Plastics Packaging
Design for Recycling

November 1, 2016
Plastics Forming Enterprises LLC.
Kristina Hansen (Technical Director)
Agenda

▶ Plastics Forming Enterprises LLC
▶ Recyclable Plastics Recovery Overview
▶ Plastics Recycling Challenges
  ▶ Labels (Paper, Adhesives, Shrink Sleeves)
  ▶ Mineral Fillers
  ▶ Additives
▶ What Does Good Look Like?
▶ Q&A
Who Is PFE?

- Independent Test Laboratory
- Pilot Plant Simulation
- R & D of Plastics Recycling Systems
- Commercial Development Strategy
MRF (Materials Recovery Facility) Example Process Model

1. TRUCK UNLOAD
2. SORT REMOVE FILM AND BULKY
3. SCREENER CARDBOARD SEPARATION
4. SCREENER PAPER
5. GLASS BREAKING
6. STEEL SEPARATION
7. ALUMINUM SEPARATION
8. PLASTIC SEPARATION PET
9. PLASTIC SEPARATION HDPE
10. PLASTIC SEPARATION PP/OTHERS
Encourage package designers, engineers, brand managers, and decision makers to adopt these APR Guidelines
Best Possible How To Recycle Label
Package Design Consideration for Recyclability

- The designer is in control of the package recyclability recommendations.

- Contamination will...
  - Increase Yield Loss
  - Reduce Value of the Plastics
  - Add to recovery cost
  - Reduce the quality
Levels of testing were created to step through improving the design for recyclability.
Compare The Levels Of Testing

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<th>HDPE &amp; PET Screening</th>
<th>HDPE &amp; PET Benchmark</th>
<th>HDPE &amp; PET Label CGD</th>
<th>PET CGD</th>
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HDPE & PET Screening
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PET CGD
- Grind
- Elutriate
- Wash
- Elutriate
- Extrude
- Solid State
- Injection Mold
- Test
PAPER LABELS
Paper - Problem Definition

- APR Provided
Paper - Recyclability Validation
APR CONFORMING THERMOFORM LABELS
ADHESIVES
Adhesives - Problem Definition
Adhesives - Investigation
Adhesives - Recyclability Validation
SHRINK SLEEVE
Shrink Sleeves - Problem Definition
Shrink Sleeves - Recyclability Validation
OLEFIN FILLERS
Olefin Fillers - Problem Definition
Fillers - Investigation
 Fillers - Recyclability Validation
PET AND OLEFIN ADDITIVES
Additives - Problem Definition

- APR Provided
Additives - Problem Definition
Additives
Recyclability
Validation
What Good Looks Like...
Pilot Plant Simulation
Questions
khansen@plasticsforming.com
603-668-7551