Management of chemicals in the footwear supply chain

OutDoor, Friedrichshafen, 14th of July, 2016

Dr. Michael Knauer
PFI Germany
Outline

1. CADS
   - Organisation
   - The group
   - Target
   - Current work

2. Management of hazardous substances
   - CADS List of restricted substances
   - CADS Guide for leather manufacturers
     – Recommendations for the avoidance of Chromium (VI) formation –

3. Summary
Outline

1. CADS
   - Organisation
   - The group
   - Target
   - Current work

2. Management of hazardous substances
   - CADS List of restricted substances
   - CADS Guide for leather manufacturers
     - Recommendations for the avoidance of Chromium (VI) formation

3. Summary
CADS - Cooperation for avoiding dangerous substances in shoes

Organisation of CADS

CADS is integrated in DSI - the German Shoe Institute. DSI was founded in 1956 and is supported by industry and commerce. DSI supports shoe manufacturers and retailers with individual marketing services, trend information and effective Press and Public Relations.
CADS - Cooperation for avoiding dangerous substances in shoes

The CADS group:

CADS, the cooperation established under the roof of the German Shoe Institute (DSI), deals with the important subject of dangerous substances that are found in shoes, textiles and leather goods, and proactively seeks to prevent their use.

More than 60 companies (industry, trade, supplier) of the shoe and textile industry.

Creation and distribution of methods for the manufacture and marketing of shoes and shoe materials without harmful substances.
CADS - Cooperation for avoiding dangerous substances in shoes

The CADS group:

**Founded:** November 2007
Since 1st October 2010 part of DSI

**Chairman:** Michael Tackenberg

**Vice Chairman:** Andreas Tepest

**General Manager:** Manfred Junkert, DSI

**Scientific - technical Management:**
Dr. Kerstin Schulte, PFI
CADS - Cooperation for avoiding dangerous substances in shoes

Target:

The objectives of the association include the generation and dissemination of knowledge on the production and marketing of shoes and shoe materials that are free of dangerous substances. Furthermore, the members of CADS are sustainably committed to environmentally-friendly manufacture. The companies affiliated to CADS voluntarily work according to guidelines that are far above the legal requirements.
CADS - Cooperation for avoiding dangerous substances in shoes

Current Work:

International activities

- CADS pools knowledge about dangerous substances and passes it on to all companies that deal with the manufacture or the trading of shoes, shoe components, materials and leather goods.
- CADS attaches the greatest importance to revealing the possibilities for avoiding dangerous substances to all the companies in the production chain throughout the world.
- CADS funds scientific studies. These are, for example, about optimised manufacturing processes or the development of substitute substances.
- CADS organises seminars with the aim of generating more knowledge and an in-depth understanding about substances and innovative manufacturing methods, or extending this.
CADS - Cooperation for avoiding dangerous substances in shoes

Current Work:

The following working groups are currently committed to the avoidance of dangerous substances:

Working group 1: VOCs, fumigation of containers, testing methods
Working group 2: Statutory and critical minimum requirements, voluntary requirements, REACH, List of Restricted Substances in Shoes
Working group 3: Testing procedures and standardisation
Working group 4: Chromium VI
Working group 5: PURE
Working group 6: Safe handling and use of biocide agents (starting soon)
Working group 1: VOCs, fumigation of containers, testing methods

The industry is endeavouring to dispense with substances containing solvents. The concentration of these substances in the air of the containers may be very high once the European place of destination is reached.

The aim of the working group for VOCs is:
- to create training documents for shoe manufacturers and to establish limits, in cooperation with the responsible authorities.
- CADS is striving to develop a suitable testing method for the measurement of VOCs in the product or container.
Working group 2: Statutory and critical minimum requirements, voluntary requirements, REACH, List of Restricted Substances in Shoes

There are currently no uniform requirements for material and shoe manufacturers. It is a matter of formulating minimum requirements and promoting dialogue with non-government organisations about critical substances.

The aim is for all CADS members:
- to agree to a common Index of Restricted Substances in Shoes.
Working group 3: Testing procedures and standardisation

Substances are frequently banned before a method of detection has been developed and standardised. Individual methods of the testing laboratories do not always lead to comparable results.

