Lamberti
leather for tanneries

Lamberti 1K Technology

Crosslinker-free, water-based leather finishing technology

Value proposition

"An innovative finishing system does away with the need for chemical crosslinkers.
The use, in this system, of original synthetic polymers, suitably combined in the different finishing layers, provides articles with high ***chemical-physical performances without*** *the disadvantage of the* ***toxicity of chemical crosslinkers****, and without the common* ***problems of rheology variation*** *that their use entails."*

State of the art

Water-based leather finishing systems involve the use of chemical crosslinkers (polyaziridines, polyisocyanates, and polycarbodiimides).

The crosslinkers are used:

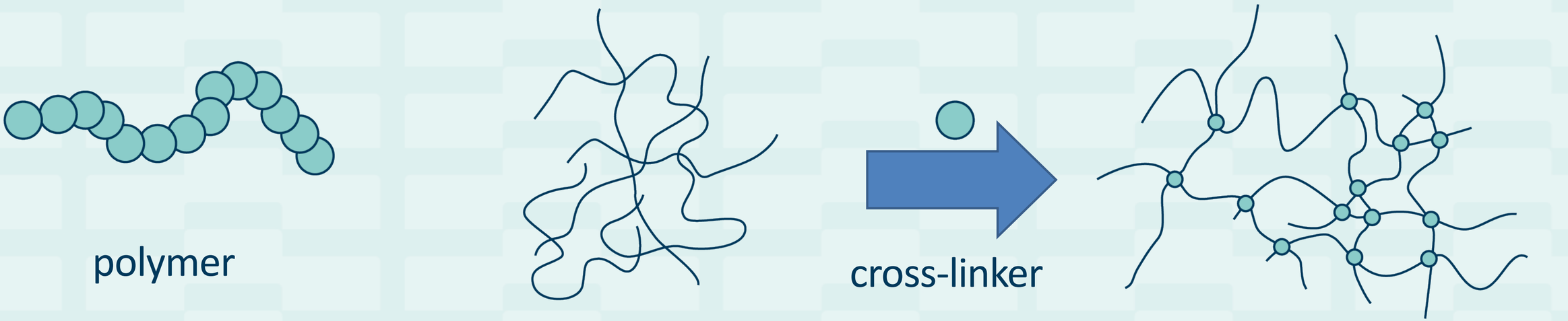
TOP COAT: ALWAYS

OVERCOAT : VERY OFTEN

BASECOAT: QUITE OFTEN

State of the art

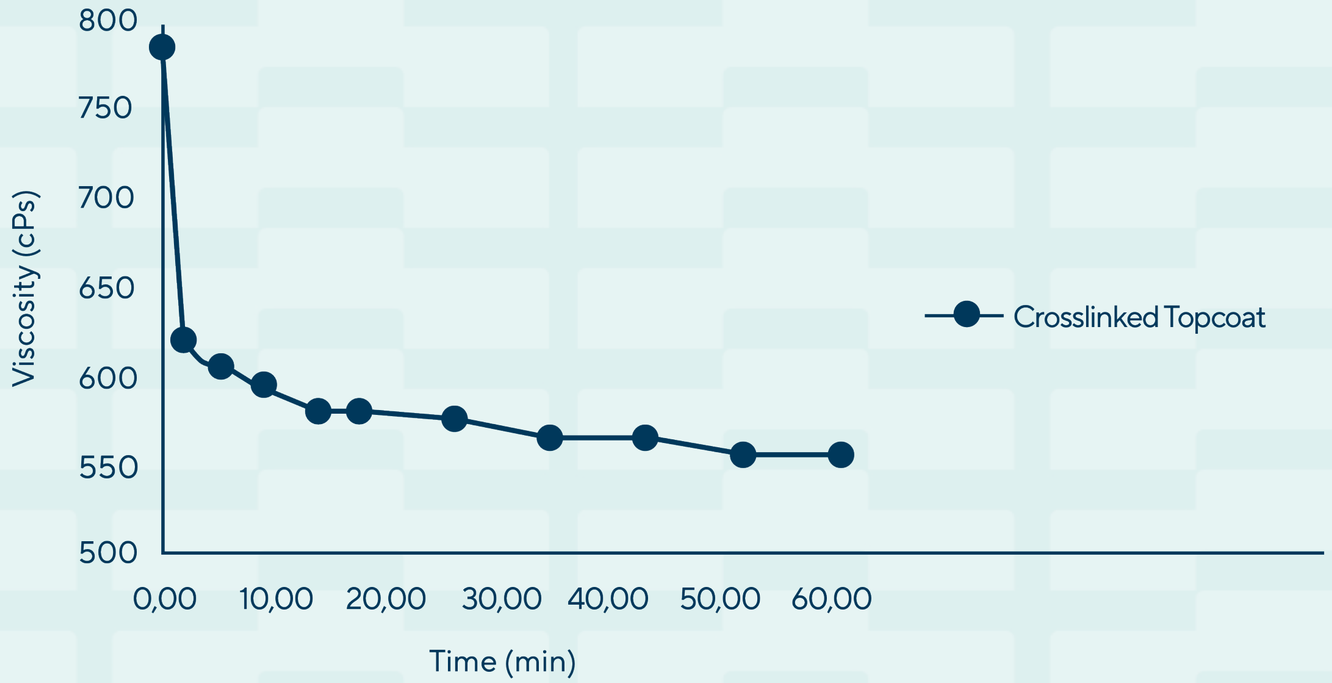
The crosslinker reacts with the functional groups of the polymers used in leather finishing forming a three-dimensional polymeric network which improves the chemical-physical properties of the finishing layer.



