



# Science and Technology in the Leather Industry

Contributions towards  
sustainable development  
by European tanners



Produced by COTANCE  
Supported by the European Commission under the improving Human Potential Programme





## What Is The Tanning Industry?

Tanning hides and skins is one of mankind's oldest trades.

It began when primitive man realised there was more value to an animal than food. Our prehistoric predecessors used the hides and skins of large mammals for clothing that protected them from adverse weather conditions.

However, left untreated, the hide or skin of an animal quickly begins to rot, putrefy and smell. Our ancestors found ways to stop this natural process so their clothing didn't become unwearable, if not unbearable.

Just think how those early discoveries happened. After a hide lay out in the sun for a few days, it became stiff and hard, but the offensive smell disappeared.

An important prehistoric advancement was smoke tanning. Hides and skins were used as building material for tents and huts. The smoke from the fireplace preserved (tanned) the hides and increased their resistance to the elements. This method was used extensively by Native Americans for their teepees and wigwams, and remains popular today in some parts of China.

Another successful invention was vegetable tanning. It probably started when hides were placed in a pool of water surrounded by trees.





Pieces of wood, bark and leaves floating in the pond contained natural «agents» or chemicals, that tanned the hide. This type of treatment dominated the leather industry until the 19th century when the chrome tanning process for leather emerged.

During the Middle Ages, tanneries became well-organised. They gathered in special areas where raw materials (hides and skins, access to water) were present in large quantities. Many tanneries have been located in the same areas in Europe for more than 500 years.

There weren't many changes in leather manufacturing from the Middle Ages through the end of the 17th century. But advancements in chemistry in the 19th century were vital to the development of the industry, especially chrome tanning, which utilises salts of chromium to cure the animal hides or skins, as well as the use of enzymes and many other discoveries.



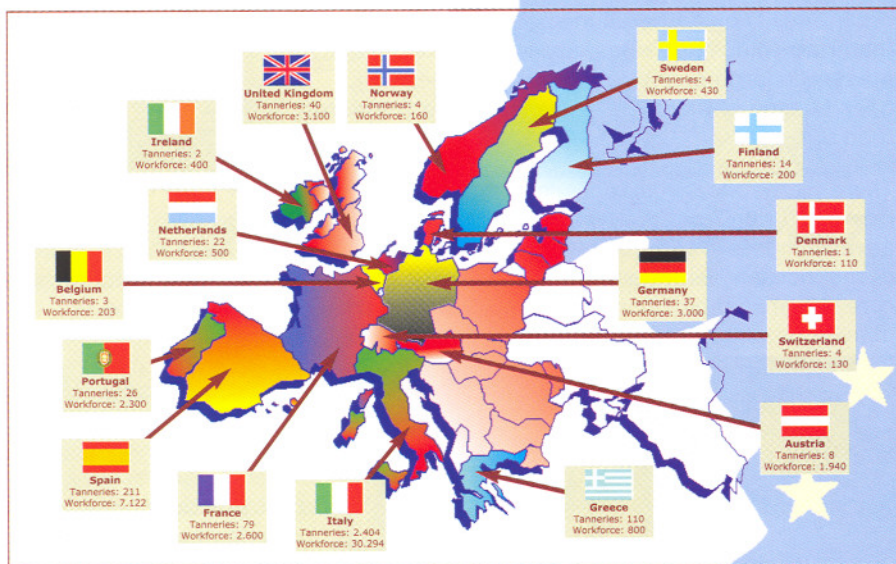
At first, the science of leather tanning was accidental. Yesterday, tanning harnessed the best practices of an agrarian craft and transformed it into a modern industry. Today, research and development is a systematic process that maximises the benefits of animal hides and skins as an important natural resource while minimising stress on the environment.

Tomorrow, the European leather industry will continue to develop innovative clean technologies that bring sustainable solutions to complex ecological, safety, aesthetic and performance challenges.



# The European Leather Industry

The leather industry in the European Union (EU) consists of approximately 3,000 tanneries that directly employ some 50,000 people. It embraces primarily small and medium-sized tanneries.



The tanning sector in Europe is present in all European countries except Luxembourg, although the majority is concentrated in Southern European countries. Certain regions and municipalities within the EU member states retain characteristic concentrations of tanneries, whose socio-economic life heavily depends on this sector's activity.

Europe is an important player in the international leather trade, providing 25 percent of the world's leather production and one of the largest and most dynamic consumer markets for leather articles.

