

The background of the slide is an abstract, high-speed photograph of a blue liquid, possibly water or a chemical solution, splashing and flowing in a dynamic, swirling pattern. The liquid is captured in mid-motion, creating a sense of energy and fluidity. The color is a deep, vibrant blue, and the lighting highlights the texture and movement of the liquid.

# **BASF DryFast - Higher Efficiency for Beamhouse Processing**

150 years

 **BASF**  
We create chemistry

# Demographic challenges set the stage for the future

## Nine billion people in 2050 **but** only one earth



‘Chemistry’ is the enabler, ‘Sustainability’ key factor

# Major Challenges of Leather Industry

- **Acute water stress**
- Degradation in raw quality
- Inelastic availability of raw materials
- **Waste disposal - The waste generated from several processes in the form of liquid, solid and air pollutants cause varying threats to the environment,**
- Shortage of skilled manpower
- Power crisis
- Currency fluctuations

# BASF: Leather Chemicals

- Leather is recognized as being a high-quality, durable product and it has a greater contribution to **environmental protection and the preservation of resources**.
- BASF Leather chemicals develops products for the leather industry that **conform to sustainable development** and responsible care. Leather developed with BASF products are capable of **meeting stringent specifications** of various stake holders
- We **promote reduction of emission of VOC** during production and exclusion of harmful substances ( RSL ) for the environment and health



150 years

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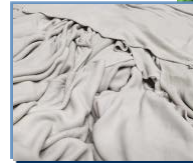
# Leather industry - through the ages

## Leather industry

**Sustainability**  
(2000)  
Eco-Footprints



**Wet white**  
(1990)  
Triggered by Audi



**Automotive leather**  
(>1970)  
Premium interior



**Chrome-tanning**  
(1880)  
New process, incl.  
Dyes and liquors



**Veg. Tanning**  
(<1860)  
Handicraft  
business



**Basyntan®**  
(1911)  
The first synthetic tanning agent



**Densodrin®**  
(2008)  
New generation of  
water-repellent



**Astacin®**  
(1980)  
Effective PU Dispersions



**Relugan®**  
(1979)  
The first polymer retanning agent

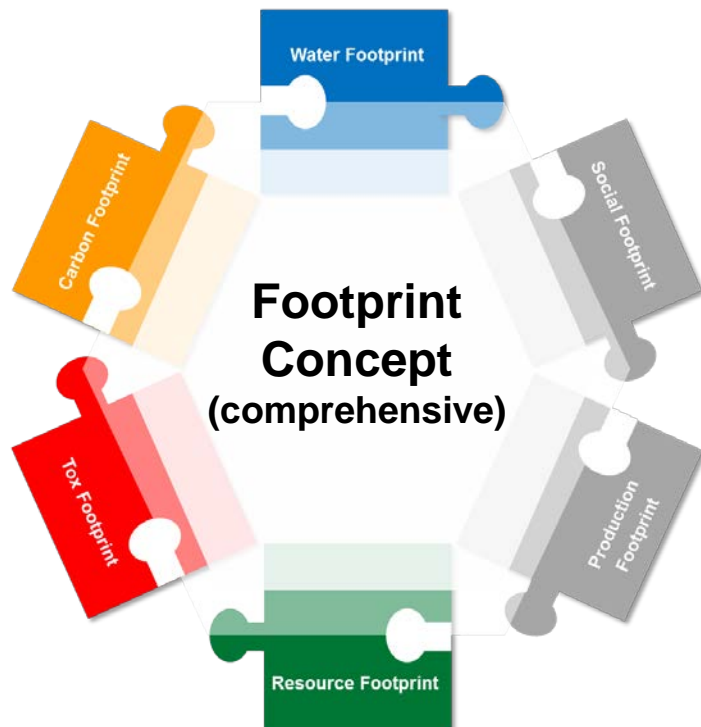


**Luganil®**  
(1972)  
The most successful non-benzidine dyes

## BASF Leather Chem.

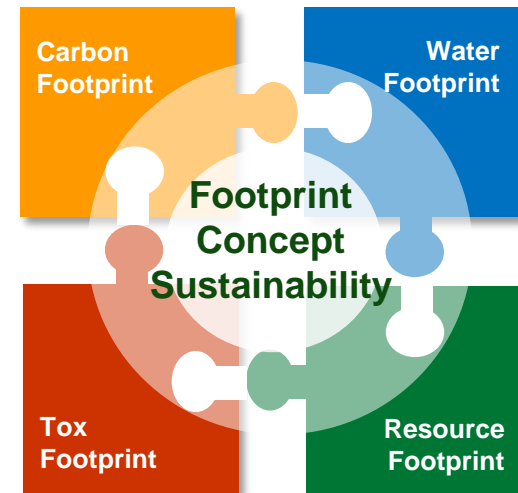
**Sustainability is key for the leather industry**