Why to develop crosslinker-free technology?

Viscosity: the use of crosslinkers in water-based finishing systems causes viscosity variation of the mixtures during the application phase, which obliges the finishing operator to carry out continuous checks and interventions to keep the application process under control.

Figure 1: Viscosity variation of the mixture, over time, after crosslinking



Why to develop crosslinker-free technology?

TIME

The chemical crosslinking in water-based systems does not reach completeness at the end of the application but, in fact, it happens that the complete crosslinking and therefore the development of the chemical-physical resistances is completed in much longer times, which can exceed 48 hours.

WORKING CAPITAL

The crosslinker has a very high cost per unit therefore it has a significant impact on the "inventory value".

WASTE PRODUCTION

The quantity of topcoat to be crosslinked is calculated by considering the theoretical consumption based on the quantity of hides and their size; despite this, it is common to work in excess so as not to run out of mixture to apply. The leftover topcoat mixture can no longer be used, as the crosslinker reacts with the mixing water over time and therefore it must ultimately be disposed of.

Why to develop crosslinker-free technology?

ENVIRONMENT & HEALTH

The crosslinkers used are all labelled as hazardous to health. European directives encourage industries to use, where possible, non-hazardous substances. Among these are the diisocyanates which belong to the family of chemical crosslinkers.

It is therefore probable that, in the near future, the EU will place ever more restrictive limits on the use of these substances. Therefore, considering the increasing attention that is placed on these aspects, the elimination of chemical crosslinkers represents an undoubted advantage.

