The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures).

- **Bags, films, and pouches:**
  - Paper (see paperboard guide)
  - Plastic: PE, HDPE, MDPE, LDPE, and LLDPE
  - Made from multiple materials
  - Plastic: nylon, PET, PP, PVC, PVDC
  - Heat-in-the-bag, advanced barriers, meat film and soaker pads, customer demand

- **Bottles, jars, jugs, and tubs:**
  - Glass
  - Plastic: HDPE, LDPE, PET, PP

- **Boxes:**
  - Paperboard, corrugate, molded fiber

- **Canisters and cartons:**
  - Paper-based including:
    - Simple containers without metal (see paperboard guide)
    - Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
    - Coated containers for refrigerated products (e.g., gable top)
  - Paper-based containers with metal tops or bottoms
  - Coated paper-based containers for frozen products

- **Cans:**
  - Steel, aluminum (including aerosols and others)

- **Trays, clamshells, thermoforms:**
  - Paper and fiber-based (see paperboard or molded fiber)
  - Plastic: PET, PP
  - Plastic: EPS, PS, PVC

- **Other:**
  - Blister packs (multiple materials)
  - Foam cushion, dunnage, inserts
  - Flat plastic
  - Tubes made from multiple materials
  - Small plastic containers or flat plastic (<2” in more than one dimension)

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October 2022 Updates

We aim to keep The Recycling Playbook a useful tool to support the transition to more sustainable packaging. As a result, periodic changes are expected since recycling and packaging are evolving.

The following changes were made to reflect the current state of U.S. recycling:

**Some rigid PP packages were moved into the “optimize” classification** where suppliers should work to make sure all design features are compatible with the recycling system

- The applicable packages were [reclassified by How2Recycle](https://www.how2recycle.com) in 2022 from considered for Check Locally labels to Widely Recyclable labels.

Additional guidance was added to:

- Clarify that PFAS in fiber packaging should be avoided per [How2Recycle’s position](https://www.how2recycle.com/pfas)
- Include [the U.S. Plastics Pact](https://us-plasticspact.org) problematic and unnecessary materials
- Include design guidance from the [Consumer Goods Forum’s](https://www.consumergoodsforum.org) Golden Design Rules
- Include the small format working group at [The Sustainability Consortium](https://www.sustainabilityconsortium.org)
- Include the PET working group and end-market tool at [The Recycling Partnership](https://www.therecyclingpartnership.org)
- Clarified RFIDs should be avoided in plastic packaging
- Include more information about PE Film design from [APR Design® Guide](https://www.aprdesignguide.org)
- Add more information about labels on glass packages
- Include design guidance from the [Aluminum Association](https://www.aluminum.org)
- Include recyclability information from the [American Forest and Paper Association](https://www.aff.org)
- Added information on composting systems and materials that are compatible with these systems
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SECTION TWO: Definitions (p. 7)

SECTION THREE: How to use the playbook (p. 11)

SECTION FOUR: Guides by Packaging Format
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  • Bottles, jars, jugs, and tubs (p. 28)
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Bags, films, and pouches:
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• Plastic: PE, HDPE, MDPE, LDPE, and LLDPE

Bags, films, and pouches:
• Made from multiple materials
• Plastic: nylon, PET, PP, PVC, PVDC

Bags, films, and pouches: Heat-in-the-bag, advanced barriers, meat film and soaker pads, customer demand

Bottles, jars, jugs, and tubs:
• Glass
• Plastic: HDPE, LDPE, PET, PP

Bottles, jars, jugs, and tubs:
• Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials

Boxes: paperboard, corrugate, molded fiber

Canisters and cartons:
• Simple containers without metal (see paperboard guide)
• Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
• Coated containers for refrigerated products (e.g., gable top)

Canisters and cartons: paper-based containers with metal tops or bottoms

Canisters and cartons: coated paper-based containers for frozen products

Cans: steel, aluminum (including aerosols and others)

Trays, clamshells, thermoforms:
• Paper and fiber-based (see paperboard or molded fiber)
• Plastic: PET, PP

Trays, clamshells, thermoforms:
• Plastic: EPS, PS, PVC

The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures)

Other:
• Blister packs (multiple materials)
• Foam cushion, dunnage, inserts
• Flat plastic

Other:
• Tubes made from multiple materials
• Small plastic containers or flat plastic (<2” in more than one dimension)
INTRODUCTION

For companies setting recyclable packaging and recycled content goals, this document is a supplemental resource for your consideration. Information in this document is presented by packaging format (i.e., bottle, box, etc.) and is focused on the most common packaging formats found in Walmart stores. This document is not exhaustive for all packaging formats nor is the information intended to be prescriptive. For more general information on sustainable packaging, please refer to Walmart’s Sustainable Packaging Playbook.

For each major packaging format, we have provided information which is designed to capture recyclability information based on existing infrastructure (with a focus on North America). This document also provides perspective on feasible recycled content levels based on current industry practice. We have also tried to identify design elements which can pose barriers or challenges to recycling.

Walmart encourages all suppliers to take a life cycle perspective when seeking to optimize package design. While we want to see all of our suppliers striving to minimize material usage and advance a circular economy for plastics, it is also important to consider potential trade-offs of material choices elsewhere in the life cycle and take those into consideration when making design choices (e.g., increased package weight impacting transportation greenhouse gas emissions, responsible sourcing of fiber based packaging, etc.).

Consider using consumer-friendly recycling labels, like the How2Recycle® label to make it easier for customers to know what they can and can’t recycle. For more information, visit: members.how2recycle.info.

Thank you to Pure Strategies, The Association of Plastic Recyclers (APR), and the Sustainable Packaging Coalition who were key partners in the development of this playbook. Additional information on plastic packaging is available in the APR Design® Guide For Plastics Recyclability.

Suppliers are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging.
SUSTAINABLE PACKAGING OVERVIEW

By optimizing design, sourcing sustainably and supporting recycling in packaging, companies can work to reduce greenhouse gas emissions through reduced weight in transportation, increased use of recycled content, and mitigating carbon from landfill. Designers, manufacturers and brands have a unique opportunity to help deliver more efficient, innovative, and sustainable packaging to shelf. The Recycling Playbook is for companies setting recyclable packaging and recycled content goals.
Bags, films, and pouches:
- Paper (see paperboard guide)
- Plastic: PE, HDPE, MDPE, LDPE

Bags, films, and pouches:
- Made from multiple materials
- Plastic: nylon, PET, PP, PVC, PVDC

Bags, films, and pouches: Heat-in-the-bag, advanced barriers, meat film and soaker pads, customer demand

Bottles, jars, jugs, and tubs:
- Glass
- Plastic: HDPE, LDPE, PET, PP

Bottles, jars, jugs, and tubs:
- Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials

Boxes:
- Paperboard, corrugate, molded fiber

Canisters and cartons:
- Paper-based including:
  - Simple containers without metal (see paperboard guide)
  - Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
  - Coated containers for refrigerated products (e.g., gable top)

Canisters and cartons:
- Paper-based containers with metal tops or bottoms
- Coated paper-based containers for frozen products

Cans:
- Steel, aluminum (including aerosols and others)

Trays, clamshells, thermoforms:
- Paper and fiber-based (see paperboard or molded fiber)
- Plastic: PET, PP

Trays, clamshells, thermoforms:
- Plastic: EPS, PS, PVC

Other:
- Blister packs (multiple materials)
- Foam cushion, dunnage, inserts
- Flat plastic

Other:
- Tubes made from multiple materials
- Small plastic containers or flat plastic (<2" in more than one dimension)

The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures)

Other:
-DEFINITIONS
WHAT DOES RECYCLABLE MEAN?

Walmart utilizes the Ellen MacArthur Foundation’s definition for recyclability for purposes of measuring progress on Walmart’s global sustainability goals. The definition is broken down into two steps:

**Step 1**: Does a ‘system for recycling’ exist in practice and at scale for this packaging category (i.e., at least 30% recycling rate is achieved for over 400 million inhabitants)?

**Step 2**: Do the various packaging components fit that ‘system for recycling’?

This guide focuses on Step 2 of the Ellen MacArthur Foundation’s Definition for Recyclability (i.e., providing information on packaging components that fit the “system for recycling”).

Packages identified as recyclable in this playbook meet many local requirements for recyclable claims and have established systems for collection, sorting, processing, and use again.

For those packages with less than 30% recycling rate achieved for over 400 million inhabitants (i.e., “at scale”), companies are encouraged to work to increase recycling rates to achieve Step 1 of Ellen Macarthur Foundation’s definition.
A VIEW OF THE RECYCLING SYSTEM STAGES AND CONSIDERATIONS

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection</td>
<td>Collection available for a substantial majority of consumers</td>
</tr>
<tr>
<td>Sortation</td>
<td>Packages are separated and aggregated for further processing</td>
</tr>
<tr>
<td>Processing</td>
<td>Commercial processes recover material</td>
</tr>
<tr>
<td>End-Market</td>
<td>The recycled material is used in new products</td>
</tr>
<tr>
<td>Consumer</td>
<td>At least a 30% recycling rate achieved for over 400 million inhabitants</td>
</tr>
</tbody>
</table>

**Not recyclable**

- **Change** to be recyclable OR **Advance** innovation and work with local collective organizations to improve recycling (without being problematic to the existing systems) or another circular economy solution (e.g., reusable or certified compostable package for appropriate uses)

**Recyclable**

Walmart utilizes the Ellen MacArthur Foundation’s definition for recyclability, and ISO definitions for recycled content, compostability, and reuse for purposes of measuring progress on Walmart’s global sustainability goals.

- May be recyclable in some regions (e.g., U.S.), but does not meet the definition for being globally recyclable
- **Optimize** design for existing recycling systems and work to increase recycling rates above 30%
EXAMPLES OF RECYCLING CHALLENGES FOR PACKAGING ACROSS THE SYSTEM

**Collection**
- No collection for PET or PP films.
  - If mixed with store drop-off (for PE) it gets discarded as waste.

**Sortation**
- Shrink sleeves can decrease the surface available to detect the plastic type for sorting.
  - Undetected PET and HDPE packages get discarded as waste.

