



## Tannery of the Year: Packer Leather, Narangba Queensland, Australia

*At one time, in the area around Brisbane, there were dozens of tanneries. Packer Leather, the only one still tanning, has survived through determination and its ability to move with the times, from sheepskin in its early days to its position now as one of the few tanneries in the world that can meet sports and outdoor footwear brands' demands for kangaroo leather.*

**K**angaroo leather is in demand for its tensile strength and lightweight properties, and there is a highly sustainable raw material supply, for reasons that will become clear. However, few tanneries around the world specialise in producing the material.

One that does is Packer Leather, a family-run tanning company based in Narangba, about 40 kilometres north of Australia's third-largest city, Brisbane. Its roots are in wool and sheepskin. Its original location, from its foundation in 1891, was at Chermide,

nearer the city but the company moved north to its current location in the 1970s when expansion of the metropolitan area brought residential communities a little too close for comfort. Joint-managing director, Lindsay Packer started in the family business in 1960 and trained first as a wool-classer. But the wool side of the business began to dwindle during that decade owing to a collapse in the price of the yarn. Even tougher challenges were just around the corner. By the end of the 1960s, his father had died and Lindsay Packer took up leadership of the business,



quickly making the decision to move to the new premises and focus on producing leather, with a first move into kangaroo leather as part of the new plan. He is still a hands-on member of the tanning team and, waving his fingers in the air, says: "This is how I think; I have to be doing something. You can't run a tannery from a chair; you have to be in the middle of it." So he shaves and trims hides most days.

### Tug-of-war

It was some time before operations of any kind could begin at Narangba as the site was subject to a planning tug-of-war between two competing local authorities, a dispute that went all the way to court. Another early set-back was a ban on exports of kangaroo leather in the mid-1970s. Mr Packer recalls vividly having to take a series of short-term steps such as carrying out contract work for tanners in Europe. "All I wanted was to keep the doors open," he says. By the end of the 1970s, he was more optimistic about Packer Leather's prospects and travelled to Europe for the first of many visits, to attend the old Paris-based leather fair in 1978, tagging on visits

