
Driscoll's®
Only the Finest Berries™


Advancing Towards 100% Recyclable Without Compromising Fruit Quality
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Driscoll's Packaging Development and Sustainability Manager
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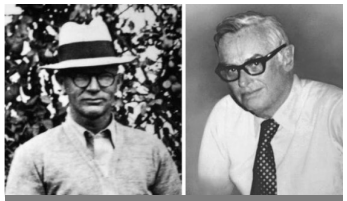
Driscoll's history

A fourth generation family owned business with over 100 years of farming heritage

Late 1860's, the first commercial strawberries grown and sold in the Pajaro Valley

Early 1900's, berries farmed in the Pajaro Valley delivered to freight trains

In 1904, Joseph "Ed" Reiter and his brother-in-law, Richard "Dick" Driscoll began growing strawberries



In 1937, Joseph "Ed" Reiter and his son Joe Reiter, along with Earl Goldsmith, began producing raspberries

In 1940, a group of growers founded The Strawberry Institute for researching and breeding superior varieties of strawberries

1950, Driscoll Strawberry Associates, Inc. was founded to market premium, fresh, California strawberries

Why is the PET clamshell the ubiquitous berry packaging?

- Rigid plastic protects berries from compression damage
- Vents – maintain the right amount of moisture throughout supply chain
- Clear – people can see the berries
- Recycled material – berry clamshells usually contain 50%+ recycled content, from postconsumer beverage bottles
- Recyclable* – reduce reliance on virgin materials, reduce environmental impacts

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** Indirectly prior to 2019, directly starting 2020*

The Challenge

Why were PET beverage bottles getting recycled but PET clamshells, aka thermoforms, were not?

PET bottle recycling rate is 29%*

- BOPP Labels
- Washable label adhesives, less adhesive overall
- High intrinsic viscosity (IV)

PET thermoform recycling rate is 9%**

- Paper labels
- Non-washable label adhesive, high level of adhesive overall
- Absorbent pads and adhesive (only for raspberries/blackberries)
- Low intrinsic viscosity (IV)

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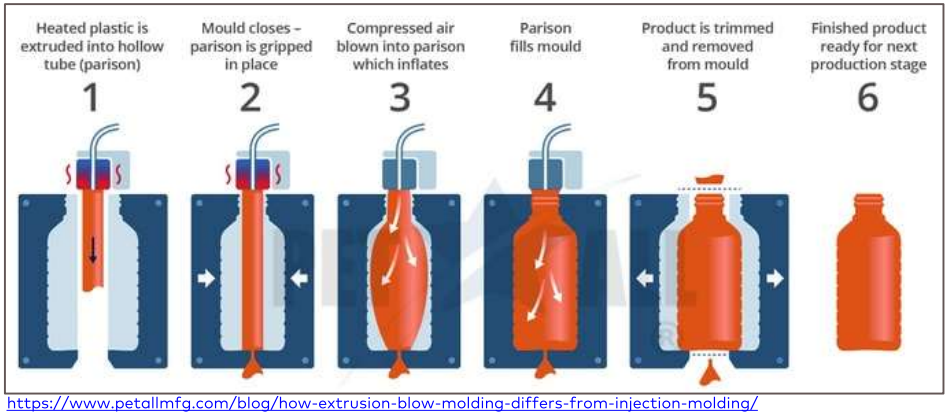
*EPA's 2018 Advancing Sustainable Materials Management: Facts and Figures Report