polyaziridines

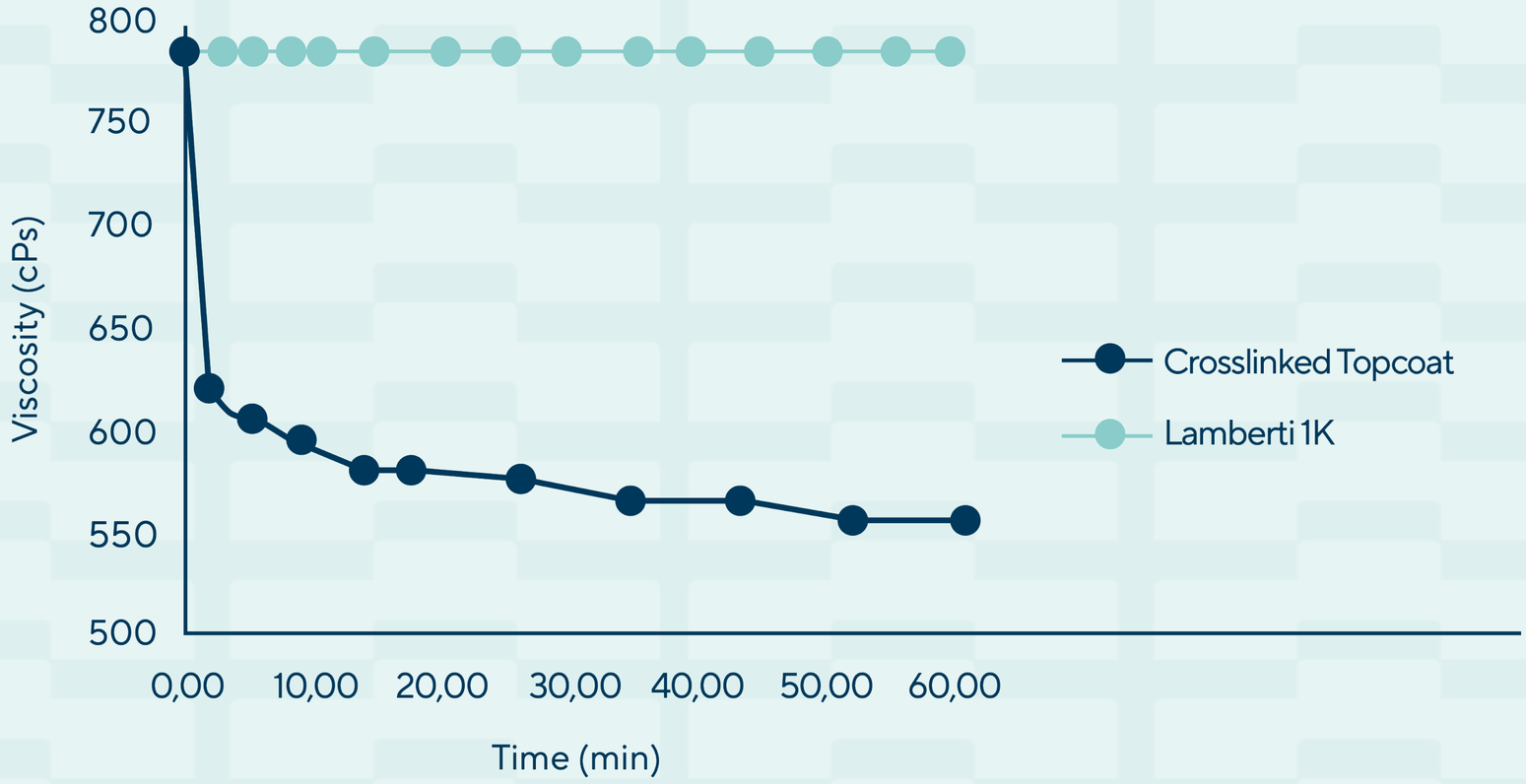
2.2. Label elements
Hazard pictograms:

Danger
Hazard statements:
H302 Harmful if swallowed.
H318 Causes serious eye damage.
H317 May cause an allergic skin reaction.
H341 Suspected of causing genetic defects.
H373 May cause damage to organs through prolonged or repeated exposure.
H411 Toxic to aquatic life with long lasting effects.
Precautionary statements:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P273 Avoid release to the environment.
P280 Wear protective gloves/clothing and eye/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a doctor.
P391 Collect spillage.
Special Provisions:
None
Special provisions according to Annex XVII of REACH and subsequent amendments:
None

2.3. Other hazards
This substance has no PBT, vPvB or endocrine disrupting properties
Other Hazards:
No other hazards

Lamberti 1K is a cross-linker free system

Viscosity: no crosslinker, no viscosity variation over time.



Lamberti 1K is a cross-linker free system

WASTE PRODUCTION

In the case of the new crosslinker technology, the leftover product can be reused without any problem for subsequent productions, thus eliminating waste