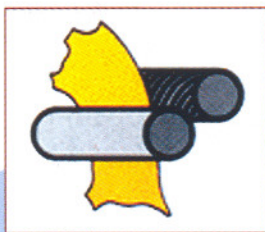
With revenues of nearly 10 billion Euros, the tanners in the EU are very competitive in the global leather market. European tanneries have a long tradition of producing different kinds of leather, from bovine and calf leather to sheep and goat leather, from sole and exotic specialties to double-face garment leather.

Centuries of experience and the outstanding know-how of European tanners and dressers create continuously strong demand for their products.



### Soaking

The skin is soaked to eliminate dirt and to rehydrate it.



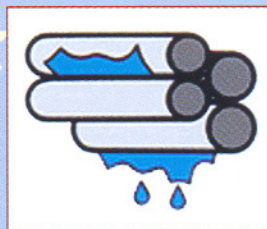
### Unhairing - Fleshing

The hair is removed chemically and flesh and fats are separated from the hide mechanically.



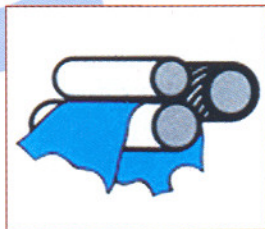
### Tanning

The hide is tanned and becomes leather.



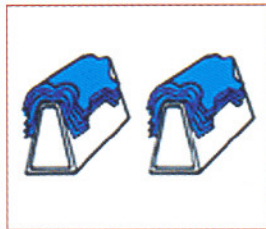
### Samming - Splitting

After the water has been squeezed out, the leather is split to achieve an even, pre-specified thickness.



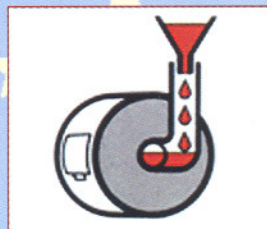
### Shaving

Irregularities are removed from the reverse side.



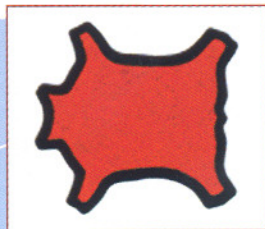
### Sorting

The leather is graded into various levels of quality.



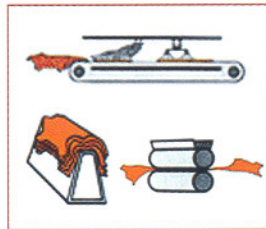
### Dyeing - Fatliquoring

First, the leather is neutralized, then it is coloured with dyes. The fatliquoring procedure produces the correct level of softness.



### Drying

Leather is either dried with a vacuum process, or a hanging process in which leather is passed through ovens.



### Finishing

The leather is given a final surface treatment to protect and perfect it. Quality controls take place after each phase.





# Environmental Advancements In The Leather Industry

## CLEANER WATER, BETTER ENVIRONMENT

Leather is usually tanned with chromium, or «chrome»: the chemical element used to coat other metals with a shiny finish that does not tarnish. Tanning hides with chromium salts produces soft,

supple leather that can be dyed in a wide range of colours.

By reducing the quantity of these salts to the precise amount required to maintain the quality consumers expect in a leather product, the discharge of chromium into the water used to process hides has been reduced by more than 90 percent.

## AN ENERGETIC ALTERNATIVE TO WASTE BYPRODUCTS

Only 20 percent of the mass of an animal's hide is converted into leather.

Today, the excess fat and tissue left over from the tanning process is converted in «biogas» plants that utilise a fermentation process to change these effluents into an alternative source of fuel.

Technologies have also been developed to convert untanned hide and skin trimmings into organic byproducts like gelatine, glue and other protein products.



## WATER WORTH WAITING FOR

Large amounts of water were once a significant part of many leather tanning processes. However, since water has become a scarce resource in some parts of Europe, the leather industry has done its part to re-engineer its once-wasteful ways.



For the past few decades, science has helped the leather industry reduce its water consumption by more than 60 percent. This has been achieved by the development of new cleaning techniques, the use of batch processes instead of rinsing, and better water management.



