



Enhanced High Density Thermoformed Part Performance with Tray-Pak Corporation

NPE 2009

June 24, 2009



Outline

- UPES and Qinnex™ Technology
- Value Chain Collaborative
- Situation
- UPES™ Extrusion Benefits
- The Tray-Pak Experience
- Results
- Outcomes



a product of



QINNEX™ TECHNOLOGY

The technology behind UPES resin delivers enhanced compatibility with various polymers systems and broadens the processing window of most polyolefins.

An Inter-Polymer made from Polyethylene (PE) and Polystyrene (PS) UPES resin offers the following:

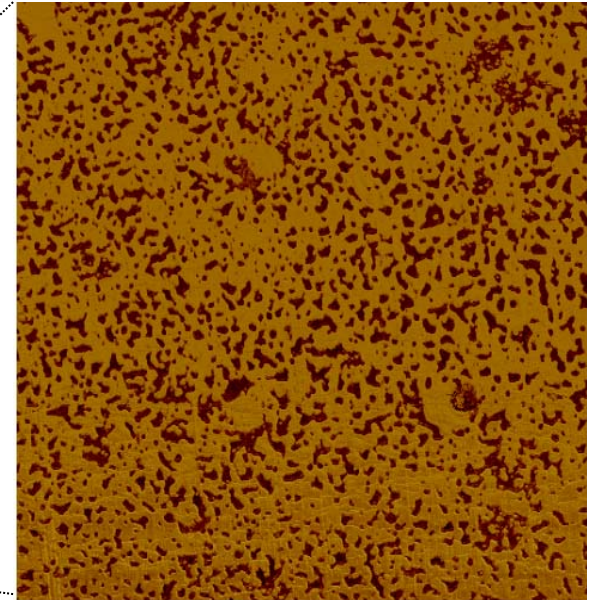
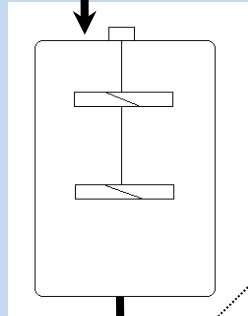
- Variable ratio of the two polymers
- Different types of polyolefins can be used

Tailored solutions available



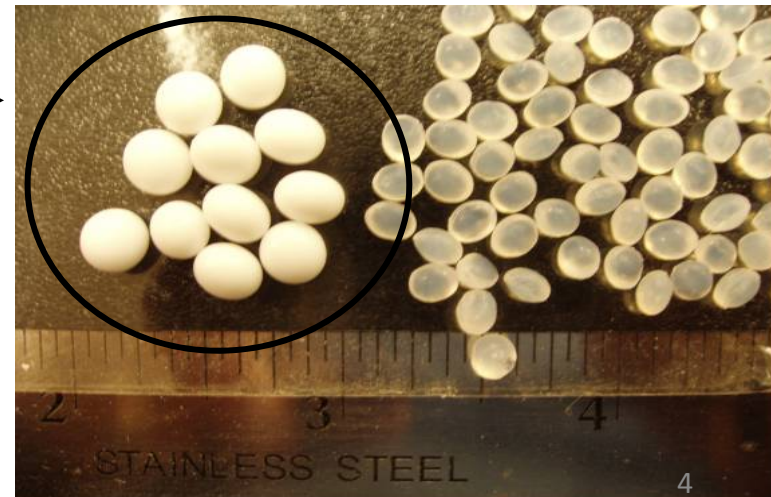
Polyolefin pellets

**Suspension
Polymerization**



0.0 2: Phase 40.0 μm

- ✓ Opaque / white beads
- ✓ bulk density ~ 37.5 to 38.1





*UPES resin is an innovative additive solution, enabled by **QINNEX Technology**, that broadens the processing window of polymer systems, enabling sustainable performance via source reduction, carbon savings and higher throughput.*



Collaboration throughout the Value Chain

NOVA Chemicals :: resin

PRIMEX :: sheet

TRAYPAK :: thermoformed parts

JOINTLY DEVELOPED, INNOVATIVE COST EFFECTIVE SOLUTION



Situation

HDPE Thermoforming Challenges

- Warp
- Increased sheet gauge required to deliver desired performance properties
- Poor material distribution
- Inefficient processing
- Difficulty achieving sustainable output rates



