LANXESS – Leading Supplier of Specialty Elastomers for the Automotive Industry

Stephen Brice
LANXESS – Business Unit Technical Rubber Products
Mobility Days
November 22, 2012, Prague, Czech Republic
Content

- LANXESS portfolio of Technical Rubber Products for automotive
- Introduction of Technical Rubber Products
  - Main headlines by product
  - Importance of automotive
  - Examples of automotive applications
- Conclusions
LANXESS offers by far the broadest portfolio of synthetic rubbers for the automotive industry

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LANXESS TRP is investing and innovating in all of its product lines.
ASTM classification – Temperature versus oil swell
**Introduction NBR**

- **LANXESS**
  - Global market leader
- **Unique property**
  - Oil resistance
- **Market volume**
  - ~500 kt (2010)
- **Average market increase**
  - ~3% per year

**Specialty rubber of acrylonitrile and butadiene**

**Comparison of penetration time**

- **Main product: NBR-bales**

**Krynac®**: Flooring Shanghai airport

**Perbunan®**: Seals in pharma

**LANXESS TRP invested via JV $ 50 million in NBR; producing 30 kt of NBR in China, effective H2-2012**
Automotive end uses represent ~ 50% of the total NBR consumption

- NBR provides superior resistance to degradation by oil and fuels
- Automotive main segment, but also construction, food and pharma
- LXS offers full range of NBR, so also NBR specialities:
  - Krynac: extremely high oil resistance grades: 4450 / 4975
  - Krynac X: for apron and cots
  - Perbunan CHM: Clean High Modulus for injection moulding
  - Baymod N: for friction and plastic modification
- LXS worldwide biggest NBR site in France offers all NBR technologies to design NBR customer solutions
## Introduction HNBR

### HNBR properties
- LANXESS universal high performance rubber with
  - Optimized processing
  - Increased product quality
  - Broader functionality window
- Continuously growing range of applications
- LANXESS is expanding capacity for
  - Belts, Sealants and Gaskets
  - Cable and Hoses
  - Diaphragms, Rolls
  - Oil drill parts and High temperature applications

LANXESS TRP invested in 40% expansion of HNBR capacity, to support its continued growth in HNBR sales. Expansion is effective H2-2012
Automotive applications of LANXESS NBR NBR powder in friction - examples

- In automotive safety parts – brakes
- Preferred material Baymod NXL 3843

Key requirements

- **product:**
  - Flexibility
  - Compactness
  - Friction coefficient
  - Noise
  - Heat resistance

- **process:**
  - powder material preferred
  - dry mixing + sintering process

Examples:
- Clutch disc
- Brake pads
- Brake linings
Automotive applications of LANXESS NBR / HNBR Seals

Examples (incl. oil filter and shock absorber seals)

Typical grades
- Kryvac® 4450
- Perbunan® 3945
- Therban® 4307 and 8505
Automotive applications of LANXESS NBR / HNBR Hoses – Examples

Typical grades

- Perbunan® 1846 (brake)
- Perbunan® 2845 (hydraulic / fluid hoses)
- Therban® 3406 (hydraulic / power steering)
HNBR Therban® – Typical automotive applications

Transmission belts
HNBR Therban® – Typical automotive applications

Dampers / Isolaters
CR properties and global demand

- **Lanxess**
  - market leader EMEA and global no 2 position
- **Unique properties**
  - Low permeability, excellent fatigue resistance
- **Further properties**
  - Low-temperature flexibility, adhesion to reinforcements
- **Market volume**
  ~300-350 kt (2010)
- **Average market increase:**
  ~3-4% per year

LANXESS TRP investing €17 million in 10% expansion of its capacity, incl. implementation of new production technology, becoming effective in 2013
Automotive sector represents ~25% of global CR consumption

- Polychloroprene is produced in a variety of grades in both dry and latex forms
- Dry grades of CR are normally used in industrial and automotive rubber goods such as axle boots, air springs, hoses and belts
- Latex grades of CR are used in waterborne adhesives and dipped goods, such as gloves and CVJ (constant velocity joint) boots

CR - Global Demand by Industries and Segments

- Adhesives: 28%
- Automotive: 26%
- Rubber Products: 18%
- Construction: 12%
- Others: 9%
- Wire & Cables: 5%
- Latex: 2%
Baypren® CR – Typical applications

- Best resistance to dynamic crack formation, very good low temperature flexibility
  => Baypren® 126

- Higher tear resistance at elevated temperatures, higher tensile strength
  => Baypren® 216

Extrusion: smooth surfaces / sharp edges / low die swell; time savings mixing; no staining
=> Baypren® 114