**Processing**
- Paper labels on plastic may not easily separate in processing.
  - The paper is not recovered and contaminates the plastic stream, reducing yields and quality.

**End-Market**
- Very small amounts of PVC in PET are unacceptable for end markets.
  - The collected, sorted, and recovered PET with PVC is contaminated, diminishing PET’s value.

**Consumer**
- Collection is less than 30% for PE plastic film through store drop-off programs (collection needs to improve).

---

Examples of recycling challenges at each stage:

- Walmart utilizes the Ellen MacArthur Foundation’s definition for recyclability, and ISO definitions for recycled content, compostability, and reuse for purposes of measuring progress on Walmart’s global sustainability goals.
<table>
<thead>
<tr>
<th>OPTIMIZE</th>
<th>CHANGE</th>
<th>ADVANCE</th>
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<tr>
<td>• Tubes made from multiple materials</td>
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<td></td>
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<tr>
<td>• Small plastic containers or flat plastic (&lt;2” in more than one dimension)</td>
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HOW TO USE THE PLAYBOOK
Recyclable packages

Small issues can be detrimental or make a package not compatible with recycling (e.g., color, labels)

**ACTION:** Use this playbook to help design out elements not recyclable and detrimental to recycling

Packages that are not recyclable

These may contaminate high value recycling streams or have feasible replacements

**ACTION:** Switch to a recyclable package, see this playbook for ideas

Packages that are not widely recyclable

Barriers in recycling systems at this time

**ACTION:** Invest and engage in the development of a recycling, reuse, take-back, or composting solution
## OPTIMIZE, CHANGE, OR ADVANCE PACKAGING AS APPLICABLE

Review the following pages for guidance and ideas for optimizing packages that are potentially recyclable and changing packages that are not recyclable or advancing development to get to a circular economy solution.

<table>
<thead>
<tr>
<th>OPTIMIZE</th>
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<tr>
<td><strong>Use this playbook to help design out elements not recyclable and detrimental to recycling</strong></td>
<td><strong>Switch to a recyclable package, see guides for ideas</strong></td>
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<td>- Paper</td>
<td>- Made from multiple materials</td>
<td>- Heat-in-the-bag, some advanced barriers, meat film and soaker pads, customer demand, life cycle considerations</td>
</tr>
<tr>
<td>- Plastic*: PE, HDPE, MDPE, LDPE, and LLDPE</td>
<td>- Plastic: nylon, PET, PP, PVC, PVDC</td>
<td></td>
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<tr>
<td>Bottles, jars, jugs, and tubs:</td>
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</tr>
<tr>
<td>- Glass</td>
<td>- Plastic: acrylic, PETG, PS, PVC, miscellaneous plastics, and multiple materials</td>
<td>- Some PP</td>
</tr>
<tr>
<td>- Plastic: HDPE, LDPE*, PET, some PP*</td>
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</tr>
<tr>
<td>Boxes: paperboard, corrugate, and molded fiber</td>
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<tr>
<td>Canisters and cartons: paper-based including:</td>
<td>Canisters and cartons: paper-based containers with metal tops or bottoms</td>
<td>Canisters and cartons: coated paper-based containers for frozen products</td>
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<tr>
<td>- Simple containers without metal (e.g., paperboard)</td>
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<td>- Multi-layer containers for shelf-stable products (e.g., aseptic boxes) and coated containers for refrigerated products (e.g., gable top)</td>
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<tr>
<td>Cans: steel, aluminum (including aerosols and others)</td>
<td></td>
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</tr>
<tr>
<td>Cushion, dunnage, and inserts:</td>
<td>Cushion, dunnage, and inserts: expanded polystyrene and other resins</td>
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</tr>
<tr>
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<tr>
<td>- Plastic*: PE</td>
<td></td>
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<tr>
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<tr>
<td>- Paper and fiber-based</td>
<td>- Plastic: EPS, PS, PVC</td>
<td>- Plastic: PET</td>
</tr>
<tr>
<td>*Plastic packages that have established recycling systems in the U.S., but not yet at rates consistent with the requirements for global reporting of progress according to the New Plastics Economy Global Commitment.</td>
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<tr>
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<td>- Small plastic containers (&lt;2” in more than one dimension)</td>
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</tbody>
</table>
Steps to take to “optimize” your package by avoiding elements not recyclable and elements detrimental to recycling in order to support sortation, processing, and end markets - Refer to the rest of this playbook for more information; follow the green pages and avoid the challenges on the gray pages.

OPTIMIZE Design Guides for Recycling

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the color compatible with recycling?</td>
<td>NO</td>
<td>Change the design</td>
</tr>
<tr>
<td>Is the label compatible with recycling?</td>
<td>NO</td>
<td>Change the design</td>
</tr>
<tr>
<td>Is the closure compatible with recycling?</td>
<td>NO</td>
<td>Change the design</td>
</tr>
<tr>
<td>Are any other materials on the package compatible with recycling (e.g., inks, additives, adhesives, attachments)?</td>
<td>NO</td>
<td>Change the design</td>
</tr>
<tr>
<td></td>
<td>YES</td>
<td>Change the design</td>
</tr>
</tbody>
</table>

- **Change the design**
  - Label coverage may be an issue, (e.g., shrink sleeve labels covering too much of the package)
  - Make sure that the label material, ink, and adhesive is compatible (e.g., no plastic on aluminum cans)

- **Change the design**
  - Metal closures prevent recyclability of plastic and paper packages – including metal caps, rings, springs

- **Change the design**
  - Oxygen and nylon barriers in plastic prevents recyclability of the packaging
Steps to take to “change” to a recyclable package and optimize its design for recycling

Are there recyclable packages that can be used (e.g., those noted in this playbook)?

- **NO**
- **YES**

Have you optimized the recyclable package, including color, labels, and other design options?

- **NO**
- **YES**

Do you have a widely recycled or store drop-off label from How2Recycle?

- **NO**
- **YES**

Have you tested all the recyclable options?

- **NO**
- **YES**

If the package is not an “advance” or exception package noted in this playbook, innovate to find a recyclable option

Refer to the design guides in this playbook for the package type and address key issues

Submit your package to How2Recycle for their review and design for recycling for all major packaging components by them (unless there are exceptions noted in this playbook)

Walmart’s aspiration is zero plastic waste... not zero plastic. While we want to find ways to use less plastic, major packaging changes should be done with thought to ensure there aren’t major trade-offs, such as an increase in greenhouse gas (GHG) emissions. If you participate in Project Gigaton, you can use the Project Gigaton packaging calculators to estimate potential GHG impacts for purposes of reporting in that program.
While experts recommend designing your packaging to fit the existing recycling system (optimizing or changing the package), there are some packages close to being recyclable or some that have no short-term options. Below are steps to take to “advance” your package by developing a recycling, reuse, take-back, or composting solution for the package - Refer to the rest of this playbook for more information

- Have you explored all possible recyclable options (including changing the materials used)?
  - NO
  - YES
  - What are the specific recycling system barriers with the package (collection, sorting, recovery, end market, consumer)?
    - DO NOT KNOW
    - YES
    - Is there potential to address the barriers with improvements in the recycling system (e.g., within five years)?
      - NO
      - YES
      - What organizations can you partner with to address the recycling system barriers (e.g., packaging suppliers, industry organization, government recycling industry)?

- Comprehensively evaluate different recyclable packages
- Consult with experts and recycling organizations (e.g., Association of Plastic Recyclers) and support collaborative initiatives that address the barriers of your packaging – see next slides
- Explore a different circular economy solution
  1. Can it be refilled or reused for the same purpose a number of times?
  2. Is a certified compostable package appropriate? See the Appendix for guidance on this.
  3. Can the package be collected at scale for another purpose (e.g., TerraCycle)?
When changing package design for recyclability, aim for:
• Optimizing each stage of the recycling system
• No major trade-offs for environmental or other impacts

Walmart’s aspiration is zero plastic waste... not zero plastic. While we want to find ways to use less plastic, major packaging changes should be done with thought to ensure there aren’t major trade-offs, such as an increase in greenhouse gas (GHG) emissions. If you participate in Project Gigaton, you can use the Project Gigaton packaging calculators to estimate potential GHG impacts for purposes of reporting in that program.

Design changes for recyclability have different levels of investment, optimizing packages has lower barriers and thus requires less investment of time and cost than most changes and advances.
## Key Levers of Change to Support Recycling

*Optimize and Advance packages have key levers of change for recycling, noted below – refer to the rest of this playbook for additional information.*

*Change packages should switch to a recyclable package – refer to the rest of this playbook for ideas.*

**Bold=primary focus**

### Optimize packages levers of change

<table>
<thead>
<tr>
<th></th>
<th>Remove contaminants</th>
<th>Use compatible labels</th>
<th>Engage consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advance: Bottles, jars, jugs, and tubs made from PP</strong></td>
<td>Remove contaminants</td>
<td>Engage consumer</td>
<td>Improve sortation</td>
</tr>
<tr>
<td><strong>Advance: Canisters and cartons: coated paper-based containers for frozen products</strong></td>
<td>Remove contaminants</td>
<td>Engage consumer</td>
<td>Improve collection</td>
</tr>
<tr>
<td><strong>Advance: Trays, clamshells, and thermoforms made from PET</strong></td>
<td>Remove contaminants</td>
<td>Engage consumer</td>
<td>Improve collection</td>
</tr>
<tr>
<td><strong>Advance: Tubes made from plastic with multiple materials</strong></td>
<td>Use single resin</td>
<td>Engage consumer</td>
<td>Improve collection</td>
</tr>
<tr>
<td><strong>Advance: Small plastic containers (&lt;2” in more than one dimension)</strong></td>
<td>Use single resin</td>
<td>Engage consumer</td>
<td>Improve sortation</td>
</tr>
</tbody>
</table>
### Key Collaborative Initiatives to Support in Order to Progress Recycling

Below are some of the collaborative initiatives to consider investing and engaging in to progress recycling:

#### Design
- **Optimize packages levers of change**
  - Use best practices to design for recycling
  - Design* Guide for Plastics Recycling
  - APR Films and Flexibles Committee