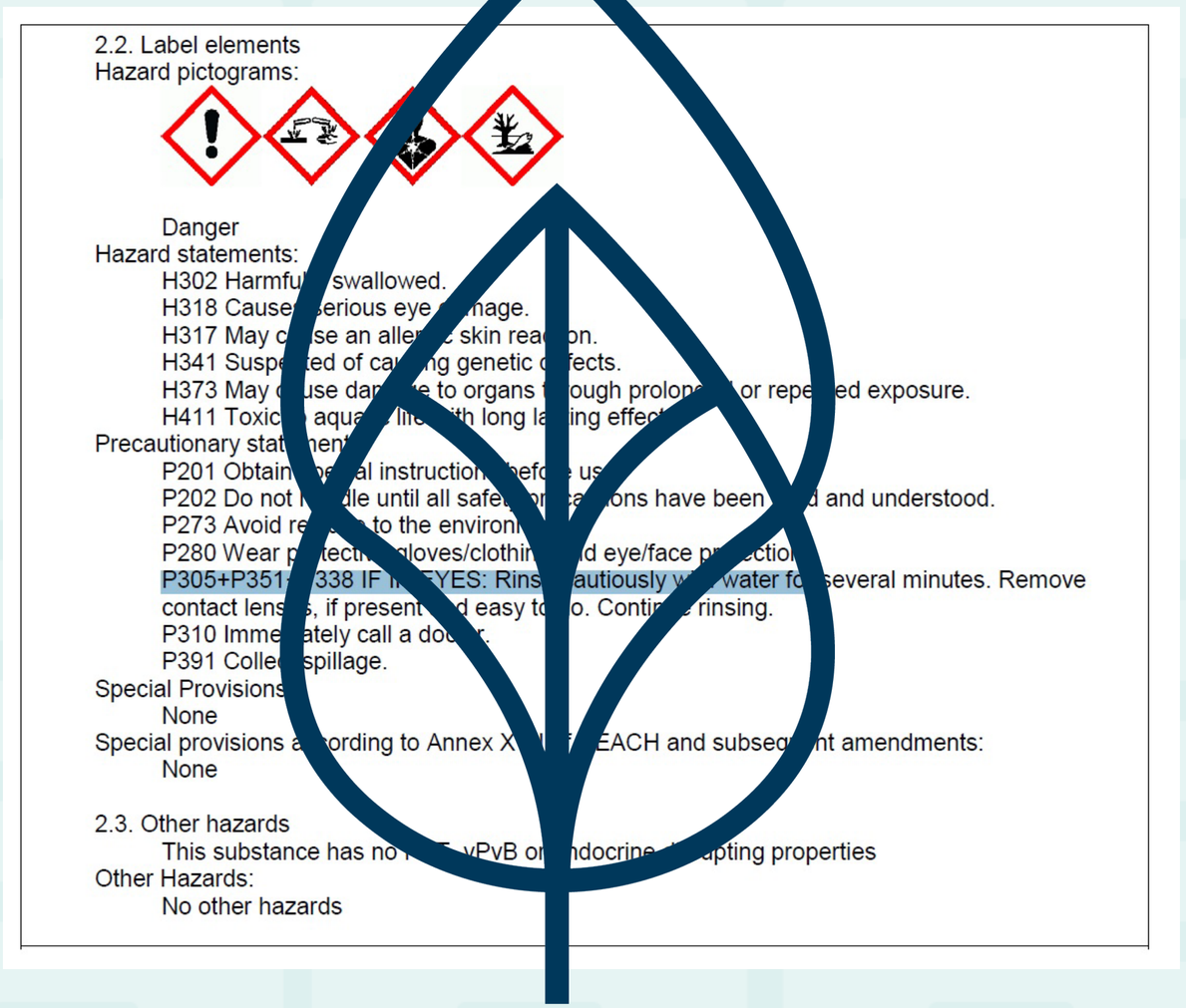
IMPACT ON WORKING CAPITAL

By working with the new crosslinker technology, warehouse costs are reduced

Lamberti 1K is a cross-linker free system

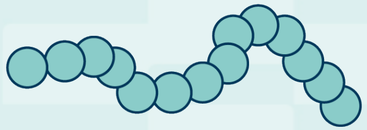
ENVIRONMENT & HEALTH

No crosslinker, no labelled substances must be handled. Safer work environment.
In addition to specific staff training for the use of dangerous products, it is necessary to subject the staff to health surveillance.
In the case of crosslinker free systems, these procedures are no longer required the EU will place ever more restrictive limits on the use of these substances.
Therefore, considering the increasing attention that is placed on these aspects, the elimination of chemical crosslinkers represents an undoubted advantage.



