

# ENTER THE NEW ENZYME AGE

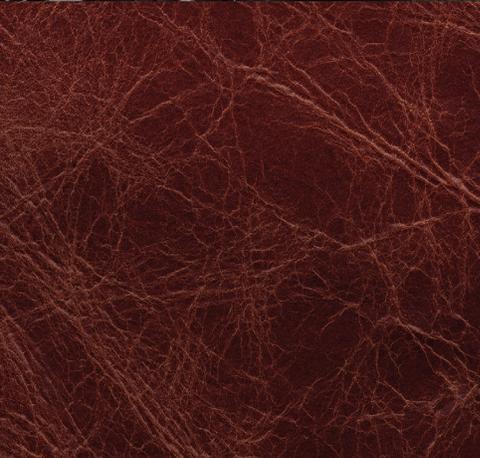
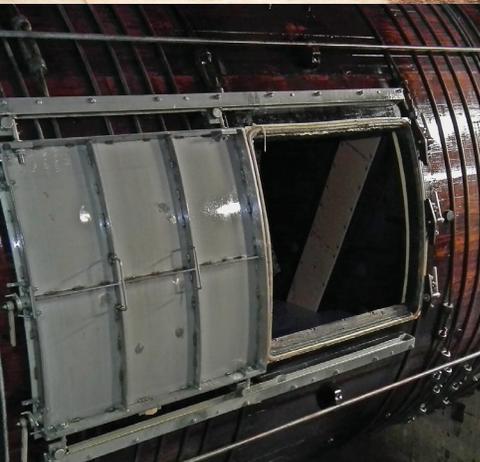
Your guide to gaining a competitive edge  
in the leather industry today.



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# INTRO



## **ENZYMATIC TECHNOLOGIES:**

They aren't "what's next." They're "what's now."

Tanneries across the globe are using enzymes to gain a competitive edge today. If your tannery isn't already embracing enzymes as part of its strategy for a prosperous future, then you may already be living in the past.

Perhaps you are resistant to change. Worried about the cost of transitioning to new technologies. Or just worried about the nature of enzymes themselves. These are perfectly reasonable positions to take until you learn the facts about enzymes and new enzyme technologies.

In this mini eBook, you will learn what enzymes are, their successes and what they can do for you.

Continue reading to see some common questions and straightforward answers about enzymes, enzyme technologies, and the impact they can have on your tannery.

# CHAPTER 1

## WHAT ARE ENZYMES?

**Enzymes are naturally occurring,** protein-based molecules that catalyze - accelerate - the various chemical reactions in all living things. Enzymes are true catalysts in that they are not consumed in the reaction, and each enzyme molecule can catalyze thousands of reactions per second.

Enzymes are very specific to the reaction that they drive; each type of enzyme has its role and should be carefully selected based on its characteristics, its specificity and the process conditions. When the right enzymes are chosen and applied in the right way, they become especially effective tools for achieving the required result in such diverse processes as soaking, unhairing, bating and degreasing.



# CHAPTER 2

## HOW LONG HAVE THEY BEEN AROUND?

Forever in nature, and long before man knew what enzymes were, we were applying dung to animal hides. We didn't know why or how, but chemical reactions took place to condition the hides and give them the properties we needed for clothing and shelter. Many of these reactions were catalyzed by enzymes - a natural and extremely effective process.

Today, the power of enzymes is all around us. We know a lot about enzymes. About how they work and what they can do for us. About how they can help us make products more efficiently and that they are often superior to conventional chemistry.



## Enzymes

are all around us

*Enzymes are used to make:*

- Laundry detergent more effective
- Animal feed more digestible
- Papermaking more sustainable
- Blue jeans "stone washed" / textiles
- Beer, wine
- Sweeteners (starch into sugar)
- Biodegradable plastics
- Bioethanol

# CHAPTER 3

## WHY ARE ENZYMATIC TECHNOLOGIES BETTER?

While most commercial chemicals can be effective, they can also be nonspecific in their action, having more effects than the one we intend. They often require higher temperatures or more time, which can lead to high energy use and undesirable byproducts.

Enzymes, on the other hand, are specific. They can be selected and used to do a particular task without unintended side effects. They also create high reaction rates even in small amounts and are easier to control, making them very efficient. And because they are derived from natural sources, they are a much more sustainable option than most conventional chemicals.

With thousands of different enzymes to choose from, each with its own specific action, there are an equal number of opportunities to apply them in innovative ways to improve products and manufacturing processes.