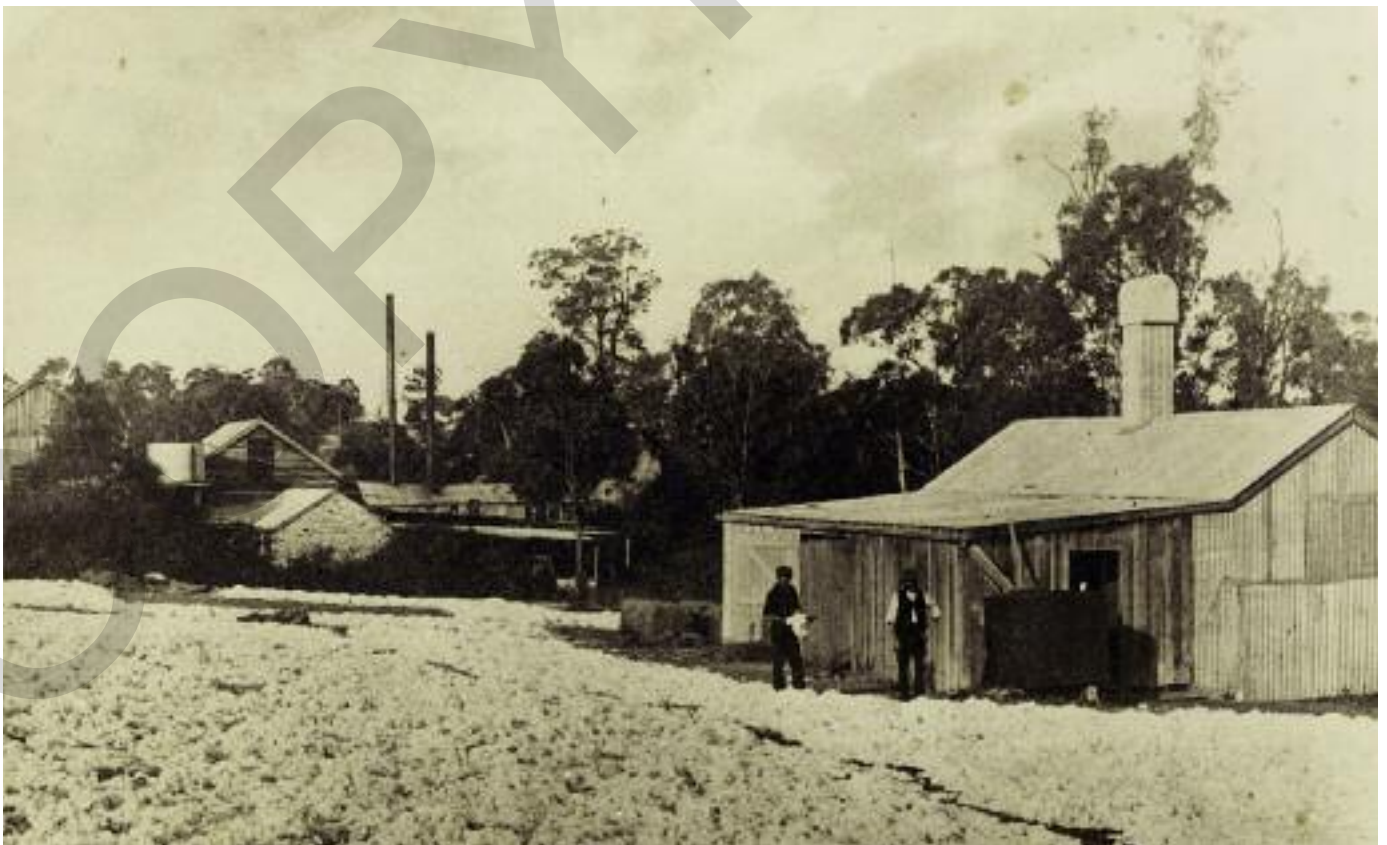
to a number of tanneries at the same time. "I was like a child in a toy-shop," he says of that trip and describes the experience of thinking, from a European perspective, about what was happening back home as "like looking back at Australia from the other end of a big tunnel and that being at the Australian end of the tunnel was like looking at everything uphill".

In Australia at that time, the shoe manufacturing industry was already beginning to go off shore, many tanneries were being run by accountants and their owners quickly lost the will to carry on, he recalls. "So I was able to hire some of their people and buy some of their equipment at a good price. I had begun to see the possibilities. You have to have a dream and believe that you can make it a reality. Then you have to be determined and work at it relentlessly. Also, you have to listen to and follow good advice when people offer it, but then you and only you can make the decision and own the outcome, whether good or bad." There were bigger tanneries than his in Brisbane at that time; he believes Packer Leather may have been about number seven then, just in the area

around Brisbane. "I think there were tanners here with huge possibilities," he says now, "but they gave up, sometimes at five-to-midnight, just as things were about to change for the better. Maybe we had the dreams, the vision, the faith to go in another direction."

### Remote location

There have been difficult times too: Mr Packer describes the impact on the business of the global financial crisis that began in 2008 as "hell", and then there is the ongoing challenge of being in such a remote location in relation to most of the rest of the leather industry. With no one to turn to easily for help, he says the company has had to become quite self-sufficient, developing a deep understanding, for example, of how tanning machinery works. This knowledge has been very valuable: there is tanning machinery on the site that Lindsay Packer installed himself. When the machinery manufacturer's technician made it to Brisbane, he only had to carry out a check that everything was in order. At the same time, he describes Packer Leather's technical director, Andrew Luke, as "world



*Beginnings of a family business. The tannery began as a sheepskin and fellmonger business in 1891. The drying of sheepskin wool is shown in the foreground of this image.*



### From a technical point of view

#### (1) Overview of operations

Packer Leather commenced operations as a fellmonger and sheepskin tannery in the 1890s, and relocated to the present site north of Brisbane in 1972. On site, 120 people are employed and produce an average of 20,000 square-metres of kangaroo leather per month.

This is approximately 70% of the production, the rest of the production mix being made up of 25% bovine and 5% sheep.

#### (2) Manufacture and processing

This is a complex operation due to the natural variation in kangaroo skins in terms of quality and shape, and of availability throughout the year. In addition, a variety of tannages are used to meet the different requirements of end-products.