How the LAMBERTI 1K system works

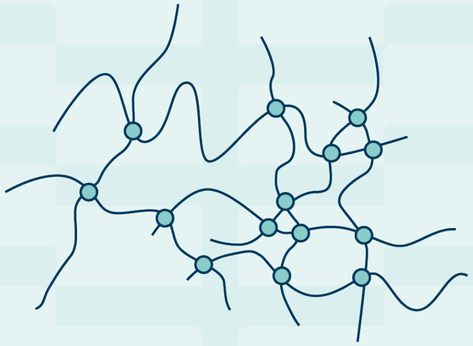
STATE OF THE ART SYSTEM



polymer

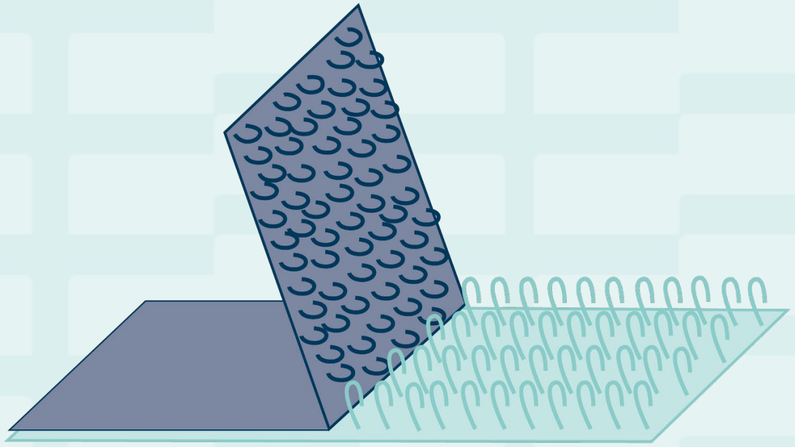
entangled polymer chains

cross-linker



cross-linked polymer chains

LAMBERTI 1K



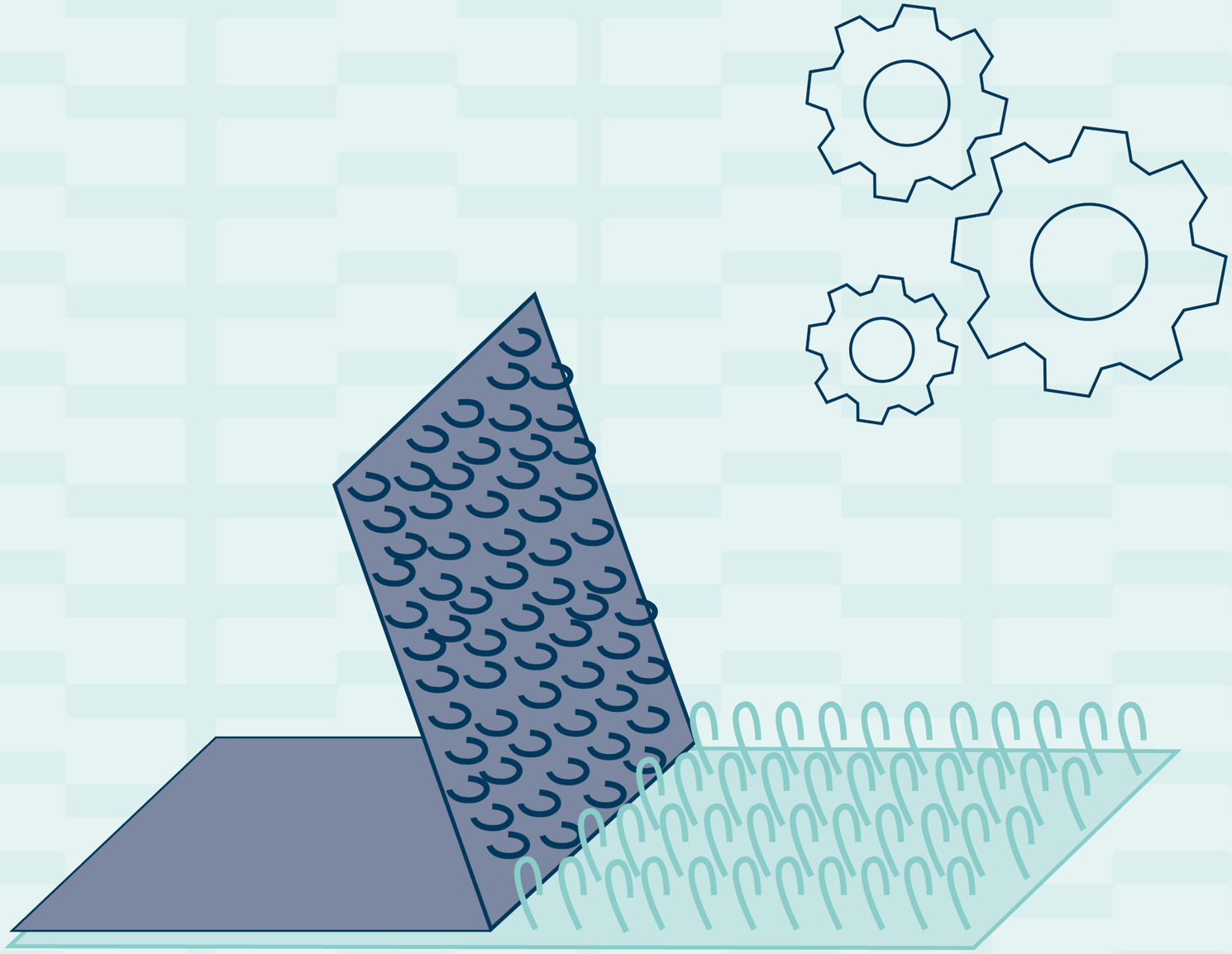
The “interlayer linking structure» allows for strong adhesion between layer surfaces.