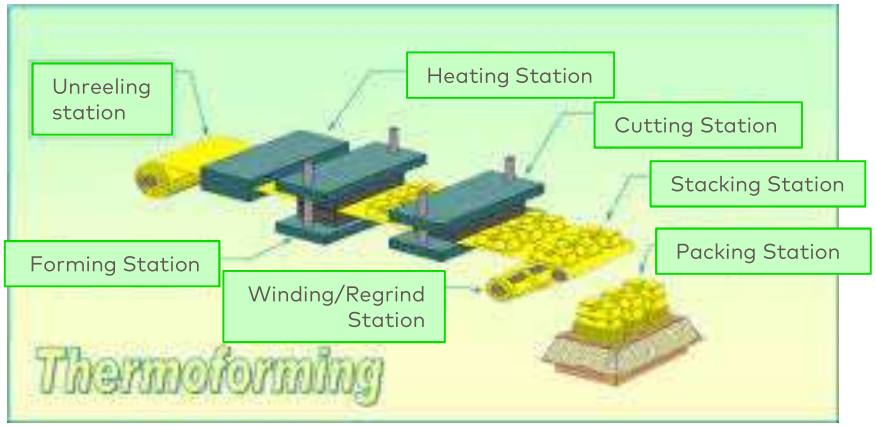
** RRS' PET Thermoform Recycling Cost & Material Flow Analysis

PET Recycling and Intrinsic Viscosity (IV)



https://www.petallmfg.com/blog/how-extrusion-blow-molding-differs-from-injection-molding/

- Due to the process of blown molding PET bottles have a higher IV—they are more flexible*



- Whereas PET thermoformed clamshells have a lower IV—they are more brittle*

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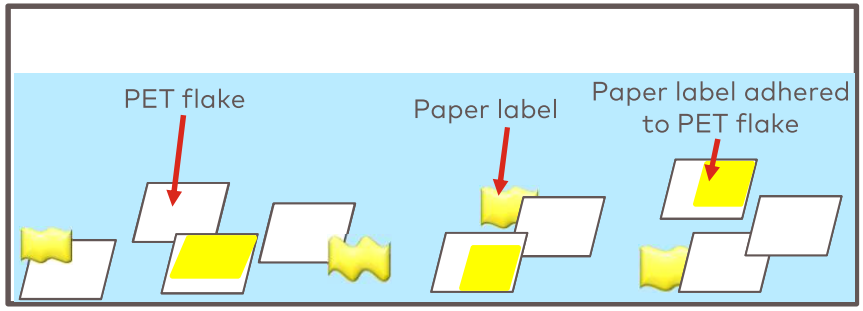
** Virgin PET resin has an IV of 0.82, bottle flake is approximately 0.72, thermoforms can be as low as 0.65*

Labels - Substrate and Adhesives

Problem: Paper labels with non-washable adhesive

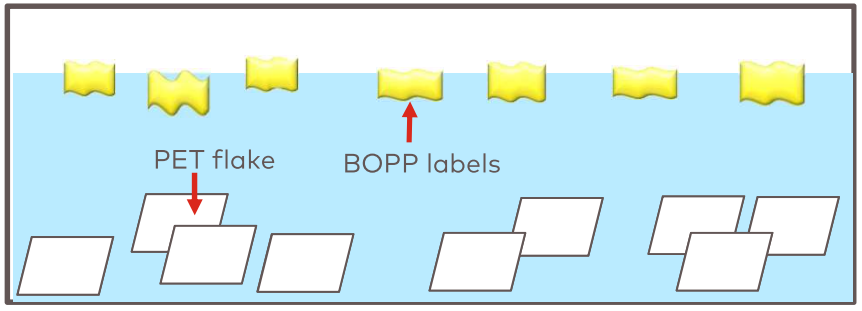
- Loose paper labels sink with the PET, causing contamination (embedding, discoloration)
- Non-washable adhesive (i.e. all temperature adhesive) means adhesive stays on PET flakes, causing contamination (streaking, discoloration)



Paper labels with all temperature adhesive in recycling caustic bath

Solution: BOPP labels with washable adhesive

- Washable adhesive separates more easily from PET flake
- Biaxially Orientated Polypropylene (BOPP) labels float to surface (can even be collected separately and recycled)
- Both innovations significantly reduce contamination