Extrusion Benefits of UPES resin

- Easy processability up to 20wt% loadings
 - No additional equipment/blends easily
 - No output/rate penalties

- Source reduction
 - Downgauging
 - Reduced process variables at lower gauge

MAINTAINS COST COMPETITIVENESS WHILE DELIVERING SOURCE REDUCTION AND INCREASED PERFORMANCE



The Tray-Pak Experience

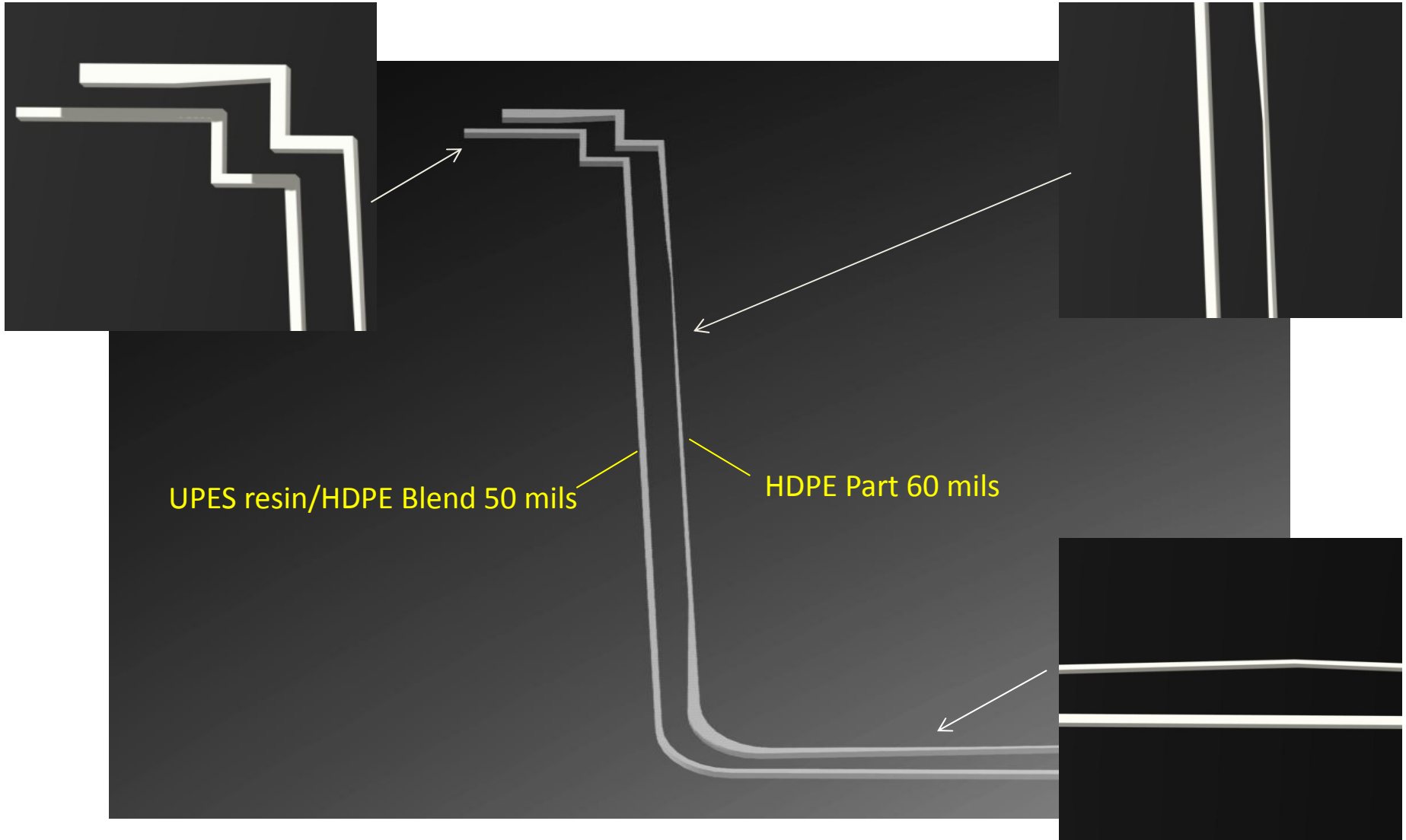
UPES resin/HDPE blends vs. HDPE

- 20% source reduction
- 33% faster forming rates
- > 200% increase in crush strength
- Enhanced part definition
- Shorter start-ups
- Reduced scrap rates
- Increased machine time availability
- Recyclable (HDPE)