Kangaroo are culled seasonally, the size and regions of the cull being closely managed by the Australian government under macropod (marsupial) management plans in each Australian state to ensure a good environmental outcome, with animal populations sustainable and the landscape protected.

In practice the cull is focused on meat supply for human consumption. This is performed by skilled professional harvesters who, after slaughter, gut the carcasses, then hold the carcasses in cold storage before delivery to two major units for flay and meat processing. As a by-product from a wide and varied collection network, the skins that result from the flay are irregular in shape. This irregularity is over and above the naturally long shanks of the animal, and the long neck, which alone provide an unusual shape that does not lend itself to easy machine operations within the tannery.

Because of variations in the quantity of skins available at any time, the only way to ensure a regular input for the tannery is to process to the acid or salt pickled state, then create a buffer stock from which skins are drawn at a uniform and manageable rate. Before storage, all of the pickled skins are sorted according to size, substance and quality, but also for potential according to the different opportunities offered by the five different tannages that are



Canbar processors are used for processing kangaroo skins. For clear forklift access for loading and unloading purposes, a rail-track has been installed to move the elevated service platform to add chemicals and monitor the four vessels.



Kangaroo skins are first processed to the acid/salt pickled state, then held sealed in cold storage. This creates a buffer that is needed to overcome the considerable variations in supply and ensure a uniform input of skins to the tannery.



Shaving is an especially skilled operation when processing kangaroo skins as there is an unusually high need to manipulate the skins and extend the shanks and necks to avoid shaving damage



Because of the long neck and shanks, a degree of tangling is inevitable in processing. Although there is emphasis on samming to best present the skins, wet stretching and staking - as shown - is also employed to extend these parts for presentation to shaving.



used. On storage, the skins are sealed in polythene and held in chilled storage at the tannery.

The normal sequence of onsite operation is a one day dirt or main soak and conventional unhairing and liming process in 2,000-skin loads in four Canbar processors, followed by fleshing, then acid salt pickle.

## Overview of wet processing

Skins are drawn as required from the pickle stock and tanned using five different tanning methods:

- High-exhaustion chrome tannage at conventional chrome content for footwear and upholstery leathers.
- High-exhaustion chrome tannage at low chrome content for gloving and garment leathers.
- A three-day alum tannage for cricket balls and various handicraft leathers.
- A 20-hour vegetable tannage for general handicraft, embossing, whip leathers, and decorative purposes.
- A two-day aldehyde tannage as a base for combination free-of-chrome leathers where vegetable tannage is not suitable.

Over and above these applications for kangaroo skins, bovine leathers are produced for labelling, some footwear, cricket balls and footballs, and some sportswear. All of these tannages are performed in four Dose stainless steel drums but, in addition, there are four wooden drums of 3.5 metres diameter, one metre in width fitted with shelves and pegs, which are mainly used for vegetable tannage.

The highest grades of wet blue and all of the other leather types are processed without delay. However, some of the wet blue leathers are held in the tanned condition, but this is limited to a maximum of one month and to lower quality leathers, for mainly pigmented finishes and light embossing.

Each of these different leather types have their own range of retannages to create an even greater range of properties in different colours and substances. The tensile and tear strength of kangaroo skins is extremely high, averaging a tear-load of approximately 8 kilos per millimetre. This means that they are highly suited to lightweight sportswear at substances as low as 0.3 millimetres. At the other end of the range, bovine leathers are produced at 3.5 millimetre thickness.

The majority of the dyeing is performed in a stainless steel Haigspiel processor and two stainless steel Unimatic dyeing machines, but the Dose drums can also be used for retannage and dyeing. The input loads for dyeing range from 200 to 2,000 skins, but after dyeing the larger loads are divided into pallet loads of 750 skins maximum for easier management. All of these vessels are served from two overhead mezzanines. All water additions are metered, and all feed containers and fittings are made from stainless steel. All solid additions are measured and added manually.

## Mechanical operations

The small size and contoured shape of each kangaroo skin, together with the long shanks and neck, can cause tangling problems in process vessels. This means in practice that within subsequent machine operations, there is a strong focus on opening heavily creased peripheral parts of each skin.