BOPP labels with washable adhesive in recycling caustic bath

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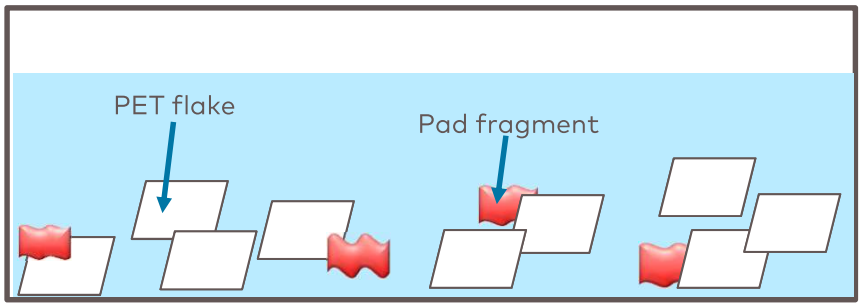
Absorbent Pads

Problem: Pads are polyethylene + cellulose, a mixed material

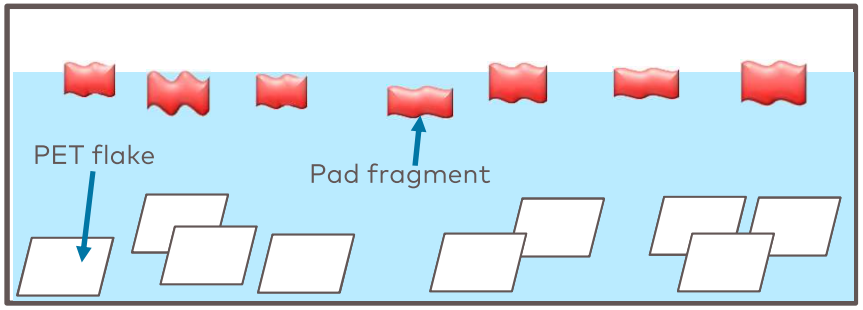
- The pads' purpose is to contain juice from fruit leaks
- Once the cellulose gets wet it sinks, contaminating the PET flake stream

Solution Testing: Absorbent pads that float and perform to the same functional standard

- Designing for the lowest common denominator of behavior – assuming consumers won't take the pad out
- Exploring polypropylene pads as PP floats to surface (can even be collected separately and recycled)



PE and cellulose pads in recycling caustic bath



Potential of PP pads in recycling caustic bath

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Pad Adhesives

Problem

- Adhesive is not water-soluble and does not wash off PET
- Existing thermoformer padding lines are set up to use hot melt (limiting ability to use cold melt that many bottle labels do)
  - Cold melt used by bottles does not lend itself to exact, controlled application as needed for thermoform food safety or aesthetic reasons

Solution search/testing

- Adhesive is that is water-soluble or washes and floats off PET thermoform
- Ideally an adhesive that will work with existing equipment

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Driscoll's Clamshell-to-Clamshell Recycling Initiative

Building a postconsumer recycled PET thermoform market through demand

2018	Research on barriers to PET clamshell recycling
2019	Barriers included MRF infrastructure, reclaimer infrastructure, and labels Asked our suppliers to explore the sourcing of recycled PET thermoform
2020	Required our suppliers to go from 0% postconsumer recycled content from recycled PET clamshells to 10% by EOY
2021	Almost 10% of postconsumer content came from recycled PET clamshells (total postconsumer recycled content was 43%)
2025	Goal is 25% postconsumer thermoforms by 2025

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Resources

- Association for Plastics Recyclers Design Guide
- APR Design Recognition Program: PET innovations on Ink, Labels, Adhesives
- Berry Sustainable
- Driscoll's Becomes First U.S.-Based Produce Company to Sign the New Plastics Economy Global Commitment

