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Transitioning into a stand-alone company

Bayer MaterialScience is now COVESTRO
Bayer MaterialScience is now covestro

CO = collaboration
VEST = investment
STRO = strong
Transitioning into a stand-alone company
Covestro – getting started

Launch of Covestro was on September 1st, 2015

IPO realized on October 6th, 2015
Structure
Covestro – at a glance

Polyurethanes
Raw materials for rigid and flexible foams

Polycarbonates
Granules and sheets for a wide variety of applications

Coatings, Adhesives & Specialties
Raw materials for coatings, adhesives and specialties

Basic Chemicals
Chlorine production as the backbone for product manufacture
Coatings, Adhesives, Specialties (CAS)

Key markets:

Automotive, transportation, corrosion protection, construction, electrical/electronics, wood and furniture, cosmetics, medical, sports and leisure

Covestro manufactures raw materials for surface coatings, adhesives and specialties.
Coping with Challenges

CLIMATE CHANGE

HELPING THE ENVIRONMENT, CONSERVING RESOURCES
To make the world a brighter place

GROWING CITIES

RISING MOBILITY
Go Green…!

Energy from sun, wind and water is the future

Innovative solutions for low & zero VOC Coatings & Adhesives

Covestro develops new materials to drive the use of ‘renewables’.

Energy from sun, wind and water is the future

Low VOC Coatings for less emission : Environment friendly
China Initiatives.....!!
Enforcement of environmental & safety laws

• Consumption tax for high VOC coatings in China
  • VOC>420g/L : 4% tax

• VOC emission fees
  • Timeframe for Wood Coating
    Stage I (Jul. 2015 – Dec. 31 2016) VOC max. 500g/l
    Stage II (After Jan. 2017) VOC max. 70~80g/l
  • Phase out SB coatings by the end of 2016

• Air quality assessment in passenger car
  • Concentration of organic matter inside the vehicle requirements (GB/T27630-2011)

Do you want to buy a toxic chamber!
Environment Friendly Coatings……How to make it ...!

The complexity of the coating layers on a vehicle is illustrated by this diagram:

- **Solvent Borne Component A**
- **Water borne Component A**
- **Co-Solvent**
- **Water**
- **SB Hardener**
- **WB hardener**

**Can be formulated up to <50 g/l**

<table>
<thead>
<tr>
<th>Component</th>
<th>Co-Solvent</th>
<th>Co-solvent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Standard Hardener</td>
<td>Low viscous Hardener</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**45% less VOC in g/l compared to Solvent Borne formulations**

**38% less VOC in g/l compared to standard hardener formulations**

**80% less co-solvent cost**
Automotive and Transportation

Lighter vehicles consume less fuel

High-performance products from Covestro make for lightweight, design freedom, efficiency and comfort.

Water borne coating emits less VOC
Construction

Buildings account for 40 percent of global energy consumption*.

Substantial energy-savings through rigid foam insulation from Covestro

Solvent Free protective, resistant, decorative coatings
Wood and furniture

Industries

**Wanted: Convenience and comfort**

Covestro combines both – with raw materials for upholstered furniture, mattresses and refrigerators as well as for Environmentally friendly coatings and adhesives.
Adhesives
Why Water Borne Adhesive?

- To improve workplace hygiene in low-wage countries
- To prevent risk of addiction through misuse of solvent adhesives
84% solvent-based PU

<1% others

16% waterborne PU

Status 2004

- Main portion of solvent-based PU adhesives is used for standard shoes in sport shoe production.

Waterborne PU adhesive is state of the art.
### Motivation for waterborne footwear adhesives

**Economic benefits**

<table>
<thead>
<tr>
<th></th>
<th>Solventbased PU</th>
<th>Waterborne PU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids content</td>
<td>15 - 20 %</td>
<td>40 - 50 %</td>
</tr>
<tr>
<td>Adhesive per pair of shoes</td>
<td>30 - 50 g</td>
<td>10 - 25 g</td>
</tr>
<tr>
<td>Solid PU per pair of shoes</td>
<td>4.5 - 10 g</td>
<td>4 - 12 g</td>
</tr>
<tr>
<td>Pairs produced with 1 kg adhesive</td>
<td>20 - 33 pairs</td>
<td>40 - 100 pairs</td>
</tr>
</tbody>
</table>

Pairs of shoes produced with 1 kg adhesive A
Application technology can be varied to meet substrate and end use requirements

<table>
<thead>
<tr>
<th>Heat Activation</th>
<th>Wet Bonding</th>
<th>Cold Tack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td>Textile</td>
<td>Automotive</td>
</tr>
<tr>
<td>Furniture</td>
<td>Wood</td>
<td>Flex Pack</td>
</tr>
<tr>
<td>Shoe</td>
<td>Paper</td>
<td>Others</td>
</tr>
</tbody>
</table>
Waterborne PU adhesives

Application: Automotive Interior
Waterborne PU adhesives

Application: 3D Furniture Facings

- 3D Furniture frontages made by using membrane-press technology
- Heat resistance provide clear benefit for long term performance
Thank you