Outline

• Introduction of Kraton Polymers
• SBC technology and its applications
• Kraton Polymers’ development strategy for innovation
• New SBCs and potential applications
  – Kraton® A and Kraton® ERS polymers for high melt flow
  – HIMA technology
  – Nexar® technology
  – Injection-moldable automotive soft skin
  – Protective film
• Summary
Kraton is the Global Leader in the SBC Industry

- We invented and commercialized Styrenic Block Copolymer (SBC) technology nearly 50 years ago.
- We design and manufacture customized SBC polymer and compound solutions to meet our leading customers’ specific innovation needs.
- We currently offer approximately 800 products to more than 800 customers, in over 60 countries.
- We employ approximately 920 people in 9 locations in all major regions of the world.

### 2014 Revenue by Geography

- **Europe, Middle East & Africa**: 36%
- **Americas**: 39%
- **Asia Pacific**: 25%
- **2%**
We have a global manufacturing, R&D, and technical support presence

- Broadest manufacturing footprint and production capabilities in the industry
- Sales network covering >60 countries, five R&D centers and global technical support
What are Styrenic Block Copolymers (SBC’s) ?

**Primary Raw Materials**
- Styrene
- Butadiene
- Isoprene

**Products**
- Un-Hydrogenated SBC’s
  - SBS, SIS
- Hydrogenated SBC’s
  - SEBS, SEPS
- Isoprene Rubber (IR)
  & IR Latex
- Compounds
  - SBC’s, PP + Additives

**Consumer Product/Enduse**
- Polymer-modified asphalt
- Tapes, labels, non-woven adhesives and industrial adhesives
- Soft Skin, Personal care, IV bags, Medical tubing
- Medical stoppers, Cold seal adhesives, Surgical gloves, Condoms

Kraton is the only provider of these value components across all products touching a wide array of applications.
Basic Polymer Structure of SBCs

**Styrenic Block Copolymer (SBC)**
SEBS, SEPS, SBS, SIS, SIBS, ...cc

**Advantages of Anionic Polymerization**
1. Precise control of block size and formation
2. Precise control of molecular weight
3. Narrow molecular weight distribution
4. Precise control of midblock structure
5. High hydrogenation ratio

**Domain Size**
~200 Å

**Morphology of Kraton Polymer**
We provide highly-engineered polymer solutions to enhance a wide variety of end use products

*SBCs provide valuable performance enhancement for polymers...*

... in a host of everyday applications
We market Cariflex® products in both solid and latex forms for a wide variety of applications.

- **Polyisoprene rubber latex**
  - Food & medical packaging
  - Dental Dams
  - Catheters
  - Needle shield
  - Condoms
  - Surgical gloves

- **Solid polyisoprene rubber**
  - Transparent soles
  - Resealable insulin plugs
  - Marine coatings

- Strong
- Pure
- Soft
- Elastic
- Transparent
50 Years of Innovation and Growth

1960
Footwear

1970
Viscosity Modifiers

1980
Adhesives

1980
Roof felts

1990
Diapers

1990
Overmolding

2010 and beyond

HiMA Technology

NEXAR

Soft Skins

Cariflex

Semi-Works

2015
Kraton Polymer’s Development Capabilities

Bench-scale polymer development – Kraton Innovation Center Amsterdam

- Five Anionic Bench Scale Units for product development
- Both unhydrogenated and hydrogenated samples
- Sample batch size: 100 g – 5 kg
- Analytical: NMR, SEC, Rheology
- Poly-isoprene testing and processing equipment

Semi Works Plant – Kraton Innovation Center Belpre

- Capacity 100-300 tons per year
- 150-250 kg polymer batch size
- Lot sizes up to 20-50 tons
- Fit for purpose scale-up volumes
- Shorter time to market
- Scale up risk reduction
Polymer development is key to our success in innovation and differentiation...

Giving Innovators Their Edge
Increasing profitability through portfolio shift

Advance growth in core markets via new polymers

Explore new markets & technology concepts

Leverage new polymer technology for new applications
We are continuing to make select investments in breakthrough innovation – High Melt Flow example

Technology Overview:

- High Melt Flow allows us to extend a group of polymers into low viscosity HSBC applications

Commercial Opportunity:

- Low viscosity allows SBCs to compete with other material types in existing processes that were previously inaccessible
  - Automotive (dashboards & interiors)
  - Specialty Polymers - coated fabrics for contract furnishings
  - Hot melt adhesives
MD6951: The Newest Polymer in the Kraton® A Family

Controlled distribution S-E/B/S-S Midblock

<table>
<thead>
<tr>
<th>Polymer</th>
<th>Polystyrene Content (%)</th>
<th>MFR 260°C/5kg (g/10min)</th>
<th>MFR 230°C/2.16kg (g/10min)</th>
<th>Hardness (Shore A, 10s)</th>
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</thead>
<tbody>
<tr>
<td>A1535</td>
<td>58</td>
<td>&lt;0.1</td>
<td>&lt;&lt;0.1</td>
<td>83</td>
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<td>A1536</td>
<td>42</td>
<td>7</td>
<td>&lt;1</td>
<td>61</td>
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<td>5</td>
<td>&lt;1</td>
<td>78</td>
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<td>MD6951</td>
<td>34</td>
<td>250</td>
<td>48</td>
<td>45</td>
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</table>

MD6951 is the NEWEST HSBC in the Kraton A family

**Key Features:**
- Highest Flow properties
- ODT ~ 170° C
- Tensile ~ 2,400psi
- Elongation ~ 700%
- Broad High Tan Delta/Tg ~ +9°C
- FDA Approved
- Available in Dense Pellet with Silica Dust