The aims of CADS:
- include the development of uniform testing methods,
- the implementation of interlaboratory tests,
- the standardisation of testing procedures.
Working group 4: Chromium VI

This working group is concerned with the avoidance of unwanted chromium VI formation in leather and leather products. 2015 CADS first published a guide for leather manufacturers. This guide provides the basis for the implementation of appropriate training for staff of the leather branch. The experts also discuss on new findings on chromium VI avoidance and deal with the toxicological assessment of chromium VI in leather.
Working group 5: PURE - coated textiles

The working group deals with the production of consumer and environmental friendly polyurethane coated fabrics, which were manufactured under safety and environmental protection regulations. Especially, but not exclusively, the concentration of solvents shall be reduced in the materials and products. The working group develops training materials as well as a testing and certification system. Members of CADS have the possibility to monitor the productions sites of these materials with a uniform standard.
Working group 6: Safe handling and use of biocide agents (starting soon)

The European regulation on biocidal products regulates the marketing and use of biocidal agents, which are used for the protection of humans, animals, materials or products because of their activity against harmful organisms such as fungi or bacteria. The working group creates a guide for the use of biocidal active ingredients under consideration of already authorized compounds in the EU.
Webinar

The regular information events and seminars conducted by CADS around the world, amongst other things, make an important contribution to this.

Goal of the workshop:
Communication of concentrated and comprehensive knowledge about hazardous contaminants in footwear and footwear materials, their avoidance, and, wherever technically feasible, their removal.
Outline

1. CADS
   - Organisation
   - The group
   - Target
   - Current work

2. Management of hazardous substances
   - CADS List of restricted substances
   - CADS Guide for leather manufacturers
     - Recommendations for the avoidance of Chromium (VI) formation

3. Summary
CADS - List of restricted substances in shoes

AIM: to agree to a common Index of Restricted Substances in Shoes and unification of the many different RSLs in the shoe sector.

- 3rd Version of the RSL valid since January 2016

- Annual review and update of legal requirements, SVHC candidates relevant for shoe materials, substances within the focus of NGO’s

- Test matrix in relevance of used materials
The substances are structured in the groups for:

- Azo Dyes
- Biocides
- Chlorinated Phenols
- Other Phenols
- Dyestuffs (allergenous, carcinogenic)
- Heavy Metals
- Organotin compounds
- Phthalates
- Polycyclic aromatic hydrocarbons
- Volatile Organic Compounds
- Chlorinated benzenes and toluenes
- Other chemical residues
The substances are structured in the groups for:

- Azo Dyes
- Biocides
- Chlorinated Phenols
- Other Phenols
- Dyestuffs
- Heavy Metals
- Organotin Compounds
- Phthalates
- Polycyclic Aromatic Hydrocarbons
- Volatile Organic Compounds
- Chlorinated Benzenes and Toluene
- Other Chemical Residues

<table>
<thead>
<tr>
<th>Substance Group</th>
<th>Short Name</th>
<th>CAS No. 1</th>
<th>CAS No. 2</th>
<th>CADS Group</th>
<th>CADS limits</th>
<th>Legal limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AZO Dyes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,3'-Dichlorobenzidine</td>
<td></td>
<td>91-84-1</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>3,3'-Dimethylbenzidine</td>
<td></td>
<td>119-93-7</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>2,4-Diaminoanisole</td>
<td></td>
<td>616-05-4</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>2,4-Toluenediamine</td>
<td></td>
<td>95-60-7</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>2,4-Xylydine</td>
<td></td>
<td>95-68-1</td>
<td></td>
<td>2</td>
<td>20 mg/kg</td>
<td></td>
</tr>
<tr>
<td>2,6-Xylydine</td>
<td></td>
<td>87-62-7</td>
<td></td>
<td>2</td>
<td>20 mg/kg</td>
<td></td>
</tr>
<tr>
<td>2-Amino-4-Nitrotoluene</td>
<td></td>
<td>99-55-8</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>2-Naphthylamine</td>
<td></td>
<td>91-69-8</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>3,3'-Dimethoxybenzidine</td>
<td></td>
<td>119-90-4</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>3,3'-Dimethyl-4,4'-Diaminodiphenylmethane</td>
<td>uais</td>
<td>838-88-0</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>4,4'-Diaminodiphenylmethane</td>
<td></td>
<td>101-77-9</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>4,4'-Methylene-Bis-(2-Chloroaniline)</td>
<td></td>
<td>101-14-4</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>4,4'-Oxydianiline</td>
<td></td>
<td>101-80-4</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>4,4'-Thiodianiline</td>
<td></td>
<td>139-85-1</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>4-Aminoaazobenzene</td>
<td></td>
<td>60-09-3</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>4-Aminodiphenyl</td>
<td></td>
<td>92-67-1</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>4-Chloro-o-Toluidine</td>
<td></td>
<td>95-69-2</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>Benzidine</td>
<td></td>
<td>92-87-5</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>o-Aminoazotoluene</td>
<td></td>
<td>97-66-3</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>o-Anisidine</td>
<td></td>
<td>90-04-0</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>o-Toluidine</td>
<td></td>
<td>95-63-4</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>p-Chloroaniline</td>
<td></td>
<td>106-47-8</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>p-Cresidine</td>
<td></td>
<td>120-71-8</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
<tr>
<td>2,4,6-Trimethylaniline</td>
<td></td>
<td>137-17-7</td>
<td></td>
<td>1</td>
<td>20 mg/kg</td>
<td>30 mg/kg</td>
</tr>
</tbody>
</table>
The materials are structured in the groups for:

- Leather
- Coated leather
- Leather fibre board
- PVC
- EVA, EVA foam
- Rubber, Rubber foam
- PU, TPU
- TPE-TPR
- Latex
- Blown materials, Foam
- Synthetic textiles
- Coated textiles
The materials are structured in the groups for:

- PU-coatings „DMFa-free“
- Natural textil
- Print for textile
- Wood, Cork
- Adhesives
- Metallic hardware
- Cellulosic material
The materials are structured in the groups for:

- PU-coatings „DMFa-free”
- Natural textile
- Print for textile
- Wood, Cork
- Adhesives
- Metallic hardware
- Cellulosic material

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 mg/kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 µg/m²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 mg/kg;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>regulated in Norway</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 mg/kg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

x test/ limit for materials with and without skin contact
● test/ limit only for materials with skin contact
○ test/ limit only for materials without skin contact
CADS - management of hazardous substances

CADS Guide for leather manufacturers
CADS - management of hazardous substances
CADS Guide for leather manufacturers

- Guideline as hardcover book for five languages: German, English, Italian, Spanish, Chinese
- Translation for further languages (e.g. Turkish) are planned
- Up to now all languages within one book; print of books with single language under consideration
CADS - management of hazardous substances
CADS Guide for leather manufacturers

Table of contents:
- Chapter 1: Chromium (VI) prohibition in leather products
- Chapter 2: The use of chromium salts in the tanning process
- Chapter 3: How does leather come to be polluted with chromium (VI)
- Chapter 4: Summary - Recommendations on avoiding chromium (VI) formation
- Chapter 5: The inspection of quality standards
- Chapter 6 + 7: Appendices
Chapter 1: Chromium (VI) prohibition in leather products

Regulations:
- In Germany since 2010 (BedGegstV): chromium (VI) not detectable
- In Europe since 2015 REACH Annex XVII: leather with skin contact < 3 mg/kg
- Uniform limit for europe
- Limit shall be lowered as soon as a lower detection limit is achievable
Chapter 2: The use of chromium salts in the tanning process

- 80% of the leather worldwide are chrome tanned (in shoe production 95%)
- Excellent properties for production of shoes like high strength, good elasticity and suppleness, color fastness
- Chromium free tanned leathers often do not meet the requirements for shoe material
- Problem is formation of Chromium VI due to chemical reaction

\[
\text{Cr}^{\text{III}} \rightleftharpoons \text{Cr}^{\text{VI}}
\]
Chapter 3: How does leather come to be polluted with chromium (VI)

- Chromium (VI) entry “from outside”:
  - contaminated tanning salts, contaminated water or machines
  - Chromium VI containing pigment dyes

- Chromium (VI) formation in leather:
  - Chromium (VI) formation possible in different production stages
  - formation related to used chemicals and processes
Chapter 3: How does leather come to be polluted with chromium (VI)

- Chromium (VI) entry “from outside”:
  - contaminated tanning salts, contaminated water or maschines
  - Chromium VI containing pigment dyes

- Chromium (VI) formation in leather:
  - Chromium (VI) formation possible in different production stages
  - formation related to used chemicals and processes
Chapter 3: How does leather come to be polluted with chromium (VI)

- Chromium (VI) formation in leather during production:
  - Beamhouse
  - Tanning
  - Wet finish
  - Drying
  - End finish
Chapter 4: Recommendations on avoiding chromium (VI) formation ("13 golden rules")

Chapter 5: Quality standards and good housekeeping
Outline

1. CADS
   - Organisation
   - The group
   - Target
   - Current work

2. Management of hazardous substances
   - CADS List of restricted substances
   - CADS Guide for leather manufacturers
     – Recommendations for the avoidance of Chromium (VI) formation –

3. Summary
CADS - management of hazardous substances

Summary

CADS:
- Is a cooperation of shoe producers, retailers, material suppliers, chemical industry and test laboratories
- Is working on an uniform RSL for companies involved in shoe production
- Works on the harmonization of non-standardized test methods for comparable results
- Creates publications on relevant topics in production and avoidance of hazardous substances
- Organizes workshops and webinars to transfer the knowledge in the supply chain
Would you like to know more about the activities of CADS?
Are you interested in a membership?
Do you like to get the CADS-RSL or the Handbook for Chromium (VI)

Get more information by sending an e-mail to info@cads-shoes.com