A Global Leader In Specialty Chemicals & Materials

Momentive Specialty Chemicals GmbH.

Automotive Road Show
November 2011
Agenda

• Momentive Specialty Chemicals
  – Company Overview and Composite Applications capabilities

• Epoxy Resin Composites in Automotive Applications

• Presentation of Momentive Specialty Chemicals “Fast Cure Epoxy RTM System”

• Discussion

• Questions & Answers
The New **Momentive**
Transformational Merger Forges An Industry Leader

Combination of Momentive Performance Materials
(formerly GE Silicones / Bayer Silicones/ Toshiba Silicones)

&

Hexion Specialty Chemicals
(formed in 2005: **Shell Epoxy Resins, Bakelite, MGS, Borden**)

**MOMENTIVE™**

Pro forma Revenue $7.8 Billion
Pro forma Adjusted EBITDA $1.3 Billion

Combination of **Technology leaders** into one company makes
Momentive unique Globally and in Epoxy Resins
The “New Momentive” Creates One of the Largest Global Specialty Chemical and Materials Growth Platforms

US$ in millions

**Momentive Performance Materials**  
Craig Morrison
- Revenue: $7.8 bn  
- EBITDA: $1.3 bn

**Epoxy, Phenolic & Coating Resins Division**  
Jody Bevilaqua
- Revenue: $3,413 mm  
- EBITDA: $593 mm
  - Base Epoxy Resins  
  - Specialty Epoxy Resins  
  - Versatic™ Acids & Derivatives  
  - Specialty Phenolic Resins  
  - Oilfield  
  - Powder Coatings  
  - Global Dispersions  
  - Acrylic Monomers

**Silicones & Quartz Division**  
Steve Delarge
- Revenue: $2,720 mm  
- EBITDA: $480 mm
  - Silicone Fluids  
  - Silanes and Resins  
  - Silicone Intermediates  
  - Silicone Elastomers  
  - Silicone Engineered Materials  
  - Urethane Additives  
  - Consumer Sealants and Adhesives  
  - Fused Quartz and Ceramic Materials

**Forests Products Resins Division**  
Dale Plante
- Revenue: $1,713 mm  
- EBITDA: $180 mm
  - Forest Products Resins  
  - Formaldehyde  
  - Formaldehyde Derivatives  
  - Wax Additives
Serving More Than...

- 20,000 customers
- 117 production facilities around the world
- With 10,000 Momentive associates

- Balanced geographic portfolio
- With sales of over $7 billion
- Ability to serve global customers in all major regions worldwide
- New Product Development opportunities across a range of technologies in shared end use markets
  - Automotive, Fiber sizing, Construction, Electronics, Tires, Silicons / Quarz, Phenolic Resins, Coatings Resins (solvent borne, Waterborne), Wind Energy, etc. among others
The Scale and Diversity of Momentive Creates Significant Opportunities

DIVERSIFICATION OF END USE MARKETS AND GEOGRAPHIES PROVIDE STRONG GROWTH OPPORTUNITIES

**PF Revenue by Industry**
- Construction, 17%
- Automotive, 12%
- Energy, 13%
- Other, 10%
- Industrial/Marine, 6%
- Electronics, 6%
- New Home Construction, 5%
- Repair/Remodel, 5%
- Furniture, 5%
- Architectural, 4%
- Adhesives, 2%
- Agriculture, 1%
- Healthcare, 1%

**PF Geographical Revenue**
- N. America, 39%
- Europe, 33%
- BRIC/ROW, 28%
- Other, 8%

**Geographical Revenue by Industry**
- Construction, 33%
- Energy, 13%
- New Home Construction, 12%
- Repair/Remodel, 6%
- Industrial/Marine, 6%
- Electronics, 6%
- Furniture, 5%
- Architectural, 4%
- Other, 10%
- Adhesives, 2%
- Agriculture, 1%
- Healthcare, 1%
Global Leadership Positions Across a Broad Range of Technologies and Industries

THE COMBINED COMPANY WOULD HAVE LEADING MARKET POSITIONS IN MORE THAN 80% OF ITS REVENUE BASE
Broad Geographic Footprint Creates Platform for Growth

THE NEW MOMENTIVE SERVES MORE THAN 20,000 CUSTOMERS FROM 93 GLOBAL SITES
Epoxy Market / Applications