#### Consumer
- **Advance:** Bags, films, and pouches made from multiple materials
  - APR Films and Flexibles Committee
  - How2Recycle, U.S. Plastics Pact
- **Advance:** Canisters and cartons: coated paper-based containers for frozen products
  - How2Recycle, U.S. Plastics Pact
- **Advance:** Trays, clamshells, and thermoforms made from PET
  - APR PET Technical Committee
  - How2Recycle, U.S. Plastics Pact
- **Advance:** Tubes made from plastic with multiple materials
  - APR Rigid Olefin Technical Committee
  - How2Recycle, U.S. Plastics Pact
- **Advance:** Small plastic containers (<2” in more than one dimension)
  - APR MRF Committee
  - How2Recycle, U.S. Plastics Pact

#### Collection
- **Sortation**
  - Packages are separated and aggregated for further processing
- **Processing**
  - Commercial processes recover material
- **End-Market**
  - The recycled material is used in new products

#### Collection available for a substantial majority of consumers
- Packages are separated and aggregated for further processing
- Commercial processes recover material

#### Design
- **Reach at least a 30% recycling rate**
- How2Recycle, U.S. Plastics Pact

#### Consumer
- **Use best practices to design for recycling**
- Design* Guide for Plastics Recycling
- APR Films and Flexibles Committee

#### Collection
- **Collection available for a substantial majority of consumers**
- How2Recycle, U.S. Plastics Pact

#### Sortation
- **Packages are separated and aggregated for further processing**
- APR, The Recycling Partnership’s Film and Flexibles Coalition, Materials Recovery for the Future, U.S. Plastics Pact

#### Processing
- **Commercial processes recover material**
- APR, The Recycling Partnership PET Recycling Coalition, Foodservice Packaging Institute, U.S. Plastics Pact

#### End-Market
- **The recycled material is used in new products**
- APR Recycling Demand Champions, Project Gigaton, U.S. Plastics Pact, The Recycling Partnership Pathway*

#### Collection available for a substantial majority of consumers
- Packages are separated and aggregated for further processing
- Commercial processes recover material

*The Recycling Partnership Pathway to Circularity includes a tool to evaluate on end-markets, applicable to all packages.
Bags, films, and pouches:
• Paper (see paperboard guide)
• Plastic: PE, HDPE, MDPE, LDPE, and LLDPE

Bags, films, and pouches:
• Made from multiple materials
• Plastic: nylon, PET, PP, PVC, PVDC

Bags, films, and pouches: Heat-in-the-bag, advanced barriers, meat film and soaker pads, customer demand

Bottles, jars, jugs, and tubs:
• Glass
• Plastic: HDPE, LDPE, PET, PP

Bottles, jars, jugs, and tubs:
• Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials

Boxes:
• Paperboard, corrugate, molded fiber

Canisters and cartons:
• Paper-based including:
  • Simple containers without metal (see paperboard guide)
  • Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
  • Coated containers for refrigerated products (e.g., gable top)

Canisters and cartons:
• Paper-based containers with metal tops or bottoms
• Coated paper-based containers for frozen products

Cans:
• Steel, aluminum (including aerosols and others)

Trays, clamshells, thermoforms:
• Paper and fiber-based (see paperboard or molded fiber)
• Plastic: PET, PP

Trays, clamshells, thermoforms:
• Plastic: EPS, PS, PVC

Other:
• Blister packs (multiple materials)
• Foam cushion, dunnage, inserts
• Flat plastic
• Tubes made from multiple materials
• Small plastic containers or flat plastic (<2” in more than one dimension)

The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures)

Other:
• © Walmart Inc.
Typically used for:
• Food
• Cleaning products
• Health and wellness (supplements, medicine)
• Pet care
• Arts and crafts
• General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
• Home and garden
• Party supplies
• Toys

*For the purposes of Project Gigaton, FSC-certified virgin content from all countries is recognized; SFI from the U.S. and Canada only; PEFC from Anguilla, Belgium, Czech Republic, Denmark, Estonia, Germany, Hungary, Ireland, Latvia, Lithuania, Netherlands, Portugal, South Korea, Spain, Switzerland, or the UK.

Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Material</th>
<th>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Strength Additives</td>
<td>Compatible with recycling processing as confirmed by Western Michigan University testing</td>
</tr>
<tr>
<td>Coatings</td>
<td>Use no coatings or use clay or varnish coatings</td>
</tr>
<tr>
<td>Adhesives</td>
<td>Minimal adhesives and tape or hydrophobic adhesives</td>
</tr>
<tr>
<td>Attachments</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</td>
</tr>
<tr>
<td>Labels and Graphics</td>
<td>Paper or direct printed</td>
</tr>
</tbody>
</table>

Suppliers are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging.
### Paper Bags

Typically used for:
- Food
- Cleaning products
- Health and wellness (supplements, medicine)
- Pet care
- Arts and crafts
- General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
- Home and garden
- Party supplies
- Toys

---

<table>
<thead>
<tr>
<th>Recyclability challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen Food Cartons</td>
<td>Frozen foods</td>
<td>Improve end market and systems for collection and recycling of material that can be recovered (e.g., fiber) or innovate to use recycling compatible options</td>
</tr>
<tr>
<td>Food-Contact and Oily/Liquid-Contact Products</td>
<td>Variety of products</td>
<td>Ensure that the package can be easily cleaned or have no/low contamination/residue otherwise find another recyclable package design (may also consider reviewing the compostable packaging information to see if that option applies)</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Materials to avoid that present recyclability challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color, Layers, or Additives</strong></td>
</tr>
<tr>
<td>Avoid: Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, bioplastic, metalized films, foils, wet strength additives that haven’t passed Western Michigan University testing, dark colors, fragrances</td>
</tr>
<tr>
<td><strong>Attachments and Adhesives</strong></td>
</tr>
<tr>
<td>Avoid: Metal, magnetic closures, electronics, PET, PLA, PP, PS, PVC, hot melt adhesives, stickers and adhesives (unless passes Western Michigan University testing)</td>
</tr>
<tr>
<td><strong>Labels</strong></td>
</tr>
<tr>
<td>Avoid: Metal foil, metalized printing, PET, PLA, PP, PS, PVC</td>
</tr>
<tr>
<td><strong>Other</strong></td>
</tr>
<tr>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see the How2Recycle program for more information</td>
</tr>
</tbody>
</table>

---

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**PE Bags and Film**

Typically used for:
- Food
- Frozen food
- Cleaning products
- Household paper
- Personal and baby care
- Pet care
- Arts and crafts
- Electronics
- General merchandise (DIY, sporting goods, home)
- Home and garden
- Party supplies
- Ecommerce envelope

---

### Recyclable best practices: Meets the following or passed the applicable APR benchmark and definitive tests

<table>
<thead>
<tr>
<th><strong>Film Resin</strong></th>
<th>LDPE, MDPE, LLDPE, or HDPE film</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resin Color</strong></td>
<td>Unpigmented is best or white or light colors</td>
</tr>
<tr>
<td><strong>Resin Additives</strong></td>
<td>Use compatible additives at levels that do not alter the base material density (e.g., EVOH at recommended levels, see the APR Design * Guide for more details); No degradable or biodegradability additives or starch</td>
</tr>
<tr>
<td><strong>Fillers</strong></td>
<td>Ensure density of blend is less than 1.0</td>
</tr>
<tr>
<td><strong>Layers</strong></td>
<td>PE</td>
</tr>
<tr>
<td><strong>Labels</strong></td>
<td>PE or direct printed</td>
</tr>
<tr>
<td><strong>Attachments</strong></td>
<td>PE</td>
</tr>
</tbody>
</table>

---

**Feasible post-consumer recycled content levels based on current industry practice**

| **Minimum (may increase over time)** | No minimum PCR content, but may be added in the future |

---

*Plastic packages that have established recycling systems in the U.S., but not yet at rates consistent with the requirements for global reporting of progress according to the Ellen MacArthur Foundation New Plastics Economy Global Commitment.*
### Recyclability Challenges

<table>
<thead>
<tr>
<th>Recyclability challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food residue</strong></td>
<td>Food and beverages</td>
<td>Ensure that the package can be easily cleaned or have no/low contamination/residue (e.g., bread) otherwise find another recyclable package design</td>
</tr>
<tr>
<td><strong>Recycled content</strong></td>
<td>Variety of products</td>
<td>No minimum due to limited availability of options currently available</td>
</tr>
<tr>
<td><strong>Multi-material packages (not all PE)</strong></td>
<td>Frozen food, wipes</td>
<td>Look for options that are compatible with recycling or innovate to use recycling compatible options</td>
</tr>
</tbody>
</table>

### Materials to avoid that present recyclability challenges

<table>
<thead>
<tr>
<th>Resin</th>
<th>Avoid: Any non-PE resins mixed in (avoid less than 90% PE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin Color or Additives</td>
<td>Avoid: Dark colors (e.g., blue, green), PVC, PVDC, metalyzed layers, fillers that alter the blend density to be greater than 1.0, starch resins, degradable additives (no biodegradability additives), PS, EPS, PVC, PVDC</td>
</tr>
<tr>
<td>Attachments and Closures</td>
<td>Avoid: RFIDs</td>
</tr>
<tr>
<td>Labels</td>
<td>Avoid: Metal, foils, fibers, PET, PLA, PP, PS, PVC, PVDC</td>
</tr>
<tr>
<td><strong>Labels</strong></td>
<td>Ensure materials, adhesives, and size of sleeve/label are not problematic for recycling, i.e., use APR “preferred” labels. Avoid: Metal foil, metalized printing, paper, PET, PLA, PP, PS, PVC</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see U.S. Plastics Pact Problematic and Unnecessary Materials and How2Recycle for more information</td>
</tr>
</tbody>
</table>

*Plastic bags and film that have established recycling systems in the U.S. but not yet at rates consistent with the requirements for global reporting of progress according to the Ellen MacArthur Foundation New Plastics Economy Global Commitment.

