Supply chain partnership

- Partner in the development of wipes
- Support in marketing communication with regards to fibers and sustainability claims
- Lenzing Fiber Experience in Austria or in-house at costumer
- Regular updates about Lenzing activities via newsletter
Kirkland Signature Babyfeuchttücher

Kirkland Signature Babyfeuchttücher:

- 70 % TENCEL®
- 30 % Lenzing Viscose®
Nonwovens technologies

Worldwide wipes by technology
(in volume, 2011)

- 74% of all rollgoods for wipes are produced by spunlace or airlaid technology
- At the converting level, lotion is added and now a wet product is produced
- Given the high transportation cost of wet wipes, the industry is still present in the main geographies in Europe, Asia and US and is predicted to stay regional.
- Lenzing Nonwoven is present in both key technologies (staple fibers in spunlace and shortcut in airlaid)
# Comparison Airlaid - Spunlace

<table>
<thead>
<tr>
<th></th>
<th>Airlaid</th>
<th>Carded and Spunlaced</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td>+ Low cost pulp as main raw material</td>
<td>+ Textile like - soft and flexible</td>
</tr>
<tr>
<td></td>
<td>+ Rougher surface is effective at cleaning</td>
<td>+ Strong and Durable</td>
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<tr>
<td></td>
<td>+ Process and cost allows thicker fabrics</td>
<td>+ Binder free</td>
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<tr>
<td></td>
<td>+ Pulp is inherently &quot;green&quot;</td>
<td>+ Wide choice of staple fibers</td>
</tr>
<tr>
<td></td>
<td>+ Suitable for flushable products</td>
<td>+ Lighter weights possible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ Process is flexible</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>- More paper like</td>
<td>- Expensive raw materials</td>
</tr>
<tr>
<td></td>
<td>- Inherently weak (wet strength, in particular)</td>
<td>- &quot;Green&quot; products add cost</td>
</tr>
<tr>
<td></td>
<td>- Binder (or fibers) required for strength</td>
<td>- Cost leads to low gsm and lean fabrics</td>
</tr>
<tr>
<td></td>
<td>- Increasing strength increases stiffness</td>
<td>- Thickness/bulk hard to achieve</td>
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<tr>
<td></td>
<td>- Limitations at lower weights</td>
<td></td>
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</tbody>
</table>

**Wipes substrate**
Global consumer wipe sales by segment, 2012

- Baby: 40%
- Home: 38%
- Personal: 22%

Source: The Future of Global Markets for Nonwoven Wipes to 2017
Lenzing fibers

- Viscose®
- Viscostar™
- TENCEL®

- absorbent
- trilobal cross-section
- highly absorbent
- SKIN friendly
- soft & smooth
Nonwovens applications

- **Wipes**
  Sustainable convenience

- **Medical**
  Naturally pure

- **Hygiene**
  Safety in sensitive areas

- **Technical**
  Leading fiber innovation
Wipes

- Baby Care
- Personal Care
- Home Care
Wipes Segment claims

- Absorbent
- Pure and chlorine free*
- Soft
- Integrated Process management

* TCF from the production site in Austria, ECF from all other sites

- Strength in wet state
- Low linting
- Smooth and gentle
- Odor free
TENCEL® vs. PES
(Video)

Wicking Rate

100% TENCEL®
vs.
100% PES
Effective lotion management (Animation)

Polyester

TENCEL®
Cosmetics - Face mask
Medical Segment

- Protective fabrics
  - Drapes, gowns, masks, sterile wrap

- Basic woundcare
  - Swabs, gauzes, plaster pads

- Advanced woundcare
  - Gelling fibre and oxidised cellulose
Medical: Segment claims

- Absolutely pure
- Highly absorbent
- Perfectly gentle to the skin
- Consistent quality
Lenzing INNOVATION: Hydrofiber

It gels on contact with wound fluid and rapidly absorbs fluid directly into its fibers - water imbibitions is at ~1100%.

Highly absorbent, useful for medium to heavily exuding Wounds and also good for bleeding wounds.
Lenzing INNOVATION: Hydrogels

**Categories:** amorphous, impregnated & sheets

Contain 80 - 95% water

Suitable for **dry or lightly exuding wounds**

Have a high water content which creates a moist and cool wound surface, is valuable in burns and painful wounds. An absorption of exudates is poor.
Hygiene Segment

- Feminine Hygiene
- Tampons
- Pantyliner
Lenzing INNOVATION: TENCEL® Biosoft - staple fiber as the solution- oil absorbency

New surface treatment

- Oil absorbent
- Water repellent
TENCEL® Biosoft
Technical Segment

- Filtration: automotive (oil) and beverage (wine, beer)
- Electrical separator papers: capacitor in batteries
- Carbon precursors: industrial insulation
- TENCEL® in color catcher
Lenzing INNOVATION: TENCEL® - Precursor for carbonization

TENCEL® Precursor Fiber

Carbonised TENCEL®
Technical segment claims

- High strength in wet state
- Circular sub-micron fibrils
- Food contact approval
- Low thermal conductivity
Ingredient branding - benefits and best practice

Lenzing Viscose® and TENCEL®…

- combine functionality with environmental responsibility
- have the required brand values
- are recognized amongst consumers, media and the relevant value chain

Costco/USA  
Akachan/Japan  
Avangard/Russia
Back-up
The Fiber Structure of Cellulosics

Ultra-Structure of Cellulose fibers

Amorphous regions and the voids of cellulose fibers are accessible by water.
Water distribution in water swollen cellulose fibers

The amount and the distribution of water within the fiber structure can vary remarkably from one cellulose fiber type to the other.