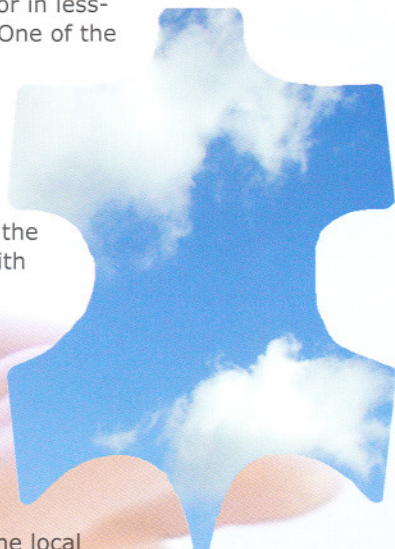
## AIR THAT CARES

Unfortunately, leather processing can be a factor in less-than-desirable air quality near local tanneries. One of the problems for the industry has been the use of organic solvents in the finishing stage of the manufacturing operations.

Science has helped lower the emission of organic solvents to the air by 90 percent for most leather types. This has been achieved by the introduction of improved systems, combined with new environmentally friendly finishes.


## HAIR TODAY, ORGANIC FERTILISER TOMORROW

In leather manufacturing, one of the first steps is the removal of hair from the hides using a unhairing agent such as sulfide. This organic waste accumulates in the wastewater sent to the local purification plant.



Science has developed a new process that reduces the residue from unhairing by 50 percent. Instead of dissolving the hairs from the hides, they are kept intact so they can be used as fertiliser by farmers, thereby reducing the use of synthetic alternatives for helping crops grow.





# Scientific Advancements Add New Qualities To Leather

Leather is a natural material with unique properties that make it the preferred choice for crafting thousands of products in addition to traditional applications in upholstery, shoes, garments and luggage.

The main difference between leather and synthetic materials is that leather can "breathe" and shape itself over time to the wearer. High-quality leather also offers the ability to absorb moisture without feeling wet.

For example, the human foot produces between three and five centilitres of sweat every day. Forty percent of the sweat will disappear, while the remaining moisture should be absorbed by the shoe so the foot doesn't feel wet. Leather is the best material for this purpose.

Leather also resists a nearly infinite amount of bending and delivers excellent elasticity. This is an important comfort factor for the top part, or «upper» of a shoe since the foot swells during the day.

The quality of finished leather depends on a combination of the original properties in the natural hide or skin, and the chemical and physical components added during the manufacturing process. New technologies are being invented every year that make leather more versatile, more colourful and more appealing as an alternative to woven fabrics and plastic.

## HOT STUFF

Special chemical treatments can enhance the fireproof qualities of leather to supplement its natural heat resistance properties.

This increases the safety of using leather in applications where fire resistance is important like movie theatres, commercial buildings, cars, aeroplanes and upholstery.

Fireproof leather can even be used for common products like potholders that adhere to any surface for a better grip.







## A RAINBOW OF CHOICES

Purple leather? Advancements in finishing processes make it possible to produce leather in any colour you can imagine in addition to traditional shades of brown and black.

Many internationally recognised designers are choosing leather to replace synthetic and dyed fabrics in stunning new designs. From futuristic chic to natural glamour, leather is fast becoming the first choice for

apparel that's soft, stunning and sexy. Even protective clothing made from leather has become stylish, with a fit and finish that's as appropriate on a Parisian fashion runway as an airport runway.

Designers are also using leather for their latest products, working closely with tanneries to develop leather with unique new properties like water resistance, not to mention a rainbow of colours, textures and finishes that look and feel right in any room.

## A NEW KICK

When it comes to sports equipment, nothing can match the strength, abrasion resistance, durability and flexibility of leather for football boots, equestrian harnesses, sport gloves, baseball mitts and the safety equipment worn by athletes everywhere from the jogging track to the ski slopes.

It's no accident that motorcycle enthusiasts rely on leather for their outerwear...it's the ultimate in protection from the elements, not to mention the asphalt.

## JUST LIKE MOM

When babies are born, the infants are often laid on a blanket made of...leather!



The soft, warm qualities of leather are far superior to other materials for the critical moment when the child is first separated from its mother.

This particular kind of leather must be «baby-proofed» through careful selection and processing to make it soft, safe and comfortable.