# Elements of Sustainability Footprint Concept

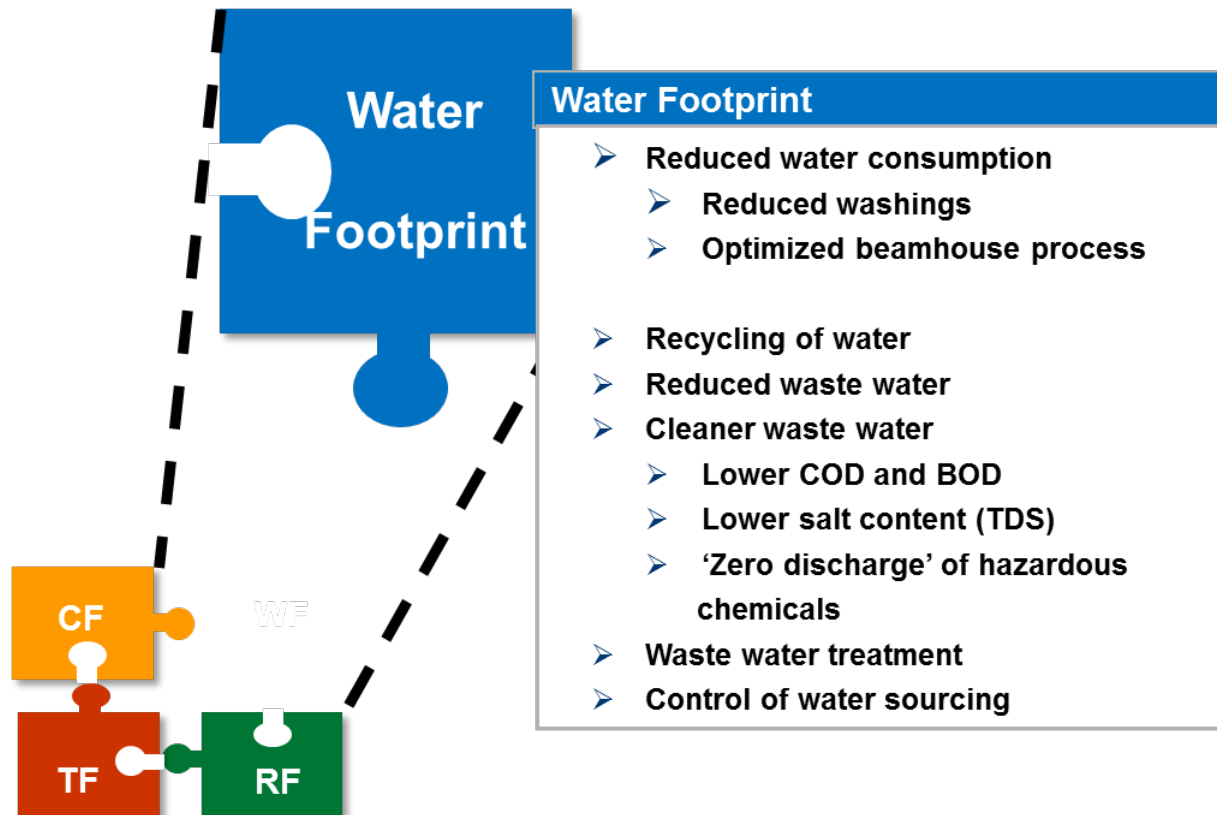


- Simplified
- Flexible
- Customized

Comprehensive and easy-to-apply  
Footprint Concept for Leather

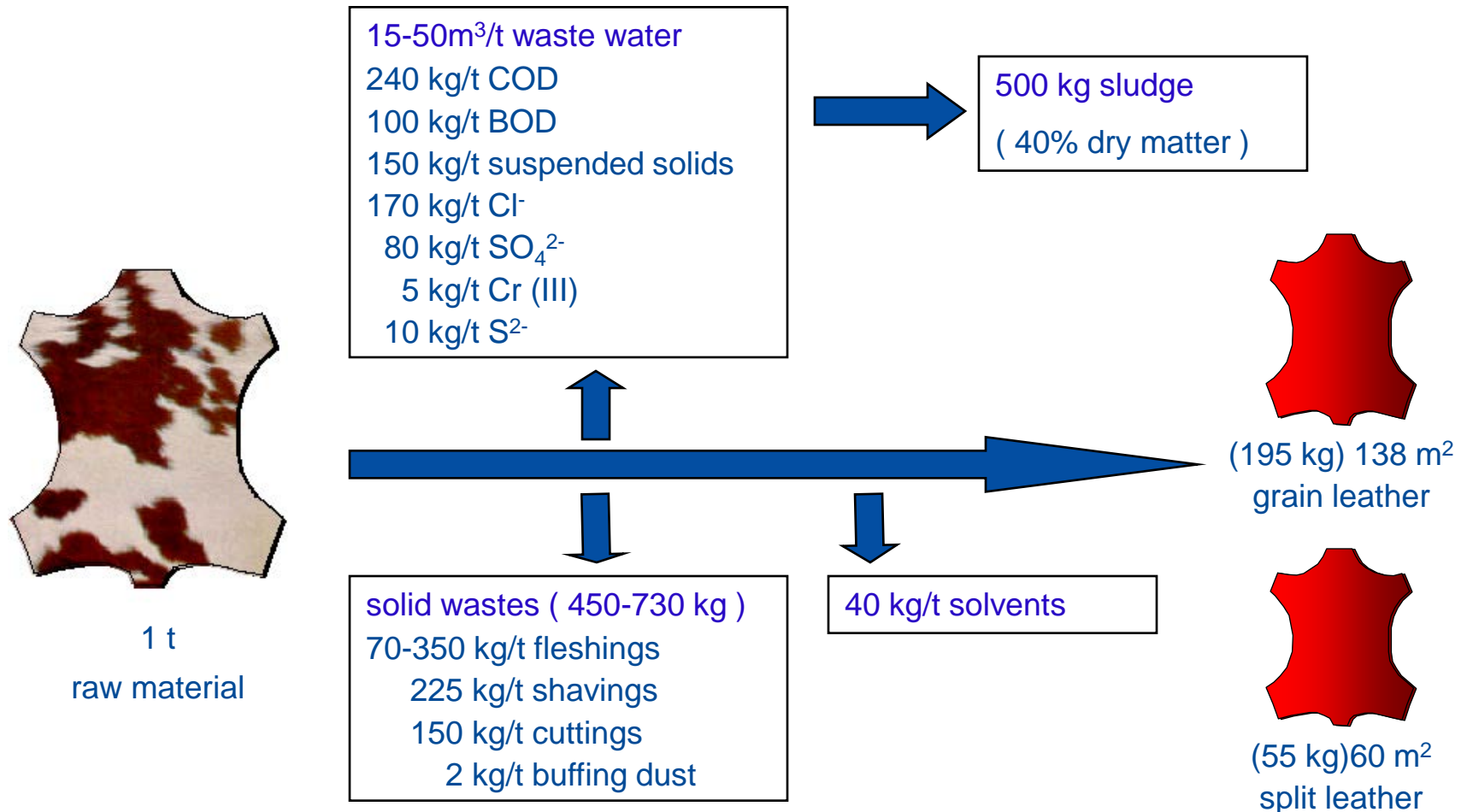


# Reducing Water Footprint In Beamhouse Processing



Water management is crucial for a sustainable leather production

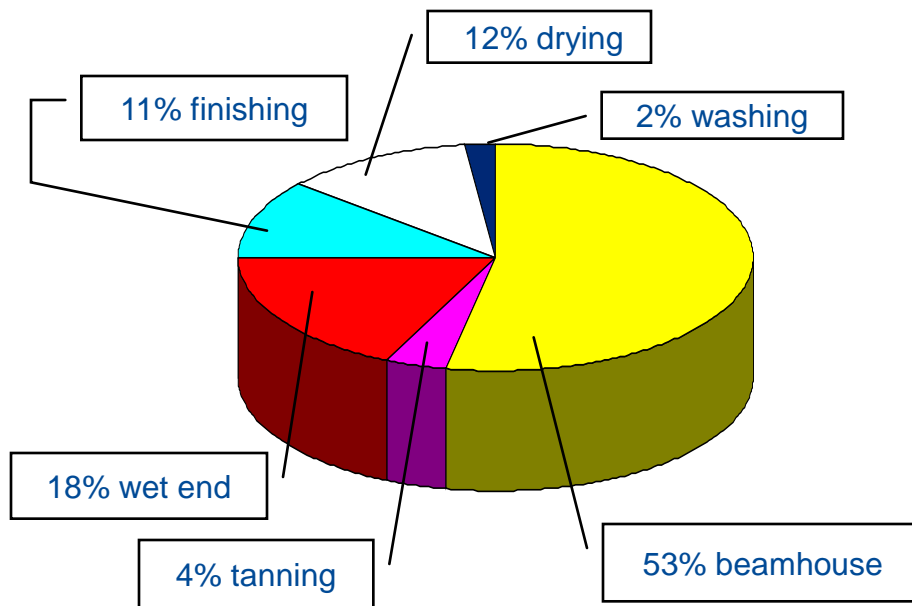
# Profit and waste management in leather production



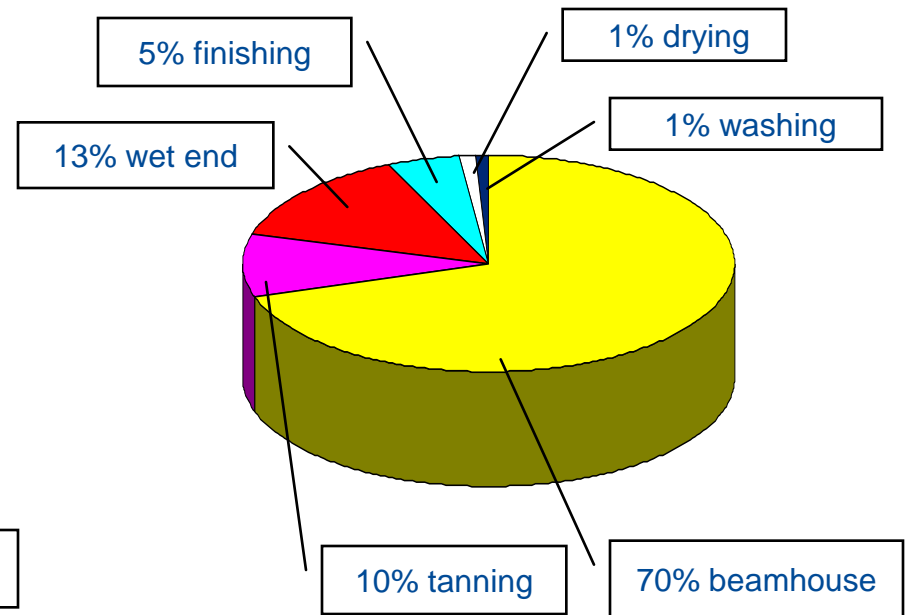


# Water demand in leather production

Splitting of water consumption (%)



COD values of single steps in %



- beamhouse shows the biggest water demand and also highest COD freight
- necessary to develop eco efficient process for beamhouse

# Sludge

- Dirt, Dung, Blood are washed out in the soaking.
- Hair burning liming processes bring a big amount of dissolved proteins into the waste water, which increase the sludge, when they settle down in the waste water treatment.
- The more lime is used, the volume of sludge will increase, as lime is not easy to dissolve.

# Sulfide

## ■ Liming process:

- ▶ Hair burning liming processes need higher amounts of sulfide to destroy the complete hair.
- ▶ Hair saving liming systems are not attacking the full hair, but just the hair roots, so less sulfide is needed.
- ▶ On both systems sulfide can be saved by using liming agents, based on organic sulfur, which is very easy to oxidize.

## ■ Waste water treatment:

- ▶ Sulfide is oxidised with maganese sulfate into thiosulfates and sulfates.
- ▶ Sulfate has a corrosive effect on concrete (e.g. pipes and tanks).



