Microscopy and Efficacy Comparisons of Demand® CS Insecticide with Cyzmic™ CS Insecticide
Demand CS Insecticide: It’s in the Formulation

- Microcaps protect active ingredient for long residual in harsh environments:
  - Heat
  - UV
  - High pH (concrete, brick)
- Complex Polymer Capsule structure
- Capsule Size optimized
- Lipophilic capsules stick to insect cuticle
- Water-Based
  - Non-staining
  - Low odor
Microscopy of *Cyzmic CS Showing Dry Down of Spray*

*Light Microscopy - Movies*

*Cyzmic CS* microcapsules rupture on drying, releasing the active ingredient at the point of dry down.

The bursting microcapsules on dry down indicate that *Cyzmic CS* has fast release technology.
Syngenta’s Demand CS microcapsules do not rupture on drying. The microcapsule walls are still clearly visible in the dried formulation.

The fact that the microcapsules remain intact on dry down indicates that Demand CS has slow release technology.
Microscopy and X-ray microanalysis of *Cyzmic CS* and Syngenta’s *Demand CS and Karate with Zeon Technology Insecticide*

Scanning Electron Microscope

**X500**  **X5000**  **X10000**

Field Emission Scanning Electron micrographs of Syngenta’s *Karate (Agricultural Formulation)*
- **Significant Capsule Rupture**

Field Emission Scanning Electron micrographs of *Cyzmic CS*
- **Significant Capsule Rupture**

Field Emission Scanning Electron micrographs of *Demand CS*
- **Little or No Capsule Rupture**

Karate with Zeon Technology is a Restricted Use Pesticide

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Demand CS vs Cyzmic CS

- Imaging and UV degradation study at Tennessee Tech
  - Includes SEM imaging, accelerated UV degradation w/ quantification
  - Initial observations:
    - Cyzmic CS capsules collapse much more readily under heat & pressure than Demand CS
    - Cyzmic CS contains fewer microcapsules and are less evenly dispersed than Demand CS
    - Formulation contains some crystalline material
Demand CS vs. Cyzmic CS

Demand CS

Cyzmic CS
Conclusions of Microscopy Research

- Demand CS microcapsule structure is unique
- Demand CS capsules do not rupture significantly on dry down of spray
- Cyzmic CS capsules rupture readily on dry down
- Microscopy suggests Cyzmic CS capsule characteristics more similar to Syngenta’s agricultural formulation (Karate with Zeon Technology) which is designed for quick release
- Additional x-ray analysis shows chemical make up of Demand CS significantly different than Cyzmic CS
  - Indicates different inerts and capsule composition
Efficacy Comparisons of Demand CS vs Cyzmic CS
Demand EZ Lasts Under Harsh Conditions

Mortality (24 h) of American Cockroaches on Painted Hardiboard Exposed to UV Light

<table>
<thead>
<tr>
<th>% Mortality</th>
<th>0 DAT</th>
<th>28 DAT</th>
<th>63 DAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand® EZ 0.015%</td>
<td>100</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Demand EZ 0.03%</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Cy-Kick® 0.05%</td>
<td>100</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Talstar® 0.02%</td>
<td>100</td>
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<td>100</td>
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<tr>
<td>Suspend® 0.01%</td>
<td>100</td>
<td>100</td>
<td>0</td>
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<tr>
<td>Tempo® 0.03%</td>
<td>100</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

JSC Contracting, 2007
### Demand CS vs. Cyzmic CS – Control of German Cockroaches

<table>
<thead>
<tr>
<th>Product</th>
<th>1 DAT Aging</th>
<th>30 DAT Aging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand CS</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>0.015%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(lowest label rate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyzmic CS</td>
<td>82</td>
<td>4</td>
</tr>
<tr>
<td>0.03%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(middle label rate)</td>
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</tbody>
</table>

*Roaches exposed to treated glazed tile surface for 5 minutes. Mortality observed 72 hours after exposure.*
Not All Microcaps Are the Same!

- Demand CS Capsule Remains Intact Under Heat & Pressure
- Cyhalocap™ Capsule Damaged Under Heat & Pressure
- Cyzmic CS Capsule Collapse
- LambdaStar™ Insecticide Capsule Fully Collapsed Under Heat & Pressure
- Cyonara™ Has Crystals – No Microcaps

- Heat, UV, Pressure can cause a Mcap to prematurely degrade
- Demand CS – Made with most durable Mcaps
Demand CS: 10,000 microcaps per square inch on treated surfaces

Demand CS

Demand CS
Important: Always read and follow label directions before buying or using Syngenta products. The label contains important conditions of sale, including limitations of remedy and warranty. Karate with Zeon Technology is a Restricted Use Pesticide. Karate with Zeon Technology is highly toxic to bees exposed to direct treatment on blooming crops and weeds. Do not apply this product or allow it to drift onto blooming plants while bees are foraging adjacent to the treatment area. Demand®, Karate with Zeon Technology®, and the Syngenta logo are registered trademarks of a Syngenta Group Company. Cyzmic™ CS and Cyonara™ are trademarks of Control Solutions, Inc. Cyhalocap™ CS is a trademark of BASF Corporation. LambdaStar™ is a trademark of LG Life Sciences Ltd. Syngenta Customer Center, 1-866-SYNGENT(A) (796-4368). www.syngentapmp.com.