The two Unimat dyeing machines are heavily used as very close control can be maintained during the dyeing process. The Haigspiel processor is shown to the right.



Vacuum drying is used to extend and flatten the skins before completion of the drying process using a horizontal through-feed drying cabinet. This dries the leather to staking moisture content, followed by feed into first-time staking.



Top-coats are applied by spraying.



Each skin must be treated individually to address these variations, and on samming considerable attention is required to fully open the shanks, although some pleating is inevitable. As the skins are fed into the machine they are also assessed for quality by the operative, and then automatically measured for area and stacked according to grade.

Wet stretching-staking is then employed to extend each piece as far as possible after samming, but considerable manipulation is required on feed to the shaving operation to minimise damage. However, some damage is inevitable, and all skins need trimming in the wet blue, dyed and finished state.

After dyeing, the skins are set, and then vacuum dried. This is followed by low-temperature drying at controlled relative humidity using a horizontal through-feed tunnel drier to reach staking moisture content levels, then throughfeed vibration staking and automatic stacking. Wherever possible there are machine linkages and automatic stacking after all operations. However, the complexity of the production range, and variation in the size both of pieces and many of the batches, means that movement is often only practical using forklift trucks and pallets.

Finishing operations are based around Gemata roller-coating and spraying machines, with roller pressing and some light embossing. Tumbling drums are used to create special effects in conjunction with throughfeed vibration staking and toggling.

### (3) Solids management

- Trimmings as crust and finished leather are sold for small leathersgoods and recycling purposes.
- Sludge from effluent treatment after dewatering on a belt press is piled in rows, turned by tractor and composted on site.
- Lime fleshings are oxidised to remove sulfides before composting.
- All pickled trimmings are composted with the sludge.
- Shavings are small in volume, and are deposited in controlled landfill together with blue trimmings.
- All used containers are washed and either recycled in the tannery or sold.
- General waste is segregated and sold for recycling.

### (4) Water and environmental management

#### [a] WATER

Fresh water is provided by municipal supply and represents 50% of the tannery water use. Rainwater is collected from all of the tannery roofing and outside areas. This rainwater is held in three lagoons and is drawn upon throughout the year for processing. This rainwater, together with part of the treated effluent following polishing, provides the 50% balance when blended with water from the municipal supply and used in manufacture.

#### b) EFFLUENT TREATMENT

All of the sulfide-containing wastewaters are segregated and collected over the working day, then subjected to catalysed aeration overnight, before mixing with the rest of the effluent from the tannery.

All of the wastewaters from processing are first fed into a



*Applying finishing pigments to kangaroo skins.*



*Skins are often re-staked within finishing operations, and the throughfeed vibration staking machine shown is equipped for automatic staking of small skins flat onto pallets.*



*After final crust trimming, the skins are measured and graded, then automatically stacked according to grade before going to finishing.*



rotary screen to remove gross solids, then discharged into a pair of linked primary balancing sumps that are continuously aerated to avoid settling. The mixed effluent is then delivered to a pair of settling tanks operating in parallel. This primary feed is dosed with polyelectrolytes, but the exhausted floats from the variety of tannages used (including aluminium salts) is sufficient for chemical dosing not to be required.

On discharge from primary settling, biological treatment takes place in an oval pond of two days' holding capacity, with aeration provided by cavitation aerators mounted on floats. Discharge is by displacement into a second oval pond of similar size at a lower level, before feed to a second pair of settling tanks working in parallel. The overflow from this secondary settling is discharged for polishing, and this is carried out by retention in three long-established and mature lagoons. Part of this polished effluent is abstracted for recycling within the tannery, and the remainder discharged from site into a pipeline dedicated to industrial effluent from the area. This blend of effluent is then subjected to full effluent treatment by the municipality before discharge to surface waters.

The settled solids from secondary clarification are discharged into the primary balancing tanks, and are finally removed from the primary settling tanks blended with primary solids. These sludges are then subjected to sludge concentration, then dewatered using a belt press.