LANXESS
Introduction EVM

EVM properties

- LANXESS’ unique high performance material (> 40% VA)
- EVM provides among others
  - Excellent Flame Retardant Non Corrosive properties
  - UV and Ozone resistance
- LANXESS is expanding capacity to follow growth in;
  - Cable isolation
  - Construction & Protective Films
  - Automotive seals
  - Plasticiser, Modifier of e.g. CR, EPDM, HNBR
  - Shoes, Translucent rubber, (Hot melt) Adhesives

LANXESS TRP is investing €9 million in expansion of EVM capacity to support continued growth in EVM sales, effective H2-2012
LANXESS EVM – Typical applications

Rocker box cover seal

ABS cable

Fuel hose cover
**EPDM properties & global demand**

- **Lanxess**
  - global market leader
- **Unique property**
  - Very good outdoor properties
- **Further property**
  - Easy processability
- **Market volume:**
  - ~1,100 kt (2010)
- **Average market increase:**
  - ~4-5% per year

**LANXESS TRP is investing > € 500 million in EPDM via acquisition of Keltan® EPDM, implementation of ACE™ EPDM technology on its largest EPDM line in Netherlands and a new worldsacle plant in China.**
The EPDM market depends mostly on the automotive industry

- Consumption of EPDM in automotive applications is the major use for EP elastomers accounting for approximately 45-55% of global demand
- EP elastomers are used for various body & chassis parts, radiator & heater hoses, door & window weatherstripping
- The growth of EP elastomers depends on the growth of the automotive industry as a whole

EPDM Global Demand by Industries and Segments

* Polymer Mod and oil additives also mostly for automotive applications
### Keltan® EPDM – Typical automotive applications

<table>
<thead>
<tr>
<th>Solid and sponge sealing systems (60-65% of automotive volume)</th>
<th>Wipers and belts (5% of automotive volume)</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Solid and sponge sealing systems" /></td>
<td><img src="image2.png" alt="Wipers" /></td>
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<tr>
<td><img src="image3.png" alt="Engine mounts" /></td>
<td>![Hoses (10% of automotive volume)]</td>
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<td><img src="image4.png" alt="Radiator hose" /></td>
<td><img src="image5.png" alt="Brake hose" /></td>
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<td><img src="image6.png" alt="Airco hose" /></td>
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Source: Company estimates
Keltan® – LANXESS’ high-performance rubber

- From January 1, 2012, LANXESS has one brand name for all LANXESS high-performance rubber EPDM: KELTAN®
- LANXESS will have one KELTAN® EPDM portfolio and coding, streamlined but matching your requirements today and in the future.
- LANXESS will convert its biggest production line in Geleen, The Netherlands, to its innovative KELTAN® ACE™ technology
- LANXESS will build a large EPDM Plant in China based on Keltan® ACE technology.

KELTAN® – The leading EPDM brand
Keltan® Eco – First commercially available bio-based EPDM

Benefits
- Reduced dependence on fossil resources
- Reduced carbon footprint due to sugar cane
- Lower energy footprint than traditional EPDM
- Truly sustainable & validated by Life Cycle Assessment
- Bio-based content can be measured by ASTM D6866 Carbon-14 test

First achievements
- Keltan® Eco made in Brazil last year > 67% bio-based
- No compromise on quality
- Positive response in the market
- Testing at customers is ongoing

Keltan® Eco helps our customers to produce "greener" products
Tailored solutions for versatile application opportunities

Focus on
- Specialty high-end applications
- Partners with sustainability on agenda
- Green applications
- Applications visible to end consumer

Application opportunities
- Bio-based, flexible, elastic, heat stable, weather resistant, durable, great surface aesthetics
- Moldable, mixable, extrudable, compatible with other synthetic rubbers
Synthetic elastomers in automotive – thus more than tires

Note: applications serve as examples only and may not be used in its entirety in depicted model; elastomers portion only without fillers; content may vary depending on individual model.
LANXESS BU-TRP will split into KEL (EPDM) and HPE (CR, NBR, HNBR/EVM) to develop both businesses

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LANXESS is investing and innovating in all of its product lines
LANXESS – your partner of choice for automotive industry

Conclusions

- LANXESS is very committed to grow & build its specialty synthetic rubber products for automotive applications
  - Acquisition of KELTAN® EPDM, KELTAN® Eco, investments in innovative ACE technology.
  - Debottlenecking of CR, HNBR and EVM capacities.
  - New production of NBR in China.
  - Construction of a new large EPDM plant in China based on ACE technology

LANXESS has thus broadest portfolio of technical elastomers for automotive and would like to be the supplier and development partner of choice for you