Typically used for:
- Food
- Frozen food
- Cleaning products
- Household paper
- Personal and baby care
- Pet care
- Arts and crafts
- Electronics
- General merchandise (DIY, sporting goods, home)
- Home and garden
- Party supplies
- Ecommerce envelope

Suppliers are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging.
Bags, Films, Pouches

Made from multiple materials
Plastic: nylon, PET, PP, PVC, PVDC

Typically used for:
- Arts and crafts
- Apparel
- Baby food and care
- Food (e.g., nuts, produce)
- Health & wellness
- General merchandise (DIY)
- Home décor (e.g., bedding)
- Home and garden
- Household paper
- Office
- Party supplies
- Personal care
- Pet food and care
- Toys

Challenges

- It is difficult for consumers to separate multiple materials
- Nylon, flexible PET, flexible PP, PVC, PVDC are not accepted in U.S. store-drop off recycling programs and can result in loss of recyclable plastic due to contamination

Guidance

Change to:
- A similar format with a PE material only (e.g., LDPE)
- A similar format with material mixtures compatible with store-drop off (e.g., HDPE, LDPE, LLDPE, MDPE)
- A different recyclable format (e.g., paperboard box, carton, HDPE tub)

For plastic, use coatings and additives proven to be compatible recycling (e.g., EVOH/compatiblizers), see APR Design® Guide For Plastics Recyclability and APR testing

See the applicable guides in this playbook to optimize the new design (e.g., labels, colors) and use the How2Recycle label

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## Bags, Films, Pouches

Made from multiple materials
Plastic: nylon, PET, PP, PVC, PVDC

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### Examples that should use recyclable options; see next slide for exceptions to the below

<table>
<thead>
<tr>
<th>Product</th>
<th>Recyclable format to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Produce and fresh food</strong></td>
<td><strong>Produce, lettuce, salad mixes</strong> PET clamshell, PE bag</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td>PE bag</td>
</tr>
<tr>
<td><strong>Meat, poultry, fish</strong></td>
<td>PET tray, PP tray (note that films used with these may not be recyclable)</td>
</tr>
<tr>
<td><strong>Cookies, crackers</strong></td>
<td>PE bag/wrap in box</td>
</tr>
<tr>
<td><strong>Bread, bagels, tortillas</strong></td>
<td>PE bag</td>
</tr>
<tr>
<td><strong>Rice and coffee</strong></td>
<td>PE bag</td>
</tr>
<tr>
<td><strong>Trail mix, nut mixes</strong></td>
<td>PET tub, PE bag</td>
</tr>
<tr>
<td><strong>Bakery ingredients and supplies</strong></td>
<td>Paper bag, PE bag</td>
</tr>
<tr>
<td><strong>Beverages</strong></td>
<td><strong>Kids juice for lunch</strong> Coated paper-based box (e.g., Tetrapak)</td>
</tr>
<tr>
<td><strong>Frozen food</strong></td>
<td><strong>Frozen breakfast, snacks, appetizers</strong> PE bag in box</td>
</tr>
<tr>
<td><strong>Frozen meals</strong></td>
<td>Paper box with a paper or PP container</td>
</tr>
<tr>
<td><strong>Frozen pizza and meals</strong></td>
<td>Paper box with PE film</td>
</tr>
<tr>
<td><strong>Frozen potatoes, meat, poultry, fish</strong></td>
<td>PE bag</td>
</tr>
<tr>
<td><strong>Pet food and snacks</strong></td>
<td><strong>Dry pet food and snacks</strong> PE bag</td>
</tr>
<tr>
<td><strong>Baby and personal care</strong></td>
<td><strong>Diapers</strong> PE outerwrap, corrugate box</td>
</tr>
<tr>
<td><strong>Wipes without an integrated dispenser</strong></td>
<td>PE bag</td>
</tr>
<tr>
<td><strong>Feminine and incontinence pads</strong></td>
<td>PE outerwrap</td>
</tr>
<tr>
<td><strong>Home care</strong></td>
<td><strong>Cleaning and laundry products</strong> PE bag</td>
</tr>
</tbody>
</table>

---

CHANGE to a Recyclable Package
Suppliers are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging.

**Bags, Films, Pouches**
- Made from multiple materials
- Plastic: nylon, PET, PP, PVC, PVDC

**Challenges and levers of change**
- **Design**: Use single resin
- **Collection**: Improve collection (curbside)*
- **Sortation**: Improve sortation
- **Processing**: Improve processing
- **End-Market**: Improve end market

**Primarily a system challenge**: Multiple-material bags, films, and pouches are not collected or recycled

- Use a single resin PE design for store drop-off film collection (confirming compatibility with the Association of Plastic Recyclers test) or switch to another recyclable format
- When the above cannot work, engage in collaborative efforts working to advance appropriate recycling systems (e.g., The Recycling Partnership’s Film and Flexibles Coalition, Materials Recovery for the Future, Association of Plastic Recyclers, U.S. Plastics Pact)

**Example packages to advance innovation and circular solutions if cannot switch to a recyclable option**
- **Heat-in-the-bag**: Frozen or fresh foods that are heated in the bag (e.g., PP bags, multiple materials).
- **Advanced barriers for refrigerated or shelf-stable foods and beverages**: (e.g., to minimize oxygen and carbon dioxide transmission for fat/oil stability): Chips and crackers with fat/oil content (e.g., potato chips, tortilla chips, cheese crackers) (e.g., PP film with or without metallization); Lunchmeat, bacon, and hot dogs (e.g., PET film); Cheese/dairy or candy (e.g., PET film, metalized pouch/film).
- **Meat, poultry, and fish minor packaging components**: Film (e.g., PVDC), Soaker pad (e.g., multiple materials).
- **Product protection**: Where testing proved that significant product loss would occur with all possible recyclable options.
- **Life cycle impacts**: A peer-reviewed life cycle assessment demonstrates significant improvements across impacts.

*Store drop-off collection is available for PE bags, films, and pouches. New collection is only needed for bags, films and pouches not compatible with store drop-off.*
<table>
<thead>
<tr>
<th>OPTIMIZE</th>
<th>CHANGE</th>
<th>ADVANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GUIDES: BOTTLES, JARS, JUGS, AND TUBS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Glass Containers

Typically used for:
- Food jars
- Beverage bottles

Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Materials</th>
<th>Container glass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Clear, amber, green, and blue</td>
</tr>
<tr>
<td>Label</td>
<td>Direct print, paper</td>
</tr>
</tbody>
</table>

Feasible post-consumer recycled content levels based on current industry practice

<table>
<thead>
<tr>
<th>Minimum (may increase over time)</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>Up to 95% PCR</td>
</tr>
</tbody>
</table>

Materials that present recyclability challenges to avoid

<table>
<thead>
<tr>
<th>Labels</th>
<th>Ensure that plastic labels are easy to remove or avoid them (e.g., the label should not cover most of the package with a very strong adhesive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachments, closures</td>
<td>Avoid: Anything molded into the glass or ceramic attachments/closures</td>
</tr>
<tr>
<td>Non-container glass</td>
<td>Avoid: Leaded glass (e.g., crystal) and heat-resistant glass (e.g., Pyrex)</td>
</tr>
</tbody>
</table>

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PET Bottles

Typically used for:
- Water and beverages
- Grocery (e.g., condiments, sauces)
- Health & wellness (e.g., supplements)
- Personal and baby care
- Cleaning products

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Recyclable best practices: Meets the following or passed the applicable APR benchmark and definitive tests

<table>
<thead>
<tr>
<th>Resin</th>
<th>PET bottle grade with a crystalline melting point between 225 and 255°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin Color</td>
<td>Clear (if color required, transparent light blue)</td>
</tr>
<tr>
<td>Resin Additives</td>
<td>No degradable or biodegradability additives</td>
</tr>
<tr>
<td>Wrap Around Label or Cut &amp; Stack</td>
<td>PP or PE (that float when printed)</td>
</tr>
<tr>
<td>Shrink Sleeve, Pressure Sensitive, or Direct Printed</td>
<td>An APR Preferred option (Learn more at <a href="https://plasticsrecycling.org/recognition/recipients">https://plasticsrecycling.org/recognition/recipients</a>)</td>
</tr>
<tr>
<td>Attachments</td>
<td>Clear if PET; colored ok for PP or PE</td>
</tr>
<tr>
<td>Closures, Pumps, and Sprays</td>
<td>PP or PE</td>
</tr>
<tr>
<td>Cap Liner</td>
<td>Liner made from PE, EVA, or TPE or no liner</td>
</tr>
<tr>
<td>Tamper Evidence</td>
<td>Easily fully removable, PET, PP, PE</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Larger than 2” in two dimensions and largely 3-dimensional (vs. flat with one dimension &lt;2”)</td>
</tr>
</tbody>
</table>

Feasible post-consumer recycled content levels based on current industry practice

| Minimum (may increase over time) | 25% PCR |
| Maximum | Up to 100% PCR |
### PET Bottles

Typically used for:
- Water and beverages
- Grocery (e.g., condiments, sauces)
- Health & wellness (e.g., supplements)
- Personal and baby care
- Cleaning products

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#### Recyclability challenges

<table>
<thead>
<tr>
<th>Recyclability challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nylon layers</td>
<td>Sparkling mineral water, food jars, and juice bottles</td>
<td>Use the APR recognized options or innovate to use recycling compatible options</td>
</tr>
<tr>
<td>Oxygen scavenger (or other) additives</td>
<td>Juice, tea, and coffee</td>
<td>Use the APR recognized options or innovate to use recycling compatible options (e.g., EvOH at low percentage)</td>
</tr>
<tr>
<td>Paper labels</td>
<td>Many products</td>
<td>These are a low-cost option that either need to pass APR benchmark and definitive tests or be replaced with non-paper APR recognized options</td>
</tr>
<tr>
<td>Pressure sensitive and shrink sleeve labels</td>
<td>Many products</td>
<td>See below for more information; Use the APR recognized options (Learn more at <a href="https://plasticsrecycling.org/recognition/recipients">https://plasticsrecycling.org/recognition/recipients</a>)</td>
</tr>
<tr>
<td>Metal parts in cap, pump, or spray</td>
<td>Beverages, cleaning and personal care products</td>
<td>Look for all plastic caps, pumps, or sprays (some applications may have functional limitations and How2Recycle labels should be used to clearly communicate that the cap, pump, or spray with metal needs to be removed before recycling)</td>
</tr>
<tr>
<td>PETG</td>
<td>Beverages</td>
<td>PETG is not the same thing as PET and should be designed out of PET packaging</td>
</tr>
</tbody>
</table>