Cotton, TENCEL® and Lenzing Viscose® show big differences in the

- amount of absorbed water
- the distribution of water over the fiber cross section
- pore size and pore distribution
The structure model of TENCEL® fibers

- A dry TENCEL® fiber consists of countless densely packed crystalline nano-fibrils
- When TENCEL® comes in contact with water vapor or liquid water this nano-fibrillar structure will adapt and open countless voids and capillaries
- Water will be absorbed in the amorphous domains and in the capillaries between the crystalline nano-fibrils
- Synthetic fibers do not have such an adaptive nano-fibrillar structure
All New!

You've just purchased the most exciting breakthrough in premium-quality baby wipes.

Kirkland Signature All Natural Fiber Baby Wipes: The FIRST and ONLY baby wipe in the world, featuring the Tencel® brand.

Tencel® is the revolutionary fabric that begins where other fabric ends...You'll see and feel why it's ultra-soft the very first time you use it.

**Better for Baby**

Tencel® is ultra-soft and absorbs faster and better than other wipes.

**Better for Your World**

Our wipes are made from 100% renewable resources.

More than ever, parents like you want products for their children that are naturally made from raw materials but are also safe for the environment.

That's why Tencel® is the ideal New Age material.

- Tencel® is made from trees. Actually, from the cellulose inside trees, which is naturally absorbent and renewable. The trees are grown on non-arable land without the need for pesticides or fertilizers.
- The innovative manufacturing process is environmentally responsible because it effectively uses, recaptures and reuses resources such as water.
- Even the wipes are biodegradable, which creates a natural, sustainable cycle.

Nature returning to Nature.

**Lenzing**

- Derived from natural resources
- 100% renewable
- Biodegradable
- In established international testing, Tencel's manufacturing process is rated more eco-friendly than other fibers. In addition, its carbon footprint is about 30% smaller than that of cotton manufacturing.

Tencel® is advanced care for your baby and for our earth.
Baby wipes - Costco - Taiwan (Feb 2012)
Advertising – New Costco

March 2012

The best just got BETTER!

NOW SOFTER AND THICKER WITH A NEW PATTERN OF QUILTED CLOUDS, MOONS AND STARS!

- Made with TENCEL®, the soft, strong and eco-friendly fiber. TENCEL® is derived from 100% natural plant-based materials.
- Enriched with d-panthenol and vitamin E and hypoallergenic.
- All this for even better comfort and care of your baby.

Only by Kirkland Signature. Only at Costco.

TENCEL® is a registered trademark of Lenzing AG. Only authorized users may use this trademark.

LENZING
LEADING FIBER INNOVATION
Baby Wipe - Akachan – Japan
Face mask - Feverlet – Korea

Feverlet Beauty Mask (FBM)

- 100% TENCEL®
- Promoted by Korean Retailer Charmzone on TV home shopping

- 4 items
- http://www.charmzonenc1.co.kr/eng/brand/feverlet_basic1.html
Face mask - BRTC – Korea

Brand BRTC
100% TENCEL®
6 items

Retail: ami co ltd
www.brtc.co.kr
Baby wipes - Wooil - Korea

ISoo (Wooil's brand), Showpin (Retailer)
The fiber blend is 60/40 Tencel/PES

Available since August, 2011
Dry kitchen towel, brand is Teddy Bear
100% Tencel®, pearl pattern at 100 gsm. Packing is 10, 20 and 30 pcs per pack.
Pantyliners - Yejimiin - Korea

- TENCEL® liner
- In the market since Feb, 2011
- www.tencel-in-hygiene.kr
Multi Layer structure of hygiene products
Sanitary Pad – Yejimiin - Korea

Yejimiin, 100% TENCEL® Top Sheet for sanitary pad; Korea

100% TENCEL® has been adopted to replace the Bamboo top sheet of Yejimiin’s non-oriental herb type sanitary pad. Design is emphasizing the raw material of TENCEL®, eucalyptus.

Co-branded.

The new product is available in the Korea market end Feb/2012.

Retail. Emart
Yejimiin - Korea

Package
Yejimiin - Korea
Pamperino – Avangard - Russia

March 2012

By featuring the Lenzing Viscose® brand Avangard informs parents in Russia about the raw material used in Pamperino baby wipes.
Wipes - Sandler Bio-Textile - Germany

Sandler Bio-Textile:
- 100 % Lenzing Viscose®
- PEFC certified
Baby wipes – Müller - Germany