# Reduction of Sludge and sulphide

- Hair saving liming process
- Filter system
- Reduction of lime
- Low sulfide or sulfide free liming process

- **Basically there are two kinds of salt used in the leather industry :**
  - ▶ Chloride – inhibits the growth of bacteria, plants and fish in the surface water
  - ▶ Sulfate – corrosive to concrete
- **They are causing the biggest problems of elimination, in the waste water treatment.**
- **Best practical working technology today is reverse osmosis**

# Chloride

- **Sodium chloride is especially used for curing raw hides.**
  - ▶ Using fresh hides or mechanical desalting process, reduces the salt freight drastically.
- **Pickling salt is the second big contribution.**
  - ▶ Low salt or salt free pickling systems achieve a lot of savings of chloride.
  - ▶ Recycling of pickle liquor.
- **Ammonium chloride in the deliming for a cheap and effective process increases the chloride content.**
  - ▶ Replacement by ammonium free deliming process.
- **Sodium chloride from chemical powder products, where it is used as a suspending agent.**
  - ▶ High concentrated, liquid products eliminate this source of salt. Handling and distribution in the process might suffer.



# Sulfate

## Sources of sulfate are:

- **Sulfuric acid in the pickling ( $\text{H}_2\text{SO}_4$ )**
  - ▶ Not easy to replace for technical and cost reasons
- **Chromium sulfate in the tanning**
  - ▶ Wet white tanning system brings less sulfate, depending on the syntan.
- **Ammonium sulfate in the deliming is a cheap and effective process, but increases the sulfate content.**
  - ▶ Replacement by ammonium free deliming process.
- **Sodium sulfate from chemical powder products, where it is used as a suspending agent.**
  - ▶ High concentrated, liquid products eliminate this source of salt. Handling and distribution in the process might suffer.

# Salt reduction

- **Use fresh raw hides free of salt**
- **Mechanical “de-salting” of salted raw hides**
- **Product selection for the processes**
  - ▶ Soaking, liming, deliming, bating, tannage (Chrome – Wet White)
- **Ammonium free deliming**
- **Low salt or salt free pickling process**
- **Recycling of process liquors**

# Nitrogen

- **Dung, blood and grease of the raw hides increase the nitrogen load during soaking.**
  - ▶ Good bleeding and washing before curing.
- **Bacterial attack releases some nitrogen from the proteins .**
  - ▶ Biocides in the curing salt can reduce bacterial attack and digestion of protein.
- **A minor part for nitrogen are amine based liming auxiliaries.**
- **Due to the opening up of the hides during the liming and bating a lot of nitrogen is released from the proteins.**
  - ▶ Opening up is necessary for the leather quality and can not be reduced to a big extent.
- **Nitrogen is also coming from hair burning unhairing systems, where the keratin of the hair and epidermis is dissolved.**
  - ▶ Hair saving processes reduce the nitrogen load a lot, as the hair is filtered out and can be used for biogas or as fertilizer.

# Nitrogen Reduction

- Amine free liming auxiliary
- Hair saving liming
- Low ammonium or ammonium free deliming products
- Low ammonium or ammonium free bating products

# COD and BOD

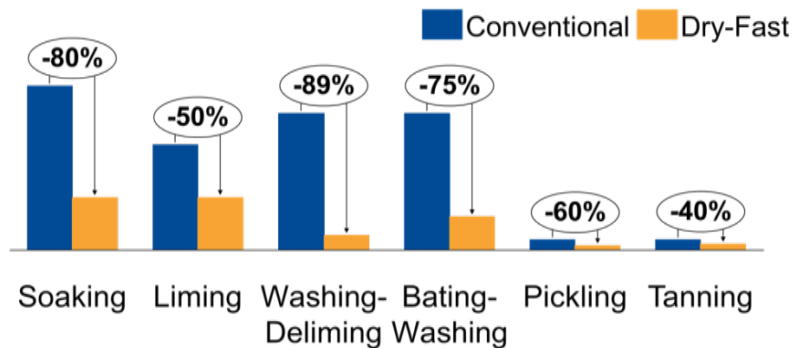
- **Biggest part of the COD and BOD is coming from the soaking and liming.**
- **Surfactants and enzymes are removing dirt, blood and unstructured proteins from the hides and raising the COD / BOD.**
  - ▶ A less intense soaking can reduce the COD / BOD, but will have a negative effect on the leather quality.
- **The liming increases the COD / BOD, because of the digestion of proteins and hair to a big extent.**