#### Materials to avoid that present recyclability challenges

- **Resin**
  - Avoid: PETG, other non-compatible resins mixed in (some EvOH levels are ok)

- **Resin Color or Additives**
  - Avoid: Transparent colors other than blue (green should be limited to compostable packaging based on guidance from the State of Washington), opaque colors, dark colors, optical brighteners, degradable additives or biodegradability additives

- **Attachments/Closures**
  - Avoid: RFIDs
  - Avoid: Metal, foils, PS, PVC, PLA, TPE/silicon with density > 1

- **Labels**
  - Ensure materials, adhesives, and size of sleeve/label are not problematic for recycling, i.e., use APR “preferred” labels. Avoid the following:
    - Materials: Metal foil, metalized printing, PS, PVC, PLA, PETG and paper labels not APR Preferred or that do not pass APR testing
    - Label coverage: Those that are not APR Preferred, does not pass APRs near infrared (NIR) Sorting Potential Test, for containers of 550 ml or less labels that cover more than 55% of the bottle surface area with label, for containers greater than 550 ml labels that covert more than 70% of the bottle surface area with label
    - Paper labels: Those that are not APR Preferred or that do not pass APR testing
    - Inks: Bleeding inks or direct printing that do not pass APR testing

- **Other**
  - Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see U.S. Plastics Pact Problematic and Unnecessary Materials and How2Recycle for more information
## HDPE Bottles

Typically used for:
- Milk
- Baby formula
- Health and wellness (supplements, medicine)
- Personal and baby care
- Cleaning products

### Recyclable best practices: Meets the following or passed the applicable APR benchmark and definitive tests

<table>
<thead>
<tr>
<th>Category</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin</td>
<td>HDPE density 0.94-0.96</td>
</tr>
<tr>
<td>Resin Color</td>
<td>Unpigmented, translucent, opaque colors (not dark)</td>
</tr>
<tr>
<td>Resin Additives</td>
<td>No degradable or biodegradability additives</td>
</tr>
<tr>
<td>Layers</td>
<td>PE or EVOH less than 3%</td>
</tr>
<tr>
<td>Labels</td>
<td>PE, PP</td>
</tr>
<tr>
<td>Adhesives</td>
<td>Wash off cleanly or minimal/no adhesive</td>
</tr>
<tr>
<td>Attachments, Closures, Pumps and Sprays</td>
<td>PE, PLA, or PS</td>
</tr>
<tr>
<td>Cap Liner</td>
<td>PE, EVA or TPE</td>
</tr>
<tr>
<td>Tamper Evidence</td>
<td>PE, PETG</td>
</tr>
</tbody>
</table>

### Feasible post-consumer recycled content levels based on current industry practice

<table>
<thead>
<tr>
<th>Category</th>
<th>Content Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum (may increase over time)</td>
<td>10% PCR for transparent/natural</td>
</tr>
<tr>
<td></td>
<td>25% PCR for colored</td>
</tr>
<tr>
<td>Maximum</td>
<td>Up to 100% PCR</td>
</tr>
</tbody>
</table>

Suppliers are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging.
# HDPE Bottles

Typically used for:
- Milk
- Baby formula
- Health and wellness (supplements, medicine)
- Personal and baby care
- Cleaning products

---

## Recyclability Challenges

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal parts in cap, pump, or spray</td>
<td>Sometimes used for cleaning, personal care</td>
<td>Look for all plastic caps, pumps, or sprays (some applications may have functional limitations and How2Recycle labels should be used to clearly communicate that the cap, pump, or spray with metal needs to be removed before recycling)</td>
</tr>
<tr>
<td>Fillers</td>
<td>When fillers are added to change the density of the package so that it sinks</td>
<td>Adjust the use of the filler to ensure the package floats</td>
</tr>
</tbody>
</table>

## Materials to Avoid That Present Recyclability Challenges

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Avoid: Other resins mixed in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin</td>
<td>Dark colors with L value less than 40 or near-infrared (NIR) reflectance less than or equal to 10% (can’t be sorted), for non-mechanical oil products (which aren’t collected for recycling), Optical brighteners, Degradable additives (no biodegradability additives), PETG, PS, EPS, PVC, PVDC</td>
</tr>
<tr>
<td>Resin Color or Additives</td>
<td>RFIDs</td>
</tr>
<tr>
<td>Attachments and Closures</td>
<td>Metal, foils, PP, PVC, silicone</td>
</tr>
<tr>
<td>Labels</td>
<td>Ensure materials, adhesives, and size of sleeve/label are not problematic for recycling, i.e., use APR “preferred” labels. Minimize direct printing. Avoid the following: Materials for any type of label: paper, PVC Materials just for non-wash releasable labels: PLA, PS, metal foils Label coverage: Those that are not APR Preferred, does not pass APRs near infrared (NIR) Sorting Potential Test, greater than 60% label coverage of the container side wall section</td>
</tr>
<tr>
<td>Other</td>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see U.S. Plastics Pact Problematic and Unnecessary Materials and How2Recycle for more information</td>
</tr>
</tbody>
</table>

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### LDPE Bottles, Jugs, and Jars*

Typically used for:
- Health and wellness bottles

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#### Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Resin</th>
<th>LDPE density 0.917-0.93</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin Color</td>
<td>Unpigmented, white, or light colors</td>
</tr>
<tr>
<td>Resin Additives</td>
<td>No degradable additives or biodegradability additives</td>
</tr>
<tr>
<td>Fillers</td>
<td>Ensure density of blend is less than 1.0</td>
</tr>
<tr>
<td>Layers</td>
<td>PE</td>
</tr>
<tr>
<td>Labels</td>
<td>PE, PP</td>
</tr>
<tr>
<td>Attachments, Closures</td>
<td>PE, PLA, or PS</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Larger than 2” in two dimensions and largely 3-dimensional (vs. flat with one dimension &lt;2”)</td>
</tr>
</tbody>
</table>

#### Feasible post-consumer recycled content levels based on current industry practice

<table>
<thead>
<tr>
<th>Minimum (may increase over time)</th>
<th>25% PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>Up to 100% PCR</td>
</tr>
</tbody>
</table>

*Plastic packages that have established recycling systems in the U.S., but not yet at rates consistent with the requirements for global reporting of progress according to the Ellen MacArthur Foundation [New Plastics Economy Global Commitment](https://www.newplasticseconomy.org/).*
**LDPE Bottles, Jugs, and Jars**

Typically used for:
- Health and wellness bottles

---

<table>
<thead>
<tr>
<th>Recyclability challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full body sleeves</strong></td>
<td>Variety of products</td>
<td>Test for compatibility with sorting (see APR near infrared (NIR) sortation potential test), covering no more than 60% of the package surface helps</td>
</tr>
</tbody>
</table>

**Materials to avoid that present recyclability challenges**

<table>
<thead>
<tr>
<th>Resin Color or Additives</th>
<th>Avoid: Dark colors with L value less than 40 or near-infrared (NIR) reflectance less than or equal to 10% (can’t be sorted), for non-mechanical oil products (which aren’t collected for recycling), optical brighteners, degradable additives or biodegradability additives, PETG, PS, EPS, PVC, PVDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachments and Closures</td>
<td>Avoid: RFIDs, Metal, foils, PP, PVC, floating silicone polymer</td>
</tr>
<tr>
<td><strong>Labels</strong></td>
<td>Ensure materials, adhesives, and size of sleeve/label are not problematic for recycling, i.e., use APR “preferred” labels. Avoid the following for:</td>
</tr>
<tr>
<td></td>
<td>• Materials for any label type: paper, PVC</td>
</tr>
<tr>
<td></td>
<td>• Materials for just non-wash releasable: PLA, PS, metal foils</td>
</tr>
<tr>
<td></td>
<td>• Label coverage: Those that are not APR Preferred, does not pass APRs near infrared (NIR) Sorting Potential Test, greater than 60% label coverage of the container side wall section</td>
</tr>
</tbody>
</table>

**Other**

Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see [U.S. Plastics Pact Problematic and Unnecessary Materials](https://www.plasticspact.org/problematic-and-unnecessary-materials/) and [How2Recycle](https://how2recycle.com/) for more information.

Plastic packages that have established recycling systems in the US, but not yet at rates consistent with the requirements for global reporting of progress according to the Ellen MacArthur Foundation [New Plastics Economy Global Commitment](https://www.newplasticseconomy.org/) **85**

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**PP Containers**

Rigid PP tubs, bottles, jugs, and jars, typically used for:
- Yogurt and food cups
- Frozen food tubs
- Personal care jars
- (other rigid PP containers may be in the “advance” classification)

---

**Optimize: Meets the following or passed the applicable APR benchmark and definitive tests**

<table>
<thead>
<tr>
<th><strong>Resin</strong></th>
<th>PP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resin Color</strong></td>
<td>Any color with an L value &gt;40 or NIR reflectance &gt;10%</td>
</tr>
<tr>
<td><strong>Resin Additives and Layers</strong></td>
<td>EVOH, workhorse additives (e.g., thermal stabilizers, UV stabilizers, nucleating agents, clarifying agents, antistatic agents, lubricants, pigments, impact improvers, chemical blowing agents), no degradable additives or biodegradability additives</td>
</tr>
<tr>
<td><strong>In mold labels</strong></td>
<td>PP</td>
</tr>
<tr>
<td><strong>Non-Wash Releasable Labels</strong></td>
<td>PP, PE – all with PP compatible adhesives</td>
</tr>
<tr>
<td><strong>Wash Releasable Labels</strong></td>
<td>PP, PE, PLA, PS</td>
</tr>
<tr>
<td><strong>Attachments</strong></td>
<td>PP, PLA</td>
</tr>
<tr>
<td><strong>Closures, Pumps, and Sprays</strong></td>
<td>PP, PS</td>
</tr>
<tr>
<td><strong>Cap Liner</strong></td>
<td>Liner made from EVA or TPE or no liner</td>
</tr>
<tr>
<td><strong>Tamper Evidence</strong></td>
<td>PP, PE, PETG, PLA</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>Larger than 2” in two dimensions and largely 3-dimensional (vs. flat with one dimension &lt;2”)</td>
</tr>
</tbody>
</table>