# The Future Of The Leather Industry

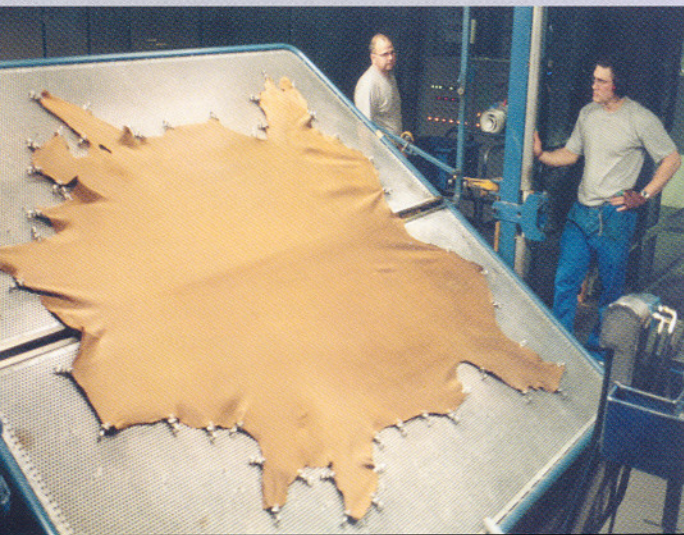
To prosper in the future, European tanneries must remain at the forefront of technological development. It is imperative that they establish co-operation within the EU and continue to participate in future R&D activities.

The European leather industry and scientists working for the industry are committed to reducing the environmental impact from the tanning process, and also to improve the quality of the product.

This brochure provides some examples of the benefits of science on this ancient craft. There are many more tanning technologies that have been substantially improved in

recent years; the leather research institutes in all European countries can provide more information about these breakthroughs.

Over the course of the last two decades, the European leather industry has developed innovative clean technologies bringing sustainable solutions to complex problems, in accordance with the guidelines established by the Rio Conference in 1992. European tanners will move ahead with sustainable development efforts after the UN World Summit for Sustainable Development held in 2002.



The combination of science and the leather industry will continue to improve the environmental performance of the industry, and thereby improve the quality of life for European citizens.





## WET AND WILD

Today, most leather clothing has to be dry-cleaned by professionals. In the future, scientific advancements will allow you to wash some kinds of leather in an ordinary washing machine.

Some kinds of leather are so water-friendly, you can even relax in leather swimwear at the beach.

## TO INFINITY AND BEYOND

Leather has played an important role in man's conquest of space. Its superior breathability, flexibility and corrosion resistance makes it ideal for gloves, boots, helmets and other mission-critical spacesuit applications.

Other surprising new uses for leather are being invented every day, thus assuring that nature's finest fabric will continue its remarkable history well into the future.



## TANNET - A NETWORK FOR SCIENCE IN LEATHER

In April 1998, the European leather industry formed a network, TANNET, that links tanners with their representatives, suppliers and customers, as well as academics and public authorities, to coordinate research in the leather industry.



As of February 2002, the network was comprised of more than 280 members who have identified research priorities for the leather industry and submitted more than 20 research proposals to the European R&D Programmes.

For further information contact:  
[info@euroleather.com](mailto:info@euroleather.com)  
[rovesta@rovesta.dk](mailto:rovesta@rovesta.dk)





For more information, contact COTANCE or the following Associations and Institutes:

## EUROPE

### COTANCE

Rue Belliard 3  
B-1040 Bruxelles  
Tel: +32 2 5127703  
Fax: +32 2 5129157  
info@euroleather.com

## BELGIUM

### UNITAN - Union de la Tannerie et de la Mégisserie Belge

c/o Masure Dhalluin  
rue des Tanneurs 140  
B-7730 Estaimbourg  
Tel: +32 69 362326  
Fax: +32 69 362310  
albert.cappelle@asure.be

## DENMARK

### Rovesta Environment

Betonvej 12  
DK-4000 Roskilde  
Tel: +45 46 773780  
Fax: +45 46 773795  
rovesta@rovesta.dk

## FINLAND

### FLIA - Finnish Leather Industry Association

Kenkä-Ja Nahkateollisuus ry  
Eteläranta 10 VII / PO Box 11  
SF-00131 Helsinki  
Tel: +358 9 17284250  
Fax: +358 9 179588  
sari.vannala@ryhma.ttiitot.fi

## FRANCE:

### FFTM - Fédération Française de la Tannerie-Mégisserie

rue de Provence 122  
F-75008 Paris  
Tel: +33 1 45229645  
Fax: +33 1 42933744  
fftm@wanadoo.fr

### CTC

4 rue Hermann Frenkel  
F-69367 Lyon Cedex 07  
Tel: +33 4 72761010  
Fax: +33 4 72761000  
ctc@lyon.ctc.fr