## [c] ENERGY

All of the heating energy used in manufacture is fuelled by natural gas. ☉



*After primary treatment and settling using two of the settling tanks shown, the effluent is subjected to biological treatment in two lagoons operating in series. Aeration is provided by cavitation aerators set on floating pontoons.*



*All of the rainwater falling on the tannery roof, parking and other hard areas is held in three reservoirs. This fresh water is blended with polished effluent, and mixed with water from the municipal supply for processing.*

class, easily among the best seven or eight people in the world at doing what he does". Nevertheless, he acknowledges the importance, even in the age of mobile phones and the internet, of face-to-face contact.

The suppliers he enjoys the best relationships with are "forward thinkers", he insists. And while he believes it's important for these suppliers to understand tanners' problems, he thinks they should go about solving those problems from their own (the suppliers') point of view. This may be an unusual way of looking at these relationships, but he insists there are occasions when tanners lack the necessary understanding of the engineering involved to know what is and is not possible. "I

suppose you need a blend of both," he says. "But it's the forward thinkers who are best at achieving that blend. They are the ones who are most open to new ideas; they lead in their fields, they are innovative and they have a passion for what they do."

He is convinced that the best way to build up trust is for supplier and tanner to work together as closely as possible. He wants a long-lasting association with his suppliers. Yes, he wants a good price for the chemicals and technology he buys, but what matters most is that it should work well, not least because Australia is too far to bring material that will not work. There are still some things he would like to see. "I think there is still too much handling," he says. "I would like to see what's possible

with robotics; this is something I haven't seen people try."

## Choice of materials

In spite of Packer Leather's roots in the sheep business, these skins now account for only 5% of output in 2014, with bovine taking up a 25% share. This leaves 70% of capacity to devote to kangaroo. The tannery processes 15,000 kangaroo skins per week, 300 or 400 sides of bovine leather and 450-500 sheepskins. All of the raw material is Australian. Queensland has a high kangaroo population because the habitat and climate suit them. Nationally, the animal's numbers are around 50 million. Rainfall levels have been relatively high throughout this decade and, with



*The Packer family: from the left Graham, Susan, Lindsay, and David.*



*Black kangaroo leather in upholstery for helicopter seating.*

good water supply, the kangaroo population levels has climbed to levels that, the authorities believe, require control to avoid threats to crops.

Lindsay Packer is aware of sensitivities around this, but says: "Scientifically, there has never been anything put in front of us to suggest one bit of downside in terms of conservation with regard to kangaroo. We make our decisions based on the scientific

data, not on politics. The biggest factor on population levels is the weather, but we know that if we build our industry based on long-term averages, we know we will still have a business 50 years down the road. It's a question of not letting greed take over. It means you could fall back to 50% and still survive if you had to." This matters a great deal to him because, while he and his brother Graham (sales and marketing

director of Packer Leather) represent the fourth generation of Packers to be involved in the business, his son, David, and his daughter Susan, working as joint managing director and customer service manager, respectively, are both part of the senior management team now too.

David Packer explains that four Australian states (Queensland, New South Wales, South Australia and Western Australia) are currently running macropod management programmes, which guarantee the long-term sustainability of this natural resource. Gamey, lean, healthy kangaroo meat is in demand for human consumption and the skins are, as with other types of meat, a by-product. He says relationships with skin suppliers are good and that a rather complicated supply chain involving harvesters, sometimes in very remote parts of this enormous country, placing carcasses in special cold storage boxes for meat companies to pick them up and process, works effectively. The company says it has "a very effective" supply chain for raw and pickled material. "It's a strong, long-term relationship," David Packer says. "It has to be: a partner like this has to have similar beliefs and ethics to ours."

Kangaroos can be large animals but they have a rather strange shape and, as wild animals, often subject themselves to damage from barbed wire or insect bites. As a result each skin yields only between four and eight square-feet of finished leather. "It's a niche market," Graham Packer says. "It's too expensive just to be a competitor to bovine leather, but it has advantages. It's lightweight and its tensile strength is very high; there's a natural cross-weave in the fibre. You cannot take bovine leather down to the same substance, around 0.3 or even 0.25 millimetres for some customers, and keep the strength there. It seems to me that a lot of footwear manufacturers still don't understand that."