Thank You

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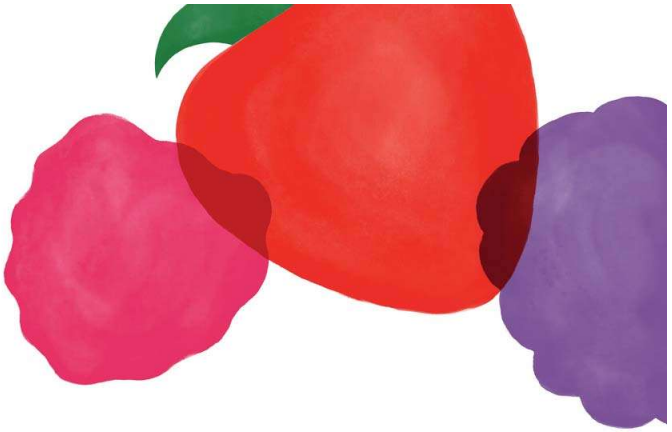
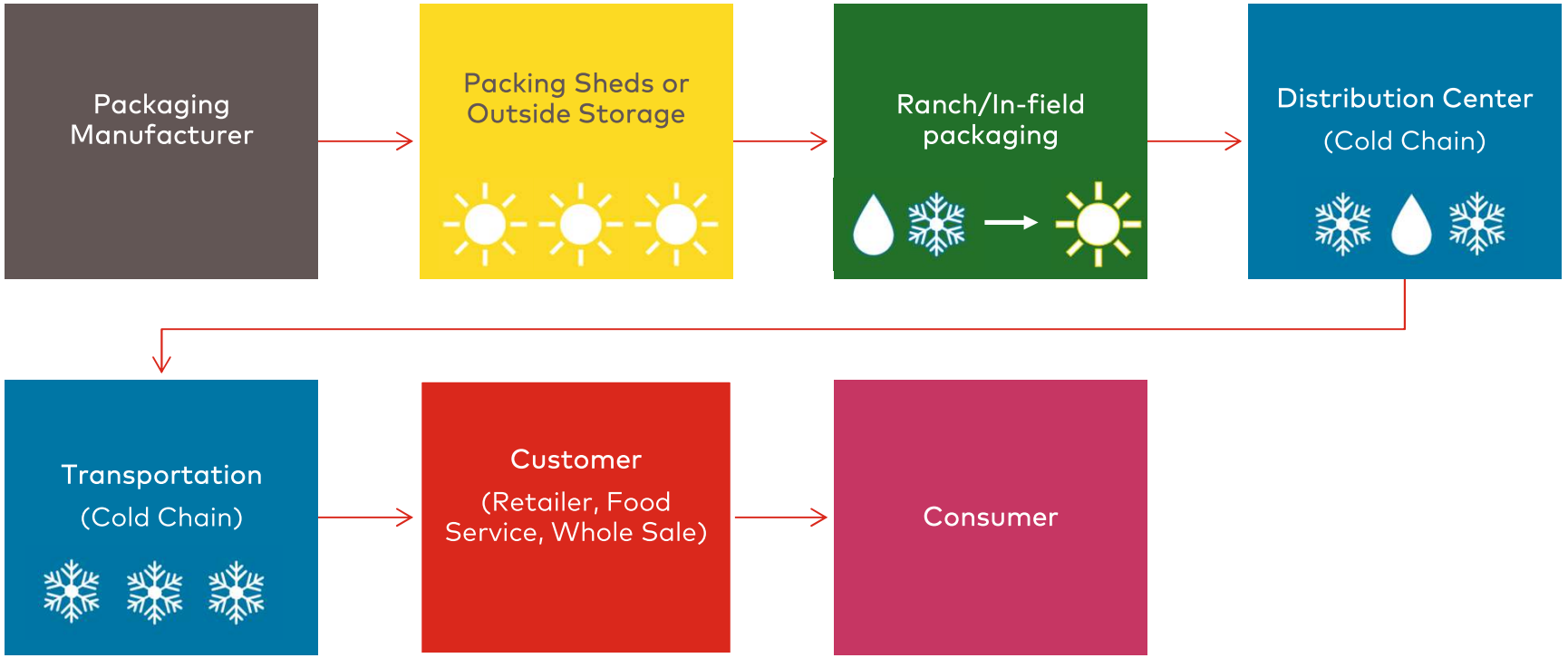


Appendix

Packaging and Berry Supply Chain



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