Quality assurance in Siptex
The first automated, industry scale sorting plant for textile waste

Dämien Bolinius
The missing link

Access to customized raw material

Access to large quantities of recycled textile fibers of high and even quality

Increased profitability for increasing amounts of recycled textiles in collected material
The Siptex project: Strong partners from the entire value chain
Facts about the facility

- **Capacity**: 4,5 tonnes per hour (24,000 tonnes per year)
- **NIR/VIS-machines**: 3
- **Conveyor**: 260 meters
- **Manufacturer**: Staedler/Tomra
- **Location**: Bjurögatan 20, Malmö, Sweden
Quality-assured products

Siptex will offer a standardized range of quality-assured recycling products with guaranteed fiber composition and color, adapted for various recycling processes.

Examples of products:

- **Cotton** (of specific purity and color)
- **Wool** (of specific purity and color)
- **Polyester** (of specific purity and color)
- **Viscose** (of specific purity and color)
- **Polyamide** (of specific purity and color)
- **Acrylic** (of specific purity and color)
- **Customized products**
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The challenge with a diverse input

New fabrics

Used fabrics
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<table>
<thead>
<tr>
<th>New fabrics</th>
<th>Used fabrics</th>
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</thead>
<tbody>
<tr>
<td>● Control over incoming materials</td>
<td>● Limited control over incoming materials</td>
</tr>
<tr>
<td>● Constant inflow</td>
<td>● Varying inflow</td>
</tr>
<tr>
<td>● Homogenous materials</td>
<td>● Bales with mixed materials</td>
</tr>
<tr>
<td>● Standards / Guidelines</td>
<td>● No standards/ guidelines exist</td>
</tr>
<tr>
<td>● Possibility to certify</td>
<td>● Certification not applicable in this stage</td>
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</tbody>
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SIPTEX - FORUM FÖR KEMIKALIESMART HANDEL
Challenge 1: Taking a representative sample
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Challenge 2: What to analyze and how often?
Challenge 3: Upscaling and communication
Mechanical recycling of textiles – The Process

Recycling steps
• Sorting – fibre type, colour, etc.
• Cleaning from trims (buttons, zippers, etc.)
• Cutting into smaller fabric pieces (perhaps not necessary after cleaning)
• Shredding of the fabric pieces, i.e. separate the fibres as much as possible from each other
• The shredding process may be necessary to repeat to achieve sufficiently good fibre separation
• Quality check of the fibres, e.g. fibre length, fibre strength, etc.

Subsequent textile production steps
(examples only, some intermediate chemical treatment steps may be needed)
• Mixing in virgin material to strengthen poor quality and to achieve requirements specification
• Carding the selected fibre mix
• Drawing the fibres into the same/right direction (sliver formation)
• Yarn spinning (open end/rotor spinning)
• Fabric production (knitting or weaving)
• Non-wovens (produced from fibres directly, i.e. no yarn spinning or fabric production involved)
Mechanical recycling of textiles – Pros

• Prevents (100%) outtake of new/virgin raw material for new textile fibres production – in accordance with the waste hierarchy
• Preserves the textile fibres material value at a higher level (compared to chemical recycling) – in accordance with the waste hierarchy
• If the input textile (waste) material is carefully pre-sorted, subsequent processes such as yarn or fabric dyeing are not required
• Suitable recycling method for production waste, since this is already pure and not mixed with other textile products/material types
• The only recycling method for cotton that generates/maintains the cotton fibres original molecular structure
Mechanical recycling of textiles – Cons

- Carefully sorting, both on fibre type and colour, is required to get a good result in terms of good quality of the recycled fibres – high cost!
- Almost always, a fraction of new/virgin fibre material is required to achieve good quality, i.e. using 100% mechanically recycled fibres for production of a new garment is rare.
- It is difficult to achieve even quality since the textile feed material variation is broad.
- Textile cleaning is of high importance since trims such as zippers and buttons may destroy the shredding/tearing machine – high cost!
Thank you!

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