- Composites
  - Automotive
  - Aerospace
  - Wind Energy
  - Pipe & Tanks
  - Recreation

- Fibers
  - Sizing of glass and carbon fiber reinforcements
  - Sizing of Non Woven Products

- Textiles
  - Adhesives, saturants and binders

Expertise in diverse Composites Applications makes us the Technology leader
Epoxy Market / Applications

- **Protective Coatings**
  - Transportation
  - Industrial Maintenance & Marine

- **Civil Engineering**
  - Polymer flooring
  - Sealants
  - Adhesives
  - Grouts
  - Chemical Anchoring
  - Construction (E.Q.) damage prevention

- **Electronics/Electrical Equipment**
  - Transformers (High and Low Voltage)
  - Switch gear

- **Electrical Laminates**
  - Printed Circuit Boards
Epoxy Resins: Epoxy Chemistry and the Resin Chain

Produced by Hexion

Epichlorohydrin

Bisphenol A

Bisphenol F

Novolacs

Amines

Chlorohydrin

Dehydrochlorination

ECH

+ R-OH

NaOH

NaCl / H2O

O-R

Epoxy Product
(Glycidyl ether)

Epichlorohydrin

Epoxy Resins

Chemical Modification

Blending

Compounding

Strength in Making RM’s ensures Consistent Quality
Global Epoxy Manufacturing Network

- Norco, LA: ECH, HPR, Modifiers
- Argo, IL: Waterborne, Fusions, LBR
- Deer Park, TX: BPA, LER, SER
- Barbastro, ES: HPR, LBR, Fusions, Modifiers
- Lakeland, FL: Curing Agents
- Pernis, NL: ECH, BPA/BPF, LER, Fusions
- Duisburg, DE: LER, HPR, Modifiers, Fusions, Compounds, Curing Agents
- Onsan, KR: LER, SER, Fusions, Modifiers, HPR, Curing Agents
- Kunshan, PRC: Specialties
- Kaoishung, TW: LBR, Specialties
- Stanlow, UK: Fusions, Waterborne
- Stuttgart, DE: Compounds, Specialties
- Momentive Confidential
Epoxy R&D: Global and Regional Focus

<table>
<thead>
<tr>
<th>Location</th>
<th>Adhesives</th>
<th>Coatings</th>
<th>Civil Engineering</th>
<th>Wind and Composites</th>
<th>Fibers / Textiles</th>
<th>Electronics</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duisburg Germany</td>
<td>Global</td>
<td>Regional</td>
<td>Regional</td>
<td>Global</td>
<td></td>
<td></td>
<td>Global</td>
</tr>
<tr>
<td>Houston</td>
<td>Global</td>
<td>Regional</td>
<td>Regional</td>
<td>Regional</td>
<td>Global</td>
<td>Global</td>
<td>Global</td>
</tr>
<tr>
<td>Louvain La Neuve</td>
<td>Global</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Regional</td>
</tr>
<tr>
<td>Esslingen Germany</td>
<td></td>
<td></td>
<td></td>
<td>Global Wind Energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onsan</td>
<td>Regional</td>
<td></td>
<td>Regional</td>
<td>Regional</td>
<td>Regional</td>
<td>Regional</td>
<td>Regional</td>
</tr>
</tbody>
</table>

Employ Best Expertise to achieve Rapid Implementation
Epoxy Specialties
Composite Laboratory Equipment

Infusion testing
Epoxy Specialties
State-of-the-Art Testing Equipment

Static & dynamic (servo-hydraulic 100kN) test systems

Momentive Beam Test
Epoxy Specialties
Pilot Laboratory Equipment

Chemistry and Application Development for

Vacuum Pressure Impregnating, Vacuum Casting, Automatic Pressure Gelation, Casting, Potting,

Technology Centre - Germany

Please visit us in Germany !!
Esslingen Test Laboratory approved by Germanischer Lloyd

- following DIN EN ISO/IEC 17025: 2005
- Mechanical Testing
- Analytical Testing
Market Segment **Automotive / Transportation**

- Significant weight reduction in comparison to metals and alloys.
- Short cycle time with high mechanical performance secures competitiveness.
- Systems:
  - **Filament Winding**
  - **Prepreg**
  - **Pultrusion**
  - **Infusion (RTM)**
  - **Tooling and Prototyping**