# CHAPTER 4

## HOW DO ENZYMATIC TECHNOLOGIES IMPROVE LEATHER PRODUCTION?

Enzymatic technologies can standardize your process, minimize hazardous chemicals, and improve efficiency and sustainability. By reducing the use of chemical treatments during the production process, enzymes contribute to safer work places and reductions in the use of sulfide in tanneries, which play a role in your Return on Environment (ROE). Here are a few areas where enzymatic technologies are superior to conventional chemistries along with benefits you can expect:

**Soaking** Enzymes can enhance rehydration and cleaning of salted or drier hides and skins. On fresh hides they promote uniform softening on the flesh side. They target the endodermis to improve the removal of globular proteins and proteoglycans, they promote opening up of the skin, improving fleshing and thus aid in further processing.

**Unhairing** Enzymatic solutions result in improved chemical penetration to prepare the epidermis for attack by reductive chemicals. They work to improve unhairing resulting in fewer hair roots, a flatter, less wrinkled pelt and a cleaner grain all while reducing the amount of sulfide and sodium ions in the process and effluent.

<b>Reducing Sodium in Beamhouse Wastewater</b>	
<b>The Challenge:</b>	A customer needed to reduce the sodium in his Beamhouse wastewater to meet the discharge requirements of his city. The customer was requesting a 47% decrease in sodium sulfhydrylate and a 50% reduction in sodium sulfide usage.
<b>The Solution:</b>	After evaluation, specific enzymatic technologies were used during the Presoak, Soak, Unhairing and Reliming processes.
<b>The Return:</b>	The combination of Buzyme <sup>®</sup> 148 and Buzyme <sup>®</sup> 7704: <ul style="list-style-type: none"><li>- significantly reduced the amount of sodium sulfhydrylate and sulfide required by unhairing by nearly 50%</li><li>- provided an estimated ROI of \$62,400 per year</li></ul>

# HOW DO ENZYMATIC TECHNOLOGIES IMPROVE LEATHER PRODUCTION?

**Bating** New enzymatic preparations have a wider temperature and pH activity range than conventional products. This improved versatility allows for increased process flexibility for effective removal of scud and hair debris. The breakdown of elastin can be controlled to regulate softness, while preserving elasticity.

**Degreasing** Enzymes aid in the breakdown of triglycerides. Under alkaline conditions, enzymatic degreasers generate soluble soaps that help emulsify the residual fat. The result is a cleaner pelt, hair-on or hair-off, and a reduced need for solvent degreasing of skins. Fat removal and distribution throughout the pelt are superior.

<b>Minimize Environmental Impact in Unhairing and Liming</b>	
<b>The Challenge:</b>	A customer needed to reduce the use of sodium sulfide without comprising the standard of cleanliness, openness and chrome penetration throughout the pelt.
<b>The Solution:</b>	With the combination of Buzyme® 7708, 7720 and Busperse® 215, the customer saw a 50% reduction of sodium sulfide and the elimination of the use of mercaptan-based auxiliary chemicals.
<b>The Return:</b>	The solution yielded environmentally positive results and an ROI of \$810,000 a year.

# CHAPTER 5

## WHAT ABOUT STORAGE AND SHELF LIFE?

Advancements in stabilization have significantly increased the shelf life of Buckman's liquid Buzyme® preparations. This longevity, coupled with the fact that enzymatic solutions take up less space and work very efficiently, make them extremely practical and an easy choice for any tannery. Plus, liquid enzyme formulations do not pose a dusting hazard, making them safer and a better choice for people and the leather itself.

The application cost of a typical enzymatic product is comparable to the cost of conventional chemistries. The economic and environmental impact, however, can be quite different. In fact, enzymatic technologies have proven to dramatically improve return on investment (ROI) and return on environment (ROE) as shown in the case studies here and on buckman.com.

## DO ENZYMATIC PRODUCTS COST MORE?

# CONCLUSION

## WOULD YOU LIKE TO LEARN MORE ABOUT ENZYMATIC SOLUTIONS DEVELOPED SPECIFICALLY FOR THE LEATHER INDUSTRY?

As a global leader in enzymatic technologies, Buckman is uniquely qualified to help you enter the new enzyme age. Our Buzyme<sup>®</sup> line is part of Buckman's Beamhouse and Tanyard System (BBTS) offerings to help give your operation an economic and environmental advantage now and for a long time to come.

Contact a **Buckman representative** for more information or visit **[buckman.com/leather](http://buckman.com/leather)** to find out more about our company and our solutions for leather.