**Feasible post-consumer recycled content levels based on current industry practice**

| **Minimum (may increase over time)** | 25% PCR |
| **Maximum** | Up to 100% PCR |

*Plastic packages that have established recycling systems in the U.S., but some (i.e., PP rigid containers are not bottles) are not yet at rates consistent with the requirements for global reporting of progress according to the Ellen MacArthur Foundation New Plastics Economy Global Commitment.*
### Design challenges Examples Guidance

<table>
<thead>
<tr>
<th>Bags and films</th>
<th>Snacks</th>
<th>Explore PE bag and film options, innovative recyclable options, or advance an appropriate circular economy program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full body sleeves</td>
<td>Many products</td>
<td>Test for compatibility with sorting (see APR near infrared (NIR) sortation potential test). Covering no more than 60% of package surface helps.</td>
</tr>
<tr>
<td>More 2-dimensional</td>
<td>Variety of products</td>
<td>Ensure that the size and shape are compatible with the sorting recycling processes by using the test from the Association of Plastic Recyclers</td>
</tr>
<tr>
<td>Food residue</td>
<td>Food products</td>
<td>Use the How2Recycle label that will include appropriate guidance for consumers to rinse the package before recycling</td>
</tr>
</tbody>
</table>

### Materials to avoid that present recyclability design challenges

<table>
<thead>
<tr>
<th>Resin Color or Additives</th>
<th>Avoid: Degradable additives, optical brighteners, dark colors (i.e., with an L value &lt;40 or NIR reflectance &lt;=10% can’t be sorted), fillers/additives that shift the density by more than 4%. PETG, PS, EPS, PVC, PVDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachments and Closures</td>
<td>Avoid: RFIDs  &lt;br&gt; Avoid: PE, metal, PVC, silicone, paper</td>
</tr>
<tr>
<td>Labels</td>
<td>Ensure materials, adhesives, and size of sleeve/label are not problematic for recycling, i.e., use APR “preferred” labels. Minimize direct printing.  &lt;br&gt; - Avoid for any label type: paper, PVC, metal foil/metalized/metal printing  &lt;br&gt; - Avoid for non-wash releasable labels: PLA, PS  &lt;br&gt; - Avoid label coverage: Those that are not APR Preferred, does not pass APRs near infrared (NIR) Sorting Potential Test, greater than 60% label coverage of the container side wall section</td>
</tr>
<tr>
<td>Other</td>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see U.S. Plastics Pact Problematic and Unnecessary Materials and How2Recycle for more information</td>
</tr>
</tbody>
</table>

---

**PP Containers**

Rigid PP tubs, bottles, jugs, and jars, typically used for:
- Yogurt and food cups
- Frozen food tubs
- Personal care jars
- (other rigid PP containers may be in the "advance" classification)

---

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**Other PP rigid containers**, such as formats that are not tubs, bottles, jugs, nor jars (e.g., tubes, single serve coffee cups, beverage cups). (film/flexible are not included here, see bags, films, pouches)

**Challenges and levers of change**

<table>
<thead>
<tr>
<th>Design</th>
<th>Collection</th>
<th>Sortation</th>
<th>Processing</th>
<th>End-Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove contaminants</td>
<td></td>
<td>Improve sortation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Primarily a system challenge**: PP may pose challenges to *sortability* for further processing and end markets.

- Engage in The Recycling Partnership’s Polypropylene Recycling Coalition, Association of Plastic Recyclers, and the U.S. Plastics Pact to advance recycling systems (while sortation is the key challenge, other aspects of the recycling system have improvement potential)
- Optimize design, see previous “green” pages
**Bottles, Jars, Jugs, and Tubs**

Made from acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials (e.g., tubes with different plastics and/or metal)

**Typically used for:**
- Arts and crafts
- Consumables (e.g., toothpaste, lotion)
- Food
- Health & wellness (e.g., medicine)
- Personal and hair care
- Pet food

**Challenges**

- It may be difficult for consumers to separate multiple materials
- Acrylic, PETG, PC, PS (and high impact PS), PVC and miscellaneous plastics are detrimental to recycling of more common plastics (e.g., HDPE, PET, PP) and are not accepted by most communities for recycling

**Guidance**

**Change to:**

- A similar format made from HDPE, PET, PP for bottles, jars, jugs and tubs
- A different recyclable format (e.g., paperboard box, cartons, PE film)

For plastic, use coatings and additives proven to be compatible with recycling to add necessary functionality (e.g., EVOH/compatibilizers), see [APR Design* Guide For Plastics Recyclability](https://www.apr.org/design-guide/) and APR testing

*See the applicable guides in this playbook to optimize the new design (e.g., labels, colors) and use the How2Recycle label*

*See information on small plastic packages (i.e., less than 2” in more than one dimension) on another page*

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**Bags, films, and pouches:**
- Paper (see paperboard guide)
- Plastic: PE, HDPE, MDPE, LDPE

**Bags, films, and pouches:**
- Made from multiple materials
- Plastic: nylon, PET, PP, PVC, PVDC

**Bottles, jars, jugs, and tubs:**
- Glass
- Plastic: HDPE, LDPE, PET, PP

**Bottles, jars, jugs, and tubs:**
- Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials

**Boxes:**
- Paperboard, corrugate, molded fiber

**Canisters and cartons:**
- Paper-based including:
  - Simple containers without metal (see paperboard guide)
  - Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
  - Coated containers for refrigerated products (e.g., gable top)
- Paper-based containers with metal tops or bottoms
- Coated paper-based containers for frozen products

**Cans:**
- Steel, aluminum (including aerosols and others)

**Trays, clamshells, thermoforms:**
- Paper and fiber-based (see paperboard or molded fiber)
- Plastic: PET, PP

**Trays, clamshells, thermoforms:**
- Plastic: EPS, PS, PVC

**Other:**
- Blister packs (multiple materials)
- Foam cushion, dunnage, inserts
- Flat plastic
- Tubes made from multiple materials
- Small plastic containers or flat plastic (<2" in more than one dimension)

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**GUIDES: BOXES**

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### Paperboard

Typically used for:
- Food
- Frozen food
- Cleaning products
- Health and wellness (supplements, medicine)
- Personal, hair, and baby care
- Cosmetics
- Pet care
- Office supplies
- Arts and crafts
- Apparel (shoes, baby, women, men)
- Electronics
- General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
- Home and garden
- Party supplies
- Toys

### Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Material</th>
<th>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Strength Additives</td>
<td>Compatible with recycling processing as confirmed by Western Michigan University testing</td>
</tr>
<tr>
<td>Coatings</td>
<td>Use no coatings or use clay or varnish coatings</td>
</tr>
<tr>
<td>Adhesives</td>
<td>Minimal adhesives and tape or hydrophobic adhesives</td>
</tr>
<tr>
<td>Attachments</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</td>
</tr>
<tr>
<td>Labels and Graphics</td>
<td>Paper or direct printed</td>
</tr>
<tr>
<td>Dunnage and Padding</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber options</td>
</tr>
</tbody>
</table>

*For the purposes of Project Gigaton, [FSC-certified](https://www.fsc.org/en) virgin content from all countries is recognized; [SFI](https://www.sfi.org) from the U.S. and Canada only; [PEFC](https://www.pefc.org) from Anguilla, Belgium, Czech Republic, Denmark, Estonia, Germany, Hungary, Ireland, Latvia, Lithuania, Netherlands, Portugal, South Korea, Spain, Switzerland, or the UK.

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### Paperboard

Typically used for:
- Food
- Frozen food
- Cleaning products
- Health and wellness (supplements, medicine)
- Personal, hair, and baby care
- Cosmetics
- Pet care
- Office supplies
- Arts and crafts
- Apparel (shoes, baby, women, men)
- Electronics
- General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
- Home and garden
- Party supplies
- Toys

### Recyclability challenges
<table>
<thead>
<tr>
<th>Frozen Food Cartons</th>
<th>Frozen foods</th>
<th>Improve end market and systems for collection and recycling of material that can be recovered (e.g., fiber) or innovate to use recycling compatible options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food-Contact and Oily/Liquid-Contact Products</td>
<td>Variety of products</td>
<td>Ensure that the package can be easily cleaned or have no/low contamination/residue (e.g., frozen waffles) otherwise find another recyclable package design (may also consider reviewing the compostable packaging information to see that option applies)</td>
</tr>
</tbody>
</table>

### Materials to avoid that present recyclability challenges

- **Color, Layers, or Additives**
  - Avoid: Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, bioplastic, metalized films, foils, wet strength additives that haven’t passed Western Michigan University testing, dark colors, fragrances

- **Attachments and Adhesives**
  - Avoid: Metal, magnetic closures, electronics, PET, PLA, PP, PS, PVC, hot melt adhesives, stickers and adhesives (unless passes Western Michigan University testing)

- **Labels**
  - Avoid: Metal foil, metalized printing, PET, PLA, PP, PS, PVC

- **Dunnage and Padding**
  - Avoid: EPS and other expanded resin materials (see cushion, dunnage, and insert guidance in this playbook)

- **Other**
  - Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see the How2Recycle program for more information

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## Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Corrugated Box Material</th>
<th>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Natural color</td>
</tr>
<tr>
<td>Coatings</td>
<td>Use no coatings or use clay or varnish coatings</td>
</tr>
<tr>
<td>Graphics</td>
<td>Direct printed</td>
</tr>
<tr>
<td>Adhesives</td>
<td>Minimal adhesives and tape</td>
</tr>
<tr>
<td>Attachments</td>
<td>Fiber</td>
</tr>
<tr>
<td>Shipping Labels</td>
<td>Paper or direct printed</td>
</tr>
<tr>
<td>Dunnage and Padding</td>
<td>Tree-based fiber options</td>
</tr>
</tbody>
</table>