### Understanding customers

Some customers do understand the benefits of kangaroo. Packer Leather's primary customers are multinational athletic footwear brands for products such as football, rugby and baseball boots. Other applications include technical gloving, other types of footwear and (although for



bovine rather than kangaroo leather) sports balls (mostly cricket and the astounding version of football called Australian Rules). High-performance footwear accounts for 53% of total output at the moment, sales and marketing manager, Mark Hourigan, explains. Sports balls and gloving are in equal-second place with a 14% share of the total. Recreational and outdoor footwear, including several brands of western-style boots, consume 5.4% of Packer Leather output at the moment, and dress footwear 5.1%. Vegetable-tanned leathers and a few other specialist products account for the rest. The company runs an interesting Facebook page celebrating some of these specialisms: they reflect a current trend towards the artisan, the small-scale handicraft production of bracelets, bags, home decorations and so on. Social media is helping to spread the word and many of these new-generation artisans are frequent visitors to the tannery's onsite shop to pick up material. "These people also talk to each other," Mr Hourigan says, "and word about the attributes of kangaroo leather has spread that way, too, among these accessory makers, as well as among bookbinders, falconry enthusiasts and even people who mend organs (they use leather in the bellows). It also helps that we have a low minimum order, 200 square-metres in a single colour."

It's the highly technical kangaroo leather that attracts most attention for Packer Leather in export markets, but, Graham Packer points out, the athletic footwear sector has suffered owing to the readiness of many big-name brands to switch to synthetic uppers, even for the boots their elite sports stars wear. "Our turnover from this segment has come down by as much as 40% in the last two or three years," he says. "It used to account for something like 90% of the market for our leather, but not any more. That said, there has been an upswing just recently and there are brands that are talking about doubling their use of kangaroo leather." He relates the reaction of one brand to seeing how uncomfortable a tennis shoe appeared to be on one of its high-profile sponsored athletes. With super-slow-motion camera shots at top tournaments to check for foot-faults, the brand was able to see and study how unyielding a synthetic upper was against a tennis athlete's moving foot. And after

carrying out research, it is increasingly opting for kangaroo leather uppers instead.

## Lessons from wool

This strengthens Graham Packer's conviction that there is a keen need for the leather industry as a whole to promote leather as a material. "The world has tried to make leather a commodity, but it's not a commodity," Mr Packer says. "But its value as a raw material needs to be made clearer. There is an absolute dearth of consumer education on this and there is a real need for it. Plastics manufacturers are attacking leather more than at any other time in my lifetime and if everyone in the leather industry keeps running around in circles doing their own thing, we'll never get anywhere. And that is happening in the leather industry because we lack leadership. There is a real contrast with the wool industry, which has the Woolmark." This is a reference to the famous skein of wool brand mark that is now owned by Australian Wool Innovation, which licenses clothing companies to pay an annual fee to put the logo on their products as an independent quality endorsement, an assurance that the product conforms to a specific set of standards.

The Packer company spreads its

community support quite widely, ranging from donating boots and balls to local sports clubs to being a founding sponsor of a medieval festival. "The emphasis is very much on the word 'local'," says Mark Hourigan. There is also a programme through which it helps to fund pastoral support for high-school students, as well as a less formal form of support called Red Frogs. Red Frogs are support volunteers who provide hands-on help during Schoolies Week, when high-spirited high-school graduates in Australia celebrate the end of their exams by taking a week-long holiday with their friends.

In 2012, the teenage daughter of one employee needed a kidney transplant and tests showed her father, the tannery employee, was compatible. The company's entire workforce took up the cause, not only encouraging their co-worker in the build-up to the operation, but raising money to help him support his family through such a difficult time. They raised thousands of dollars from staff, which the company quadrupled. Both family members are doing well. Everyone remembers the rush to help with pride and fondness. David Packer says it shows that there is more to being part of what Packer Leather is trying to do than just turning up for work. 🌐



## Control and Accreditations

### LABORATORY SERVICES

The laboratory is well equipped for the physical testing of leather. The emphasis is on the tear-strength because of the high quantity of very thin leathers, being typically as low as 0.3 mm in thickness. The many different test methods practised reflect the unusual properties and end-uses of these niche leathers, and to meet customer requirements.