DELIVERS A BALANCE OF SUSTAINABLE PERFORMANCE AND COST

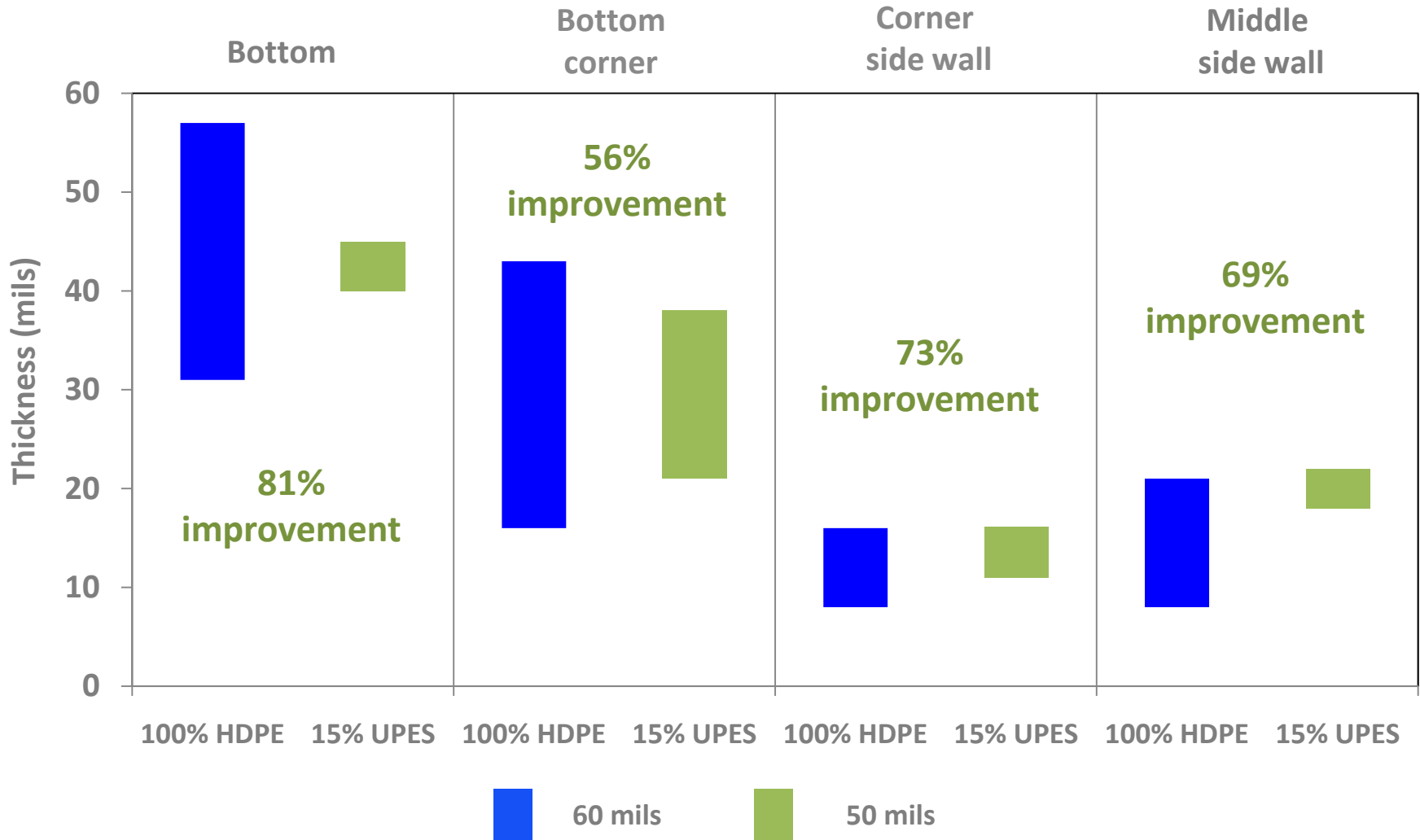


Material Distribution @ Key Part Locations



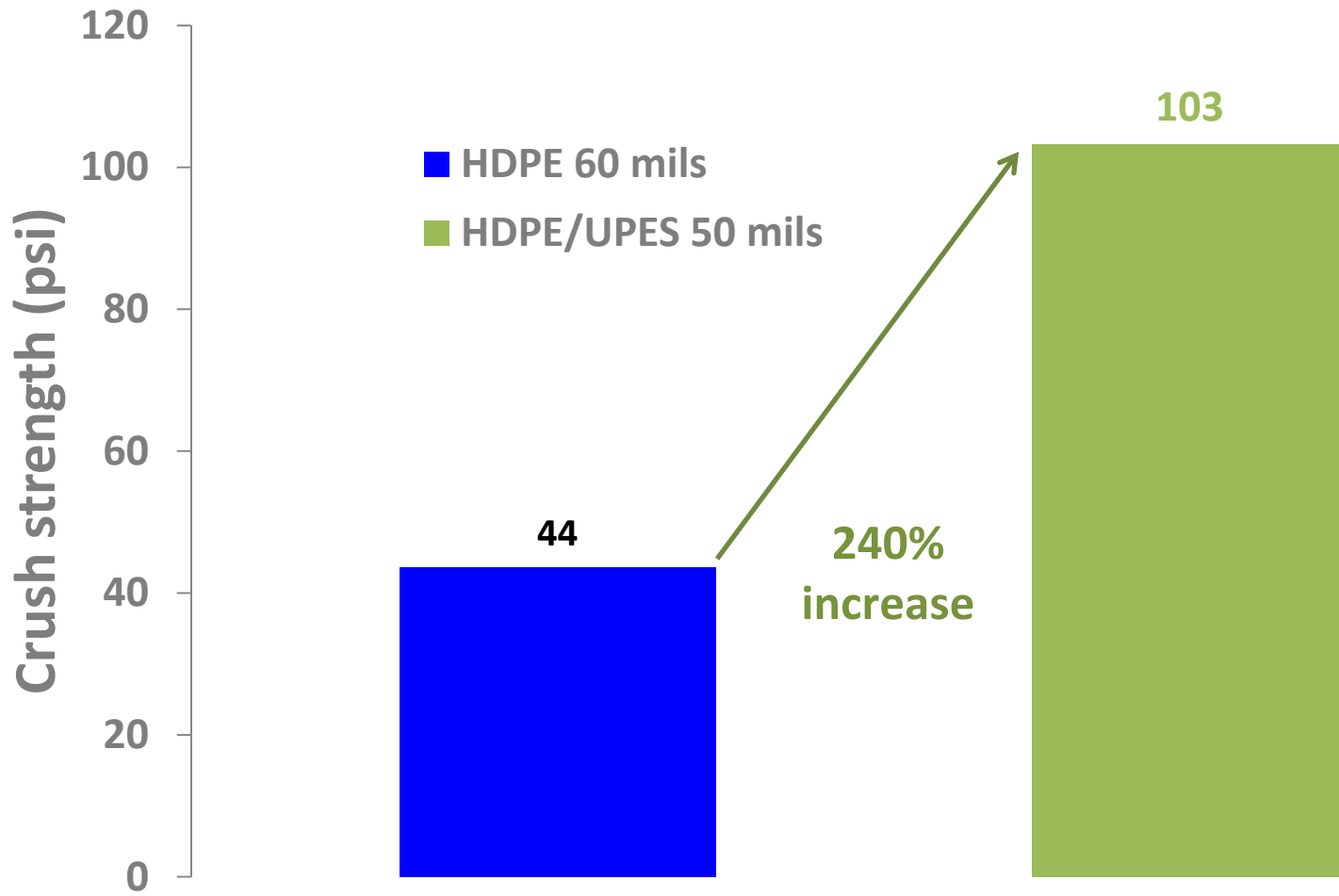


Thickness Variation Improvements at Key Part Locations





HDPE/UPES Performance Improvements





Sustainable Outcomes

- Source reduction with improved part performance
- Cost neutral / potential for improved economics
- Recyclable
 - Back into sheet
 - Into consumer stream





*UPES resin as an additive to HDPE in thermoforming applications enables significant **source reduction** while **increasing performance** at **no additional cost.***



For more information visit www.upesresin.com

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