**Potential Applications:**
- Soft-touch Overmolding
- Protective “Cling” Films
- PU, PP and Many Other Polymer Modifications
- Enhanced Filler Loading/Performance
- Sound Dampening/Deadening
MD1648: The Newest Polymer in the Kraton® ERS Family

<table>
<thead>
<tr>
<th>Kraton ERS polymer</th>
<th>Polystyrene content, %</th>
<th>MFR (230°C/2.16kg), g/10 min</th>
<th>Shore A Hardness</th>
<th>Product form</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1641</td>
<td>33</td>
<td>&lt;&lt;1</td>
<td>58</td>
<td>Crumb</td>
</tr>
<tr>
<td>G1640</td>
<td>31</td>
<td>&lt;1</td>
<td>60</td>
<td>Fluffy crumb</td>
</tr>
<tr>
<td>G1642</td>
<td>21</td>
<td>&lt;1</td>
<td>48</td>
<td>Crumb</td>
</tr>
<tr>
<td>G1645</td>
<td>13</td>
<td>3.5</td>
<td>35</td>
<td>Dense pellet</td>
</tr>
<tr>
<td>G1643</td>
<td>18</td>
<td>18</td>
<td>52</td>
<td>Dense pellet</td>
</tr>
<tr>
<td>MD1648</td>
<td>20</td>
<td>220</td>
<td>52</td>
<td>Dense pellet</td>
</tr>
</tbody>
</table>

MD1648 Key Features:
- 10X lower viscosity than next comparable HSBC polymer
- ODT ~ 200°C
- Excellent elasticity & strong mechanicals
- Available in dense pellet with organic dust

<table>
<thead>
<tr>
<th>Kraton ERS polymer</th>
<th>MFR (230°C/2.16 kg), g/10'</th>
<th>Tensile strength, MPa</th>
<th>Elongation at break, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1643</td>
<td>18</td>
<td>&gt;14</td>
<td>700</td>
</tr>
<tr>
<td>MD1648</td>
<td>220</td>
<td>11</td>
<td>750</td>
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</table>
The low viscosity of MD1648 is expected to enable new applications.
HiMA – Future Road Construction and Maintenance Technology

Objectives
- New asphalt modification technology with significant total road construction cost reduction
- Use of high vinyl polymer platform for better asphalt compatibility and performance upgrade

Value Proposition with MD0243 SBS polymers
- Wearing course
  - 20-30% life cycle extension
  - Fatigue and rutting resistance
  - Maintenance cost reduction
  - Road service downtime reduction
- Base course (additional)
  - Lower road construction cost
  - Longer life cycle

Markets & Applications
- Wearing course for overlays and bridges
- Base course for new roads
Nexar® has superior polymer design for Hi-Tech markets

Novel block copolymer technology combining exceptional wet strength with outstanding transport and selective permeability performance.

**Application Focus**

- Microclimate Control for Textiles
- ERV - Regulate Indoor Air Quality
- Enhance Water Quality
  - Pressure driven separation
  - Capacitive de-ionization
Injection molded Kraton® TPE technologies for soft skin automotive interiors

Benefits of the Kraton® Injection Molded Soft Skins (IMSS) Products

• Simplified process.

• Inherent density advantages versus PVC slush and TPO foils.

• Competitive systems economics versus slush mold PVC skins and thermoformed TPO foils.

• Enables the reuse of scrap and production trim waste.

• Phthalate free and low plasticizer content results in exceptional VOC, Fogging and long term validation performance.

• Designed to meet Automotive OEM Specifications.

Carrier: Polypropylene
Over Molding: Kraton® IMSS
Protective Films

Value proposition

- **MD6649, MD6666 and MD67XX series**: preserves integrity of finished surfaces (metal, glass, plastics)
- **Lower system costs**: one step co-extrusion, no drying need
- **Superior protection**: resists dimples, moisture, UV, clean film
- **High flexibility, adjustable tack**: tack on curved surfaces, removable

![Graph showing adhesion with Kraton co-ex compounds](image)

*Figure 1: Tailoring adhesion with Kraton co-ex compounds - Thickness: 39 micron LDPE / 13 micron adhesive*
Product Families

Kraton™ D
(USBC)

G Compounds

Kraton G
(HSBC)

SEBS

D Compounds

SBS Polymers

Oil Extended SBS

SIS

SBS

SIBS

SEPS

SBS Polymers

Oil Extended SBS

General
SEBS

ERS SEBS

Kraton A

FG SEBS

Oil Extended SEBS

Cariflex™ IR
(Isoprene Rubber)

Solid IR

IR Latex

IR0307
IR0310

G2705
G2832
G7705
G7720
G7723
G7820

G1701
G1702
G1730

G1650
G1651
G1652
G1654
G1657
G1633
G1726

G1640
G1641
G1642
G1643
G1645
MD1648
A1535
A1536
MD1537
MD6951
FG1901
FG1924
FG1925
MD6684
RP6670

G1650
G1651
G1652
G1654
G1657
G1633
G1726

G1640
G1641
G1642
G1643
G1645
MD1648
A1535
A1536
MD1537
MD6951
FG1901
FG1924
FG1925
MD6684
RP6670
Summary

- Kraton Polymers has been a global leader in SBC industry for more than 50 years and created a number of epoch-making innovations in versatile applications.

- New polymer development is key to our success in our innovation and differentiation of products. We continue to make select investment in breakthrough innovation.

- Creative polymer design leads to high melt flow polymers which allow easier processing and broaden the application space for HSBC’s.

- Our new polymers and application know-how are available which can help customers to meet market needs in India.

Thank You!
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