Weight savings in all applications contributes to overall efficiency
Glass fiber Epoxy Composite Leaf Springs for Light Trucks – Daimler Sprinter: Prepreg Technology

Leaf spring data:

- ca. 1400 mm long,
- ca. 75 mm wide,
- ca. 30 mm thick and
- ca. 160 mm high.

ca. 5.5 kg weight compared to 25 kg steel front leaf spring

Source: IFC Composite
Composite Leaf Springs for Trucks
Leaf Spring stacking arrangement in Mercedes Sprinter

Source: IFC Composite
New growing applications for epoxy glass or carbon fiber reinforced structures

Composite coil springs have been known for a few years. Static mechanical and fatigue performance as well as thermo mechanical (Tg) values are fulfilling all requirements.

Now it’s time for implementation of mass production.

Glassfiber epoxy coil spring model, source: Sardou S.A.
Epoxy System for Truck Roofs and Wind Deflectors
RTM Technology
By Way of Illustration: MAN TG-X Roof

Source: Fritzmeier Composite
Epoxy System for Glass Fiber Reinforced Truck roofs and Wind Deflectors – RTM Technology

RTM mold and truck roof while demolding, source: Fritzmeier Composite
Thermolatent (Fast Cure) Epoxy RTM Systems
for
Automotive Structural Parts suitable for mass production

November 2011
Project Target and Objectives

Development of a thermolatent RTM Epoxy Systems for Automotive Structural car body applications suitable for automotive mass production

A novel Fast Cure System (FC-RTM)

Internal set targets:

Injection time: > 1 minutes (variable)
Curing time: ≤ 2 minutes
Injection & curing temperature: 80 - 125 °C
Tg onset, first run > 95 °C min.
Total cycle time: < 5 minutes
# Targeted Product Performance and Standard Methods

<table>
<thead>
<tr>
<th>Product performance</th>
<th>Unit</th>
<th>Target value</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tg onset, DSC, first run, 10K/min, N₂ gas</td>
<td>°C</td>
<td>&gt; 100</td>
<td>ISO 11357</td>
</tr>
<tr>
<td>Curing degree, DSC conversion</td>
<td>%</td>
<td>&gt; 98</td>
<td>ISO 11357</td>
</tr>
<tr>
<td><strong>Tensile test</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile modulus</td>
<td>MPa</td>
<td>3000 ± 10%</td>
<td>DIN EN ISO 527</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>MPa</td>
<td>&gt; 75</td>
<td></td>
</tr>
<tr>
<td>Elongation at break</td>
<td>%</td>
<td>&gt; 5</td>
<td></td>
</tr>
<tr>
<td><strong>E-modulus DMA</strong></td>
<td>MPa</td>
<td>E’₉₀°C &gt; 0.8* E’₂₃°C</td>
<td>GS 97036</td>
</tr>
<tr>
<td>Linear thermal expansion coefficient</td>
<td>°/K</td>
<td>&lt; 80*10⁻⁶</td>
<td>DIN 53752-A</td>
</tr>
<tr>
<td>Water uptake</td>
<td>%</td>
<td>&lt; 0.2</td>
<td>DIN EN ISO 62</td>
</tr>
<tr>
<td>(7 days at 23 °C, specimen 4x10x80 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volumetric reaction shrinkage</td>
<td>%</td>
<td>&lt; 6</td>
<td>ISO 3521</td>
</tr>
<tr>
<td><strong>Fracture toughness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GᵢC</td>
<td>J/m²</td>
<td>200 ± 20</td>
<td>ISO 13586</td>
</tr>
<tr>
<td><strong>Burning rate</strong></td>
<td>mm/min</td>
<td>&lt; 100</td>
<td>GS 97038</td>
</tr>
</tbody>
</table>
## Targeted Product Performance and Standard Methods

