted bugs
- DurateK to extend durability
- Konstant to keep you at a steady temperature in all climes
- The K100 package for glove leathers that includes enhanced strength, water resistance, sweat resistance, breathability, colourfastness, grip improvement and fire retardance.

This is not the sort of catalogue that we expect to see from the somewhat staid and traditional tanning sector and involves advanced utilisation of techniques in nanotechnology and biomimicry. The clever aspect is that while most of the technologies are not new in themselves, having been present in the textile sector for some time, Packer has worked to find the most advanced format now available, and the ones most suited for the leather application.

Technologies

Grip enhancement uses polymers that we associate with grippy rubber rather than the leather industry, Kool Leather bio-mimics chlorophyll making black and other dark colours appear white to the infrared zone of light, and DurateK involves a polymeric nanotechnology to provide enhanced resistance to abrasion. The polymer particles cover the leather fibres without damaging the other properties of the leather.

Konstant is based on phase change materials, which has been introduced elsewhere in leather with limited success. Packer argues that it is only recommended where the wearer is repeatedly going through temperature transients or intermittently touching hot or cold objects. The phase change materials store heat energy when the person becomes warm and gives that energy back as they cool down. One of the difficulties found in leather has been getting enough of the phase change chemical into the leather for a meaningful outcome and to ensure this Packer offers a variety of application systems to place the material both accurately and adequately.

According to Graham Packer, Marketing Director, these new K leather technologies have allowed Packer to change its dialogue with its customers. The technologies are available on a "pick and mix" basis and so each user can consider the individual requirements needed for each activity.

K-100 Accelerate for example is particularly suited to motor racing as it offers not only fire retardance but also very high thermal stability to avoid excess shrinkage. On top of this its high level of insulation means a reduction in burns through direct heat contact.

DurateK is important in many military situations, where high levels of durability and abrasion resistance are required. But, according to Mr Packer, the Packer polymer approach works better than traditional strengthening techniques, as it does not harm other aspects of the leather, such as the requirement for ball control in soccer footwear.

On the aspect of grip, which is important in many areas such as golf and baseball gloving, Packer has turned to sticky rubber from rock climbing footwear and Formula One racing for compounds which can subtly enhance grip without breaking the rules of the sports or needing endless "topping up". Packer anticipates that this product will find additional applications well beyond gloving.

These new developments have been produced through the efforts of recently appointed technical director, Darryl Cassingham, who says that the company is now committed to an ongoing search for new concepts suitable for improving and enhancing the customer benefits obtained from its leather. With significant niches having been carved for K-leather over many years in soccer, track shoes, military and industrial uses, he foresees an exciting future the company.



A baseball batsman's glove from specialist glover Easton.

Easton