

# **Chemicals for the tanning industry - trends and future challenges**

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# Overview of presentation

- 1) Overview of leather chemicals used today**
- 2) Examples of innovation**
- 3) The future trends and impact of Regulations**



# Chemicals today & tomorrow



## Best Available Techniques (BAT) Reference Document for the Tanning of Hides and Skins

Industrial Emissions Directive 2010/75/EU  
(Integrated Pollution Prevention and Control)

JOINT RESEARCH CENTRE  
Institute for Prospective Technological Studies  
Sustainable Production and Consumption Unit  
European IPPC Bureau

2013



[http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN\\_Adopted552013.pdf](http://eippcb.jrc.ec.europa.eu/reference/BREF/TAN_Adopted552013.pdf)



# Chemicals today & tomorrow



## The framework for sustainable leather manufacture

Working paper

Jakov BULJAN, Ivan KRÁČ



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



<http://leatherpanel.org/content/framework-sustainable-leather-manufacture-working-paper>



# Chemicals today & tomorrow

## Beamhouse

**Traditional technology uses considerable amounts of basic chemicals**

**Changes are being driven by the need to reduce pollution**

**Processes available:**

- hair save**
- low salt processes**
- low sulfide unhairing**
- ammonia-free delimiting/bating**
- enzymatic unhairing**
- lipases to partially replace surfactants**



# Chemicals today & tomorrow

## Beamhouse

### Trends

- continuing demand for safe, efficient processes with low impact technologies
- further uses of enzymes
- chemicals from renewable raw materials
  - biochemicals from fermentation of natural components
- emission properties of natural materials?



# Chemicals today & tomorrow

## Pre-tanning and Tanning

### Main tanning processes

- chrome tanning remains the universal process
- vegetable extract tanning
- organic (metal-free) tanning

### Challenges for chrome tanning

- Cr in waste water
- disposal of Cr-containing shavings
- need to avoid formation of traces of Cr(VI)



# Chemicals today & tomorrow

## Pre-tanning and Tanning

### Trends

- alternative tannage for specific types of leather, e.g. automotive
  - metal-free tanning, easier utilisation of shavings, whiter



# Chemicals today & tomorrow

**21 years ago the first auto manufacturer decided to change completely to Cr-free leathers. Why?**

**AUDI AG**

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Datum

12.08.94

AUDI hat beschlossen, zukünftig nur noch chromfrei gegerbtes Leder in allen Fahrzeugen einzusetzen. Vor diesem Hintergrund ist vorgesehen, bis zur Verfügbarkeit dieses gegerbten

**The superior dry heat stability of organic tanned leathers was the key aspect, the ecological advantages were an additional benefit**



# Chemicals today & tomorrow

## Retanning /filling / auxiliaries

Main retanning processes use melamine, phenol and naphthalene condensate syntans and acrylic polymers

Selection and changes are being driven by the need to produce specific leather characteristics

### Challenge

- minimising residual formaldehyde, phenol and naphthalene



# Chemicals today & tomorrow

## Retanning /filling / auxiliaries

### Processes available using:

- lubricating/softening polymers
- lighter weight filling by using air-filled spheres
- products from renewable resources

### Future

- more polymer developments, synthetic production allows controlled residuals
- further utilisation of products from renewable resources



# Chemicals today & tomorrow

## Fatliquors

Currently a wide range of oils and fats, natural and synthetic, are used

Changes are being driven by higher performance requirements for leather, e.g. low emission requirements of automotive leathers

Future:

- more use of products from renewable resources
- chlorinated fatliquors?



# Chemicals today & tomorrow

## Dyes

**Mostly anionic acid and direct dyes. Ionic interaction fixes the dye to leather.**

**Attempts made to introduce high fast, covalent bonded dyes for leather, but volumes too low.**

**Low application temperature and pH restricts the type of dyes that can be used.**

**Fashion determines colour, but black and brown dominate (80%). Dyes selected to meet specs.**

**Future:**

- ? No investment in new dye structures, registration costs are high and volumes low**



# Chemicals today & tomorrow

## Finishing

**Industry uses a wide range of polymer types and formulated products**

**Fashion determines colour and surface effects.  
Creativity required to meet fashion demands.  
Automotive industry requires high performance,  
with low emissions**

### **Future:**

- **water-based systems, free of restricted substances, natural finishes, lower add-on, upgrading and soil resistance**



# Chemicals today & tomorrow

## Innovation

The chemical industry has developed innovative products and application processes

Examples of chemical innovations:

- hair save
- increasing use of enzymes
- organic tanning systems
- lubricating polymers
- light-weight filling agents
- solar reflective leather
- water-based finishes
- roller coating applications (chem. & machinery)



# Chemicals today & tomorrow

## Future trends and impact of Regulations

**Are Regulations and restrictions influencing innovation?**

- REACH Regulation
- MRSL restrictions



# Chemicals today & tomorrow

## REACH

The EU REACH Regulation aims to:

- boost innovation
- replace hazardous chemicals with less toxic alternatives



# Chemicals today & tomorrow

## REACH

- All existing chemical substances (> 1t/yr) made in or imported into the EU are to be registered by May 2018
- Large volume substances are already registered but many 1000s of small volume chemicals are now in testing before being submitted to ECHA
- Large commitment of resources by chemical suppliers



# Chemicals today & tomorrow

## REACH

- **SVHC - Substances of Very High Concern** have been identified by risk analysis and subject to authorisation and «sunset» dates for phasing out their use
- **Currently 163 SVHC Candidate substances (incl. Annex XIV), growing each 6 months**



# Chemicals today & tomorrow

## MRSL – Manufacturing Restricted Substances List

- ZDHC is a group of 19 brands and their aim is to have Zero Discharge of Hazardous Chemicals by 2020.
- ZDHC have identified several priority groups of chemicals, which they will require the textile and leather manufacturers not to use.
- MRSL targets the chemical products not the finished article. ZDHC will publish a Leather MRSL list of chemical substances (the textile MRSL already exists)



# Chemicals today & tomorrow

**2015 CHEMICAL MANAGEMENT SYSTEM GUIDANCE MANUAL** | JOINT ROADMAP DELIVERABLE

**ZDHC**  
ZERO DISCHARGE OF HAZARDOUS CHEMICALS PROGRAMME

adidas GROUP    BURBERRY    C&A    ESPRIT    Gap Inc.    G-STAR RAW

H&M    INDITEX    Jack Wolfskin    Lbrands    LEVI STRAUSS & CO.    LI-NING

MARKS & SPENCER    NB    NIKE    PUMA    PVH    UNITED COLORS OF BENETTON



# Chemicals today & tomorrow

**Thank you for your attention**