How the LAMBERTI 1K system works

LAMBERTI 1K

The LAMBERTI 1K system works if the entire finishing package is used: basecoat, overcoat, topcoat.

Products not belonging to the LAMBERTI 1K family can compromise the formation of the "interlayer connection structure“and thus make the system inefficient



How the LAMBERTI 1K system works

STATE OF THE ART

Products	I	II	III	IV	Operation
Water		500			I) 1x12 g/ft²
Lamfix W 499		500			II) 1x1 g/ft²
Lambinder C 181	1000				
Lambinder C LC/08			1000		Embossing
Nova TC 6				1000	(120°C/200 atm)
Reticolante 05	10		20		
Reticolante 08				30	Milling 8h
Pigment	150		100		
					III) 1x4 g/ft²
					IV) 1x3 g/ft²
Viscosity	40"		30"	25"	

LAMBERTI 1K

Products	I	II	III	IV	Operation
Water		500			I) 1x12 g/ft²
Lamfix W 499		500			II) 1x1 g/ft²
Lambinder C 1K 701	1000				
Lambinder R 1K 800			1000		Embossing
Nova 1K 900				1000	(100°C/200 atm)
~~Reticolante 05~~					
~~Reticolante 08~~					Milling 8h
Pigment	150		100		
					III) 1x4 g/ft²
					IV) 1x3 g/ft²
Viscosity	40"		30"	25"	

LAMBERTI 1K technology does not imply any process or equipment variation compared to the state of the art

How the LAMBERTI 1K system works

LAMBERTI 1K

Lamberti 1K provides significantly superior wet rubbing results compared to the state-of-the-art technology. All other values are almost equivalent.

UNI EN ISO 11640	**Wet rub fastness**	STATE OF THE ART: **LAMBERTI 1K:**	450 cycles **800 cycles**
UNI EN ISO 11640	**Dry rub fastness (1000 cycles)**	STATE OF THE ART: **LAMBERTI 1K:**	4/5 (gray scale) **4 (gray scale)**
UNI EN ISO 5402	**DETERMINATION OF FLEX RESISTANCE (100.000 cycles)**	STATE OF THE ART: **LAMBERTI 1K:**	OK, no breakups **OK, slight surface**
UNI EN ISO 11644	**Adhesion test**	STATE OF THE ART: **LAMBERTI 1K:**	16 N/cm **17 N/cm**
UNI EN ISO 17233	**COLD CRACK (-20°C)**	STATE OF THE ART: **LAMBERTI 1K:**	no breakups **no breakups**
UNI EN ISO 17076	**Abrasion resistance TABER (1000 cycles CS10 – 1kg)**	STATE OF THE ART: **LAMBERTI 1K:**	4/5 (gray scale) **4 (gray scale)**
UNI EN ISO 105 – B02	**LIGHT FASTNESS**	STATE OF THE ART: **LAMBERTI 1K:**	4/5 (gray scale) **4/5 (gray scale)**
UNI EN ISO 17228	**COLOR FASTNESS TO AGING**	STATE OF THE ART: **LAMBERTI 1K:**	4/5 (gray scale) **4/5 (gray scale)**

FLEX TEST

LAMBERTI 1K

There is a different behaviour of the finishing layer in the flex test between the two technologies. LAMBERTI 1K after 100,000 cycles does not show breakage but only a more marked crease in the stressed area compared to state-of-the-art technology (image 1a and 1b, optical microscope 62X)

State of the art

Lamberti 1K

More marked creasing appearance with Lamberti 1K process

Conclusions

- LAMBERTI 1K is an innovative technology that allows leather to be finished without using crosslinkers.
- The application process is simplified and remains practically identical to the one currently in use.
- No new equipment or equipment other than those normally used in tanneries is required
- No process waste is generated.
- The work environment is considerably improved and workers' health is better protected
- Inventory costs decrease
- Superior wet rubbing results compared to the state-of-the-art technology and other physical values almost equivalent.