<table>
<thead>
<tr>
<th>Process parameters</th>
<th>Unit</th>
<th>Targeted value</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working tool temperature</td>
<td>°C</td>
<td>80-125</td>
<td>-</td>
</tr>
<tr>
<td>Injection time at 80-125 °C</td>
<td>sec.</td>
<td>&gt;60</td>
<td>-</td>
</tr>
<tr>
<td>Start formulation viscosity at 80-125 °C</td>
<td>mPa*s</td>
<td>&lt;150</td>
<td>DIN 53019</td>
</tr>
<tr>
<td>Viscosity development of system after 60 sec. infusion time at 80-125 °C</td>
<td>mPa*s</td>
<td>&lt;300</td>
<td>DIN 53019</td>
</tr>
<tr>
<td>Mixing ratio</td>
<td>pbw</td>
<td>100/5–100/30</td>
<td>-</td>
</tr>
<tr>
<td>Internal mould release</td>
<td>% mass</td>
<td>&lt;2</td>
<td>-</td>
</tr>
<tr>
<td>Mixing tolerance of the components</td>
<td>Pbw</td>
<td>±2</td>
<td>-</td>
</tr>
<tr>
<td>Curing time at 80-125 °C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conventional system</td>
<td>Min</td>
<td>&lt;5</td>
<td>-</td>
</tr>
<tr>
<td>accelerated system</td>
<td></td>
<td>&lt;2</td>
<td>-</td>
</tr>
<tr>
<td>Fiber volume content (glass + carbon)</td>
<td>% Vol</td>
<td>55</td>
<td>-</td>
</tr>
</tbody>
</table>
### Results - Typical data and reactivity

<table>
<thead>
<tr>
<th>Performance</th>
<th>Unit</th>
<th>Target</th>
<th>KW-11-154</th>
<th>KW-11-86</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing ratio resin / hardener</td>
<td>pbw</td>
<td>-</td>
<td>100 / 16</td>
<td>100 / 16</td>
</tr>
<tr>
<td>Start formulation viscosity at:</td>
<td>mPa*s</td>
<td>&lt; 150</td>
<td>20 ± 3</td>
<td>25 ± 3</td>
</tr>
<tr>
<td>105°C</td>
<td></td>
<td></td>
<td>15 ± 2</td>
<td>16 ± 2</td>
</tr>
<tr>
<td>110°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity development of system at 110°C after:</td>
<td>mPa*s</td>
<td>-</td>
<td>55 ± 5</td>
<td>29 ± 3</td>
</tr>
<tr>
<td>30 sec</td>
<td></td>
<td></td>
<td>250 ± 30</td>
<td>169 ± 10</td>
</tr>
<tr>
<td>60 sec</td>
<td></td>
<td>&lt; 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pot life (100g sample) at 25°C</td>
<td>min</td>
<td>-</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>Gel time (hot plate)</td>
<td>sec.</td>
<td>-</td>
<td>50</td>
<td>53</td>
</tr>
<tr>
<td>110°C*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Gel times measured on the RTM mould at Cannon Italy
Reactivity at 105°C

Viscosity development at 105°C

- KW-11-A-85 105°C
- KW-11-A-86 105°C

Target
Viscosity versus Temperature

**KW-11-154**

![Graph 1](image1)

**KW-11-86**

![Graph 2](image2)

**RHEOPLUS/32 V2.81**
**MCR 300**
**PP 25mm**
**Gap 1mm**
HP-RTM Trials at Cannon (Italy)

Mold dimension: 500 x 375 mm
Thickness: 2 mm

Processing parameters:
- Resin temperature: 65°C
- Hardener temperature: 30°C
- Tool temperature: 110°C
- Mixing pressure: 140-170 bar
- Injection time: 7-10 sec
- Pressure in mould: 50-70 bar
- Curing temperature: 110°C
- Curing time: 2 minutes
### HP-RTM trials of Carbon-reinforced Specimens

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mould:</td>
<td>500 mm x 375 mm</td>
</tr>
<tr>
<td>Thickness:</td>
<td>2mm</td>
</tr>
<tr>
<td>Fiber:</td>
<td>Carbon UD, Toray T 620 MA 0°/90° MA ±45°</td>
</tr>
<tr>
<td></td>
<td>(with and without epoxy binder)</td>
</tr>
<tr>
<td>Layers structure:</td>
<td>5 layers</td>
</tr>
<tr>
<td></td>
<td>3x 0°/90°</td>
</tr>
<tr>
<td></td>
<td>2x ±45°</td>
</tr>
<tr>
<td></td>
<td>(0°/90° // +/- 45° // 90°/0° // -/+ 45° // 90°/0°)</td>
</tr>
<tr>
<td>FVC:</td>
<td>45-50%</td>
</tr>
</tbody>
</table>