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### Recyclability challenges

| Any addition that was not listed as recyclable | Variety of applications | Consider having the package tested by Western Michigan University |
| Adhesives | Hot melt | Avoid hot melt adhesives and use instead water-soluble adhesives |

### Materials to avoid that present recyclability challenges

| Color, Layers, or Additives | Avoid: Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, bioplastic, metalized films, foils, wet strength additives that haven't passed Western Michigan University testing, dark colors, fragrances |
| Attachments | Avoid: Metal, magnetic closures, electronics, PET, PLA, PP, PS, PVC |
| Labels | Avoid: Metal foil, metalized printing, PET, PLA, PP, PS, PVC |
| Dunnage and Padding | Avoid: EPS and other expanded resin materials (see cushion, dunnage, and insert guidance in this playbook) |
| Other | Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see the How2Recycle program for more information |

---

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Molded Fiber

Typically used for:
• Frozen food trays (for some applications)
• Produce trays
• Bakery trays

Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Material</th>
<th>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Strength Additives</td>
<td>Compatible with recycling as confirmed by Western Michigan University testing</td>
</tr>
<tr>
<td>Coatings</td>
<td>Use no coatings or use clay or varnish coatings</td>
</tr>
<tr>
<td>Adhesives</td>
<td>Minimal adhesives and tape or hydrophobic adhesives</td>
</tr>
<tr>
<td>Attachments</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</td>
</tr>
<tr>
<td>Labels and Graphics</td>
<td>Paper or direct printed</td>
</tr>
<tr>
<td>Dunnage and Padding</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber options</td>
</tr>
</tbody>
</table>

Feasible post-consumer recycled content levels based on current industry practice

<table>
<thead>
<tr>
<th>Minimum (may increase over time)</th>
<th>Use certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>Up to 100% PCR</td>
</tr>
</tbody>
</table>

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**Molded Fiber**

Typically used for:
- Frozen food trays (for some applications)
- Produce trays
- Bakery trays

### Materials to avoid that present recyclability challenges

<table>
<thead>
<tr>
<th>Component</th>
<th>Avoid:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color, Layers, or Additives</strong></td>
<td>Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, metalized films, foils, wet strength additives that haven't passed Western Michigan University testing, dark colors, fragrances</td>
</tr>
<tr>
<td><strong>Attachments and Adhesives</strong></td>
<td>Metal, magnetic closures, electronics, PET, PLA, PP, PS, PVC, hot melt adhesives, stickers and adhesives (unless passes Western Michigan University testing)</td>
</tr>
<tr>
<td><strong>Labels</strong></td>
<td>Metal foil, metalized printing, PET, PLA, PP, PS, PVC</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see the <a href="#">How2Recycle</a> program for more information</td>
</tr>
</tbody>
</table>

---

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Bags, films, and pouches:
- Paper (see paperboard guide)
- Plastic: PE, HDPE, MDPE, LDPE, and LLDPE

Bags, films, and pouches:
- Made from multiple materials
- Plastic: nylon, PET, PP, PVC, PVDC

Heat-in-the-bag, advanced barriers, meat film and soaker pads, customer demand

Bottles, jars, jugs, and tubs:
- Glass
- Plastic: HDPE, LDPE, PET, PP

Bottles, jars, jugs, and tubs:
- Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials

Boxes:
- paperboard, corrugate, molded fiber

Canisters and cartons:
- Paper-based including:
  - Simple containers without metal (see paperboard guide)
  - Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
  - Coated containers for refrigerated products (e.g., gable top)

Canisters and cartons:
- Paper-based containers with metal tops or bottoms
- Coated paper-based containers for frozen products

Cans:
- Steel, aluminum (including aerosols and others)

Trays, clamshells, thermoforms:
- Paper and fiber-based (see paperboard or molded fiber)
- Plastic: PET, PP

Trays, clamshells, thermoforms:
- Plastic: EPS, PS, PVC

The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures)

Other:
- Blister packs (multiple materials)
- Foam cushion, dunnage, inserts
- Flat plastic
- Tubes made from multiple materials
- Small plastic containers or flat plastic (<2" in more than one dimension)

GUIDES: CARTONS AND CANISTERS

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**Paperboard**

Typically used for:
- Food
- Health and wellness (supplements, medicine)
- Personal, hair, and baby care
- Cosmetics
- Office supplies
- Arts and crafts
- General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
- Party supplies
- Toys

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**OPTIMIZE Design Guides for Recycling – best practices**

<table>
<thead>
<tr>
<th>Recyclable best practices: Meets the following</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
</tr>
<tr>
<td><strong>Wet Strength Additives</strong></td>
</tr>
<tr>
<td><strong>Coatings</strong></td>
</tr>
<tr>
<td><strong>Adhesives</strong></td>
</tr>
<tr>
<td><strong>Attachments</strong></td>
</tr>
<tr>
<td><strong>Labels and Graphics</strong></td>
</tr>
<tr>
<td><strong>Dunnage and Padding</strong></td>
</tr>
</tbody>
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### Paperboard

Typically used for:
- Food
- Health and wellness (supplements, medicine)
- Personal, hair, and baby care
- Cosmetics
- Office supplies
- Arts and crafts
- General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
- Party supplies
- Toys

### Recyclability Challenges

<table>
<thead>
<tr>
<th>Recyclability challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rigid Canisters or Cartons</strong></td>
<td>Variety of products</td>
<td>Very rigid paper packages that are more three-dimensional than two-dimensional may not be sorted with the paper recycling and end up as waste, therefore it is best to test for sorting and include any necessary instructions for flattening as needed.</td>
</tr>
<tr>
<td><strong>Frozen Food Cartons</strong></td>
<td>Frozen foods</td>
<td>Improve end market and systems for collection and recycling of material that can be recovered (e.g., fiber) or innovate to use recycling compatible options.</td>
</tr>
<tr>
<td><strong>Food-Contact and Oily/Liquid-Contact Products</strong></td>
<td>Variety of products</td>
<td>Ensure that the package can be easily cleaned or have no/low contamination/residue otherwise find another recyclable package design (may also consider reviewing the compostable packaging information to see that option applies).</td>
</tr>
</tbody>
</table>

### Materials to avoid that present recyclability challenges

<table>
<thead>
<tr>
<th>Color, Layers, or Additives</th>
<th>Avoid: Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, bioplastic, metalized films, foils, wet strength additives that haven’t passed Western Michigan University testing, dark colors, fragrances</th>
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<tbody>
<tr>
<td>Attachments and Adhesives</td>
<td>Avoid: Metal, magnetic closures, electronics, PET, PLA, PP, PS, PVC, Hot melt adhesives, Stickers and adhesives (unless passes Western Michigan University testing)</td>
</tr>
<tr>
<td>Labels</td>
<td>Avoid: Metal foil, metalized printing, PET, PLA, PP, PS, PVC</td>
</tr>
<tr>
<td>Dunnage and Padding</td>
<td>Avoid: EPS and other expanded resin materials (see cushion, dunnage, and insert guidance in this playbook)</td>
</tr>
<tr>
<td>Other</td>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see the How2Recycle program for more information</td>
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</tbody>
</table>

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Canisters and Cartons

Coated paper for shelf-stable or refrigerated foods and beverages

Typically used for:
• Shelf stable broth, milk, wine, juice (sometimes referred to as aseptic boxes, bricks, or TetraPak)
• Refrigerated milk, juice (sometimes referred to as gable top)

Frozen food cartons are not currently recyclable.

Recyclable best practices: Meets the following

| Material                      | Shelf stable cartons: primarily of paper with a thin layer of polyethylene and an additional layer of aluminum
|                              | Refrigerated cartons: primarily of paper with a thin layer of polyethylene
| Attachments                   | Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber

Feasible post-consumer recycled content levels based on current industry practice

| Minimum (may increase over time) | Use certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber

Recyclability challenges

| Frozen Food Cartons | Frozen foods | Improve end market and systems for collection and recycling of material that can be recovered (e.g., fiber) or innovate to use recycling compatible options
| Mixed materials     | Beverages    | Avoid using non-paper materials beyond those used in the carton itself - see materials above (e.g., no metal attachments/closures, RFIDs)

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**Canisters and Cartons**

- Paper-based containers with a metal top or bottom

**Typically used for:**
- Baby food
- Frozen juice concentrate
- Grocery (e.g., coffee, chips)

*Shelf-stable and refrigerated cartons and bricks (e.g., TetraPak) are recyclable*

---

**Challenges**

- It may be difficult for consumers to separate multiple materials
- Metal can be detected during sorting in recycling systems, potentially losing the paper recycling value
- Rigid paper containers may not sort with paper, potentially losing the paper recycling value
- Double sided coated frozen paperboard containers may not be accepted for recycling

---

**Guidance**

**Change to:**

- A similar format with a single material and optimize for recycling (e.g., paperboard canister or box or HDPE tub)
  - Very rigid paper packages that are more three-dimensional than two-dimensional may not be sorted with the paper recycling and end up as waste, therefore it is best to test for sorting and include any necessary instructions for flattening as needed
  - A different recyclable format (e.g., paperboard box, PE film, PET tub, PP tub), coatings for paper-based packaging may need to validate recyclability with testing (e.g., through Western Michigan University tests)

*See the applicable guides in this playbook to optimize the new design (e.g., labels, colors) and use the How2Recycle label (see next page for information on frozen food containers)*

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## Canisters and Cartons

- **Coated paper-based frozen food containers**

  **Typically used for:**
  - Ice cream and related products

  **Shelf-stable and refrigerated cartons and bricks (e.g., TetraPak) are recyclable**

<table>
<thead>
<tr>
<th>Challenges and levers of change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>Remove contaminants</td>
</tr>
<tr>
<td><strong>Collection</strong></td>
</tr>
<tr>
<td>Improve collection</td>
</tr>
<tr>
<td><strong>Sortation</strong></td>
</tr>
<tr>
<td>Improve sortation</td>
</tr>
<tr>
<td><strong>Processing</strong></td>
</tr>
<tr>
<td>Improve processing</td>
</tr>
<tr>
<td><strong>End-Market</strong></td>
</tr>
<tr>
<td>Improve end market</td>
</tr>
</tbody>
</table>