## GREECE

### HTA - Hellenic Tanners Association

c/o Hellenic Tanneries, S.A.  
Patras Industrial Zone  
EL-25018 Patras-Greece  
Tel: +30 610 647305  
Fax: +30 610 647306  
**ELKEDE**  
Moraitini Str.  
EL-14452 Athens  
Tel: +30 10 2855580  
Fax: +30 10 2846471  
elkede@elkede.gr

## GERMANY

### VDL - Verband der Deutschen Lederindustrie

Fuchstanzstrasse 61  
D-60489 Frankfurt/M  
Tel: +49 69 97843141  
Fax: +49 69 78800009  
Lederverband@t-online.de  
**LGR**  
Postfach 2944  
D-72719 Reutlingen  
Tel: +49 7121 16230  
Fax: +49 7121 162311  
lgr@lgr-reutlingen.de  
www.lgr-reutlingen.de

## ITALY

### UNIC - Unione Nazionale Industria Conciaria

Via Brisa 3  
I-20123 Milan  
Tel: +39 02 8807711  
Fax: +39 02 72000072  
info@unic.it  
**SSIP**  
Via Poggioreale 39  
I-80143 Naples  
Tel: +39 081 5979100  
Fax: +39 081 265574  
ssip@iol.it

## NETHERLANDS

### FNL - Federatie van Nederlandse Lederfabrikanten

Postbus 90154  
NL-5000 LG Tilburg  
Tel: +31 13 5944778  
Fax: +31 13 5944749  
FNL@WISPA.nl

## PORTUGAL

### APIC - Associacao Portuguesa dos Industriais de Curtumes

Av. Fernao de Magalhaes 460/5  
P-4300 Porto  
Tel: +351-225.37.41.15  
Fax: +351-225.37.20.65  
**CTIC**

S. Pedro Apartado 158  
P-2380 Alcanena  
Tel: +351 249 881577  
Fax: +351 249 881390  
email@ctic.pt

## SPAIN

### CEC - Consejo Español de Curtidores

Valencia 359/3  
E-08009 Barcelona  
Tel: +34 93 4593396  
Fax: +34 93 4585061  
inform@leather-spain.com  
**AIICA**  
Avda. Pla de la Massa s/n  
E-87000 Igualada  
Tel: +34 93 8055388  
Fax: +34 93 8050618  
info@aiica.com  
www.aiica.com

## SWEDEN

### SG - Svenska

Garveriidkareforeningen  
c/o C. Lennartsson  
Elmo Leather AB  
SE-51281 Svenljunga  
Tel: +46 325 661400  
Fax: +46 325 611477  
Christina.lennartsson@elmoleather.com

## UNITED KINGDOM

### BLC - Leather Technology Centre

Leather Trade House  
King's Park Road  
Moulton Park  
Northampton GB-NN3 6JD  
Tel: +44 1604 679999  
Fax: +44 1604 679998  
info@blcleathertech.com  
www.blcleathertech.com

## NORWAY

### NGL - Norske Garveriers Landsforeningen

c/o Borge Garveri as  
N-5250 Lonevåg  
Tel: +47-56-19.36.00  
Fax: +47-56-19.36.01  
mail@borge-garveri.no

## SWITZERLAND

### VSG - Verband

Schweizerischer Gerbereien  
c/o Eduard Gallusser AG  
Auerstrasse 11  
CH-9442 Berneck  
Tel: +41-71-744.17.22  
Fax: +41-71-744.65.59  
gallusser@leder.ch

## HUNGARY

### BCE - Association for Leather and Shoe Industry

Gisella u. 24-26  
H - 1143 Budapest, XIV  
Tel: +36-1-221.9327  
Fax: +36-1-251.5887  
bce@mail.mata.hu

## SLOVENIA

### GZS - Chamber of Commerce and Industry of Slovenia

Textiles, clothing and leather processing Association  
Dimiceva 13  
SI - 1504 Ljubljana  
Tel: +386-15 898 297  
Fax: +386-15 898 100  
Joze.Smole@gzs.si

### Photographs:

With thanks to: Sylvia A. Matheson, David Gonzalo Maeso, Museo de l'Art de la Pell, Curtumes Carvalhos, CTIC, LGR, AIICA, The Celtic Sheepskin Company, UNIC, DTI.