LAMBERTI 1K
which leather items can be produced?

LAMBERTI 1K is a new technology that has been developed in the area where Lamberti has the greatest experience: ***Upholstery.*** *In this context, the technology was also validated through tests carried out in the tannery.*
Therefore LAMBERTI 1K can currently be used to produce upholstery leather articles.
In addition to this sector, the development activity is also experimenting with the use of LAMBERTI 1K in leather goods and shoeupper.

Articles with Lamberti 1K

1_EMBOSSED UPHOLSTERY ARTICLE

- embossing on the preground
- milling;
- Basecoat
- overspray
- Topcoat (matte)

Articles with Lamberti 1K

2_NATURAL GRAIN ARTICLE

- Milling and ironing
- Basecoat
- overspray
- Topcoat (matte + glossy)

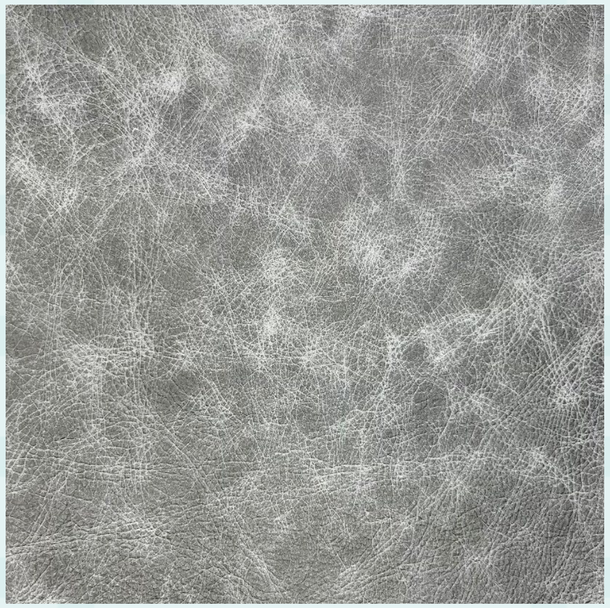
3_TWO-TONE EFFECT ARTICLE

- preground
- Basecoat
- overspray
- Two-tone effect
- Topcoat (glossy)

Articles with Lamberti 1K

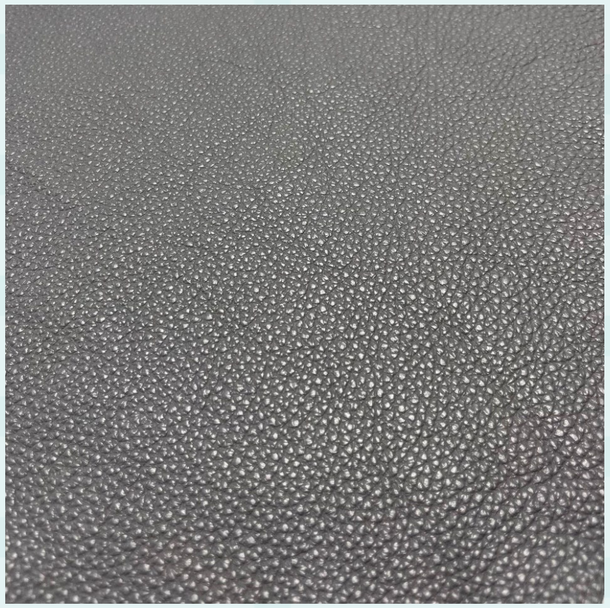
4_79 ARTICLE

- Basecoat
- 79 effect (+ milling)
- Ironing
- overspray
- Topcoat (glossy)



5_TIP SHINE ARTICLE

- Embossing on the Basecoat
- milling
- overspray
- Topcoat (tip shine)
- 8h milling
- ironing



Articles with Lamberti 1K

6_NUBUK EFFECT ARTICLE

- Nubuck effect Basecoat
- Nubuck effect overspray
- Topcoat (matte)
- Ironing 120°C
- Touch coat

7_LEATHERGOODS ARTICLE

- Basecoat
- overspray
- Topcoat (tip shine),
- embossing
- 4h milling
- ironing

LAMBERTI 1K

We are open to collaborate with anyone who is interested in using this technology and improving knowledge and skills with us.

We do believe that a new era for leather finishing is about to begin.

Thank you

Lamberti 1K

Crosslinker Free Technology

Lamberti

leathertanneries.lamberti.com