**Epoxy binder: EPIKOTE™ Resin 05390 (Momentive)**
## Performance of Carbon-reinforced Specimens

<table>
<thead>
<tr>
<th>Performance</th>
<th>Unit</th>
<th>KW-11-154</th>
<th>KW-11-86</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DSC, 10K/min</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tg onset first run</td>
<td>°C</td>
<td>not possible*</td>
<td>not possible*</td>
</tr>
<tr>
<td>Conversion (DSC enthalpy)</td>
<td>[%]</td>
<td>&gt; 98</td>
<td>&gt; 98</td>
</tr>
<tr>
<td><strong>DMA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>onset</td>
<td>°C</td>
<td>117</td>
<td>104</td>
</tr>
<tr>
<td>tan delta</td>
<td>°C</td>
<td>135</td>
<td>128</td>
</tr>
<tr>
<td><strong>Tensile test</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tensile modulus</td>
<td>MPa</td>
<td>37000 ± 3000</td>
<td>40200 ± 1100</td>
</tr>
<tr>
<td>tensile strength (max)</td>
<td>MPa</td>
<td>400 ± 40</td>
<td>460 ± 12</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>%</td>
<td>2 ± 0.1</td>
<td>2 ± 0.1</td>
</tr>
<tr>
<td><strong>ILSS (SEBN, DIN EN 2563)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0°</td>
<td>MPa</td>
<td>52 ± 2</td>
<td>52 ± 2</td>
</tr>
<tr>
<td>90°</td>
<td></td>
<td>55 ± 5</td>
<td>60 ± 2</td>
</tr>
</tbody>
</table>

* overlap residual enthalpy with Tg

**Formulations contain 1% internal mould release (1.2% in the epoxy resin)**

Epoxy binder EP 05390: approx. 20g/m²
Conclusion

• Several high speed RTM systems (2 min. cure cycle) developed

• 3 Systems selected for HP-RTM trials at Cannon and Krauss Maffe

• Successful HP-RTM trials at Cannon and Krauss Maffe (mould problem)

• Trials confirmed lab testing results with regard to:
  - *Thermolatency during infusion* (Gel time > 45 sec at 110°C)
  - *Better fiber wetting*
  - *Fast cure* (2 min. at 110°C)
  - *Good thermal and mechanical performance* (Tg > 100°C)
  - *No post-cure needed*
  - *Good mould release in combination with Internal Release Agent (IMR)*
  - *Compatible with epoxy binder* (e.g., Epikote 05390)
  - *Very good surface quality* (surface Class A finish)
Current development status with focus on processing and performance

Epoxy chemistry – fiber sizing:

Fiber sizings have significant impact on the performance of the fiber reinforced structure.

Intensive research and development will further lead to new sizing materials which will contribute to improved mechanical performance and consequently to weight reduction of composites.
Current developments with focus on processing and performance

For example, functionalization of preforms with carbon nano tubes.

CNT are “tools” which can enhance mechanical performance. 

Issue in combination with RTM technology = heterogeneous distribution of CNT

Solution: Apply CNT via the preform.

Result: Uniform distribution of particles with
No washout effect
No enrichment of CNT was observed
Expected effect of mechanical enhancement
THANK YOU All for your attention

and last, but NOT least, just a glance where Momentive serves the Automotive Industry....
Automotive Applications within the Momentive group

**Momentive Heritage**
- Underhood
  - Sensors, stoppers & seals
  - Sparkplugboots
  - Ignition cables
  - Air systems seals & flaps
  - Charge air cooler gasket
  - Turbo-hoses
  - Powertrain seals & gaskets
  - Wire harness connectors & cables
  - Engine mounts
  - Fuel system seals, gaskets, o-rings & membranes
  - Exhaust hangers
  - Potting materials for sensitive electronics
  - Adhesives for engine control units
  - Sealing of sensitive areas
  - Thermal interface materials to remove excess heat
  - Fuel additives

- Interior
  - Phenolic resin copper – clad laminates
  - Epoxy resin copper – clad laminates
  - Epoxy resin multilayer – PWB materials
  - Phenolic molding compounds – ash trays
  - Phenolic resins – interior cushioning felt
  - Dispersion for seating applications