# Water footprint optimization of beamhouse process

- Recycling of process liquors
- Selection of appropriate equipment
- Use fresh/mechanical desalted raw hides
- Selection of used products
- Hair saving liming process / filter system
- Low sulfide liming process
- Reduction of lime
- Amine- & Ammonium free processes
- Chrome exhaustion & fixation / recycling
- Low salt / salt free pickling process
- Tanning system

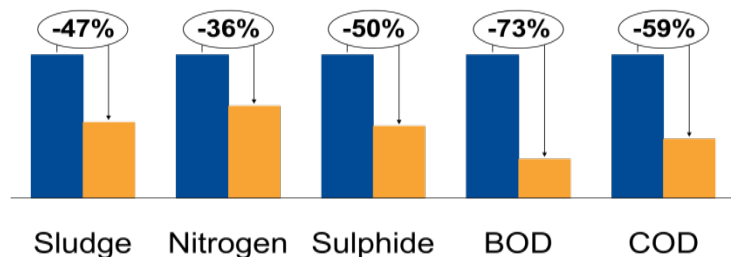


# BASF DryFast Beamhouse System



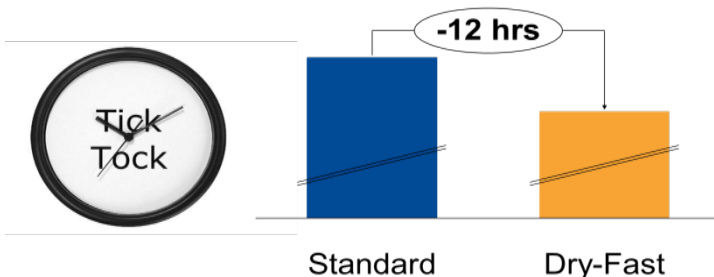
## Reduces water consumption by up to 60%

- Less washing at all stages
- Lower float operations
- Further savings with water recycling



## Reduces sludge by up to 50%

- Low dosage of chemicals
- Less hazardous chemicals in effluent
- Lower emission



## Shortens process time by up to 12 hours

- Optimized process steps
- Improved process efficiency through high exhaustion of chemicals

DryFast saves water and time with cleaner effluent

# BASF DryFast Beamhouse System

- |   |                                                                                                                                                                                                       |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Effective surfactants (Eusapon <sup>®</sup> OC, Eusapon <sup>®</sup> W , Eusapon <sup>®</sup> ON) and enzymatic product (Basozym <sup>®</sup> S20) eliminate multiple washings                        |
| 2 | Organic sulfur compounds (Mollescal <sup>®</sup> HW) together with enzymatic auxiliaries (Basozym <sup>®</sup> L10) facilitates cleaner surface, hair root removal and reduces sludge in the effluent |
| 3 | Ammonium free deliming process (Decaltal <sup>®</sup> ES-N liq.) reduces pollution load in effluent . Salt free pickling with Implenal <sup>®</sup> PIC NS                                            |
| 4 | Better uptake and even chrome distribution (Implenal <sup>®</sup> DC liq., Neutrigan <sup>®</sup> ) ensures fuller leather                                                                            |



**Reduction of water consumption by up to 60%**

**Cleaner effluent, sludge reduction by up to 50%**

**Shortens process time by at least 12 hours**

**DryFast saves water and time with cleaner effluent**

# Towards a Responsible Beamhouse System : Synergy for Value addition & water conservation

## Surfactants (Eusapon®)

- Wetting & dispersing
- Not sensitive to pH
- Biodegradable

## Liming (Mollescal®)

- Better removal of keratin & non fibrous proteins
- Less sulfide & lime

- Flat and fine grain,
- Eco efficient products

## Deliming (Decaltal®)

## Pickling (Implenal®)

- Fuller leather
- shorter running time
- Reduction in TDS



- Improved process efficiency
- Integrated process designs
- Reduced emission at source



# Towards a Responsible Beamhouse System :

## Synergy for Value addition & water conservation



### Savings in Water and Energy !

- Improved wetting & cleaning abilities - eliminate multiple washing steps
- Shorter floats & processing times
- Integrated beamhouse processes that consume less water



### A Cleaner Effluent, Easy to Treat !

- Eco efficient products – eliminate emissions at process
- Eliminate / reduce conventional harmful chemicals
- Eco friendly alternative for each process need



### Synergies that improve Value Realization !

- Greater area yield and better sales value
- Better response and value addition in the downstream processes
- Enables to meet stringent brand specifications



We create chemistry