- Exterior
  - Phenolic molding compounds
    - starter caps & oil caps
    - switches
    - brake booster valve bodies
    - heat insulators
    - fuel pump impellers
    - various pulleys
    - accumulator pistons – AT devices
  - Precision molded products
    - heat insulators
    - various pulleys
    - accumulator pistons – AT devices
  - Phenolic resins
    - engine shell molds
  - Phenolic fuel additives

**Hexion Heritage**
- Underhood
  - Phenolic molding compounds
    - starter caps & oil caps
    - switches
    - brake booster valve bodies
    - heat insulators
    - fuel pump impellers
    - various pulleys
    - accumulator pistons – AT devices
  - Precision molded products
    - heat insulators
    - various pulleys
    - accumulator pistons – AT devices
  - Phenolic resins
    - engine shell molds
  - Phenolic fuel additives

- Interior
  - Switches & light guides
  - Rain / camera sensors
  - Steering wheels
  - Dashboards

- Exterior
  - Weatherable & abrasion resistant coatings
  - Weatherstrip coating
  - Automotive paint & coatings
  - Car waxes

**Momentive Heritage**
- Underhood
- Interior
- Exterior

**Hexion Heritage**
- Underhood
- Interior
- Exterior

**Hexion Heritage**
- Exterior
  - Phenolic resins
    - Tires
    - Brake linings & pads
  - Precision molding compounds & Precision molded products
    - Brake pistons
  - Epoxy fiber sizing
    - Tire cords

CED coatings, topcoats & refinishing systems
- Epoxy structural panels & adhesives
- Epoxy primer coatings
- Composite structural panels
- Tackifying resins
All Momentive product codes and names, used in this document are

EPON™, EPIKOTE™ and EPIKURE™

which are registered trademarks of Momentive Chemicals, Inc. or an affiliate of Momentive Specialty Chemicals, Inc.
DISCLAIMER: THE MATERIALS, PRODUCTS AND SERVICES OF MOMENTIVE PERFORMANCE MATERIALS INC., MOMENTIVE PERFORMANCE MATERIALS USA INC., MOMENTIVE PERFORMANCE MATERIALS ASIA PACIFIC PTE. LTD., MOMENTIVE PERFORMANCE MATERIALS WORLDWIDE INC., MOMENTIVE PERFORMANCE MATERIALS GmbH, THEIR SUBSIDIARIES AND AFFILIATES DOING BUSINESS IN LOCAL JURISDICTIONS (collectively “SUPPLIERS”), ARE SOLD BY THE RESPECTIVE LEGAL ENTITY OF THE SUPPLIER SUBJECT TO SUPPLIERS’ STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, SUPPLIERS MAKE NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (i) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS, OR (ii) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING SUPPLIERS’ PRODUCTS, MATERIALS, SERVICES, RECOMMENDATIONS OR ADVICE. AFOREMENTIONED EXCLUSIONS OR LIMITATION OF LIABILITY ARE NOT APPLICABLE TO THE EXTENT THAT THE END-USE CONDITIONS AND/OR INCORPORATION CONDITIONS CORRESPOND TO THE RECOMMENDED CONDITIONS OF USE AND/OR OF INCORPORATION AS DESCRIBED BY SUPPLIER IN ITS PRODUCT DATA SHEET AND/OR PRODUCT SPECIFICATIONS. EXCEPT AS PROVIDED IN SUPPLIERS’ STANDARD CONDITIONS OF SALE, SUPPLIERS AND THEIR REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS, PRODUCTS OR SERVICES DESCRIBED HEREIN. Each user bears full responsibility for making its own determination as to the suitability of Suppliers’ materials, services, recommendations, or advice for its own particular use. Each user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating Suppliers’ products, materials, or services will be safe and suitable for use under end-use conditions. Nothing in this or any other document, nor any oral recommendation or advice, shall be deemed to alter, vary, supersede, or waive any provision of Suppliers’ Standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by Suppliers. No statement contained herein concerning a possible or suggested use of any material, product, service or design is intended, or should be construed, to grant any license under any patent or other intellectual property right of Suppliers or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product, service or design in the infringement of any patent or other intellectual property right.

The Momentive logo is a trademark of Momentive Performance Materials Inc.