### Both design and system challenges:
Mixtures of materials, such as with the coatings, may be difficult to separate and may end up as waste

### Optimize design and advance the recycling system:
- **Switch to a recyclable format** (e.g., use recyclable coating, use a PET or PP tub) or develop an appropriate circular economy solution (e.g., advance the recycling system, reuse, or composting)
  - If using paper with recyclable coatings proven to fit in a recycling system (e.g., a new one), be sure to avoid including metal and ensure compatible with recycling systems, especially for sortability since very rigid paper packages that are more three-dimensional than two-dimensional may not be sorted with the paper recycling and end up as waste, therefore it is best to test for sorting and include any necessary instructions for flattening as needed

### Use the How2Recycle label

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### Guide: Cans

<table>
<thead>
<tr>
<th>OPTIMIZE</th>
<th>CHANGE</th>
<th>ADVANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GUIDES: CANS</td>
<td></td>
</tr>
</tbody>
</table>

- **Bags, films, and pouches:**
  - Made from multiple materials
  - Plastic: nylon, PET, PP, PVC, PVDC

- **Bottles, jars, jugs, and tubs:**
  - Glass
  - Plastic: HDPE, LDPE, PET, PP

- **Boxes:**
  - Paperboard, corrugate, molded fiber

- **Canisters and cartons:**
  - Paper-based including:
    - Simple containers without metal (see paperboard guide)
    - Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
    - Coated containers for refrigerated products (e.g., gable top)

- **Cans:**
  - Steel, aluminum (including aerosols and others)

- **Trays, clamshells, thermoforms:**
  - Paper and fiber-based (see paperboard or molded fiber)
  - Plastic: PET, PP

- **Other:**
  - Blister packs (multiple materials)
  - Foam cushion, dunnage, inserts
  - Flat plastic
  - Tubes made from multiple materials
  - Small plastic containers or flat plastic (<2” in more than one dimension)

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Metal Containers

Typically used for:
• Beverage cans
• Food cans
• Aerosol food cans
• Aerosol cleaning product cans

Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Materials</th>
<th>Aluminum, steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labels</td>
<td>Lacquer printing on container</td>
</tr>
<tr>
<td>Attachments, closures</td>
<td>Same metal as package</td>
</tr>
</tbody>
</table>

Feasible post-consumer recycled content levels based on current industry practice

<table>
<thead>
<tr>
<th>Minimum (may increase over time)</th>
<th>70% aluminum, 20% steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>Up to 100% PCR</td>
</tr>
</tbody>
</table>

Recyclability challenges

<table>
<thead>
<tr>
<th>Recyclability challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full body sleeves</td>
<td>Beverages</td>
<td>Avoid using or ensure compatible with removal during recycling (since a contaminant that reduces value of recycled metal and can slow down recycling operations)</td>
</tr>
<tr>
<td>Mixed materials</td>
<td>Beverages</td>
<td>Avoid PVC; avoid using non-metal materials (e.g., no plastic, lead, steel, or glass); and maximize total portion of aluminum in aluminum containers</td>
</tr>
<tr>
<td>Metal trays and pans</td>
<td>Frozen food</td>
<td>Shift to a recyclable option (e.g., light colored PP) or work to improve the acceptance of these for recycling (currently metal trays not collected by enough communities because they are difficult to separate from cans; limited value; can have food contamination)</td>
</tr>
</tbody>
</table>

Materials to avoid that present recyclability challenges

<p>| Attachments and Closures | Avoid: Plastic, stickers |
| Labels                  | Avoid: Stickers, full body plastic sleeves |</p>
<table>
<thead>
<tr>
<th>OPTIMIZE</th>
<th>CHANGE</th>
<th>ADVANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GUIDES: CUSHION, DUNNAGE, AND INSERTS</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Recyclable best practices: Meets the following

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<tr>
<th>Material</th>
<th>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Strength Additives</td>
<td>Compatible with recycling processing as confirmed by Western Michigan University testing</td>
</tr>
<tr>
<td>Coatings</td>
<td>Use no coatings or use clay or varnish coatings</td>
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<tr>
<td>Adhesives</td>
<td>Minimal adhesives and tape or hydrophobic adhesives</td>
</tr>
<tr>
<td>Attachments</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</td>
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<tr>
<td>Labels and Graphics</td>
<td>Paper or direct printed</td>
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### Paper Cushion

Typically used for:
- General merchandise
- Home and garden
- Ecommerce

### Materials to avoid that present recyclability challenges

<table>
<thead>
<tr>
<th>Category</th>
<th>Avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color, Layers, or Additives</strong></td>
<td>Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, bioplastic, coatings, metalized films, foils, wet strength additives that haven’t passed Western Michigan University testing, dark colors, fragrances</td>
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<tr>
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</tr>
<tr>
<td><strong>Labels</strong></td>
<td>Metal foil, metalized printing, PET, PLA, PP, PS, PVC</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Intentionally added per- and polyfluoroalkyl substances (PFASs) – see the <a href="#">How2Recycle</a> program for more information</td>
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**Corrugated Board**

Typically used for:
- General merchandise
- Home and garden
- Ecommerce

<table>
<thead>
<tr>
<th>Recyclable best practices: Meets the following</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corrugated Box Material</strong></td>
</tr>
<tr>
<td><strong>Color</strong></td>
</tr>
<tr>
<td><strong>Coatings</strong></td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
</tr>
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<td><strong>Adhesives</strong></td>
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<td><strong>Attachments</strong></td>
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Corrugated Board

Typically used for:
• General merchandise
• Home and garden
• Ecommerce

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<table>
<thead>
<tr>
<th>Materials to avoid that present recyclability challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color, Layers, or Additives</strong></td>
</tr>
<tr>
<td><strong>Attachments and Adhesives</strong></td>
</tr>
<tr>
<td><strong>Labels</strong></td>
</tr>
<tr>
<td><strong>Other</strong></td>
</tr>
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</table>
Molded fiber could be used with the following:
- General merchandise
- Home and garden
- Ecommerce

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Recyclable best practices: Meets the following

<table>
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<tr>
<th>Material</th>
<th>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Strength Additives</td>
<td>Compatible with recycling as confirmed by Western Michigan University testing</td>
</tr>
<tr>
<td>Coatings</td>
<td>Use no coatings or use clay or varnish coatings</td>
</tr>
<tr>
<td>Adhesives</td>
<td>Minimal adhesives and tape or hydrophobic adhesives</td>
</tr>
<tr>
<td>Attachments</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</td>
</tr>
<tr>
<td>Labels and Graphics</td>
<td>Paper or direct printed</td>
</tr>
</tbody>
</table>

Feasible post-consumer recycled content levels based on current industry practice

<table>
<thead>
<tr>
<th>Minimum (may increase over time)</th>
<th>Use certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>Up to 100% PCR</td>
</tr>
</tbody>
</table>

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Molded fiber could be used with the following:
- General merchandise
- Home and garden
- Ecommerce

### Materials to avoid that present recyclability challenges

<table>
<thead>
<tr>
<th>Category</th>
<th>Avoid:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color, Layers, or Additives</strong></td>
<td>Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, metalized films, foils, wet strength additives that haven’t passed Western Michigan University testing, dark colors, fragrances</td>
</tr>
<tr>
<td><strong>Attachments and Adhesives</strong></td>
<td>Metal, magnetic closures, electronics, PET, PLA, PP, PS, PVC, Hot melt adhesives, Stickers and adhesives (unless passes Western Michigan University testing)</td>
</tr>
<tr>
<td><strong>Labels</strong></td>
<td>Metal foil, metalized printing, PET, PLA, PP, PS, PVC</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Intentionally added per- and polyfluoroalkyl substances (PFASs) – see the <a href="#">How2Recycle</a> program for more information</td>
</tr>
</tbody>
</table>

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### PE Cushion*

**Typically used for:**
- General merchandise
- Home and garden
- Ecommerce

---

### Recyclable best practices: Meets the following or passed the applicable APR benchmark and definitive tests

<table>
<thead>
<tr>
<th>Resin</th>
<th>LDPE, MDPE, LLDPE, or HDPE film</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin Color</td>
<td>Unpigmented is best or white or light colors</td>
</tr>
<tr>
<td>Resin Additives</td>
<td>Use compatible additives at levels that do not alter the base material density (e.g., EVOH at recommended levels, see the APR Design Guide for more details); No degradable or biodegradability additives or starch</td>
</tr>
<tr>
<td>Fillers</td>
<td>Ensure density of blend is less than 1.0</td>
</tr>
<tr>
<td>Layers</td>
<td>PE</td>
</tr>
<tr>
<td>Labels</td>
<td>PE or direct printed</td>
</tr>
<tr>
<td>Attachments</td>
<td>PE</td>
</tr>
</tbody>
</table>

### Feasible post-consumer recycled content levels based on current industry practice

**Minimum (may increase over time)**

No minimum PCR content, but may be added in the future

---

*Plastic packages that have established recycling systems in the U.S., but not yet at rates consistent with the requirements for global reporting of progress according to the Ellen MacArthur Foundation New Plastics Economy Global Commitment.*

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### PE Cushion*

*Plastic packages that have established recycling systems in the U.S., but not yet at rates consistent with the requirements for global reporting of progress according to the Ellen MacArthur Foundation New Plastics Economy Global Commitment.

<table>
<thead>
<tr>
<th>Recyclability challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycled content</td>
<td>Variety of products</td>
<td>No minimum due to limited availability of options currently available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials to avoid that present recyclability challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resin</strong>&lt;br&gt;Avoid: Any non-PE resins mixed in (avoid less than 90% PE)</td>
</tr>
<tr>
<td><strong>Resin Color or Additives</strong>&lt;br&gt;Avoid: Dark colors (e.g., blue, green), PVC, PVDC, metalized layers, fillers that alter the blend density to be greater than 1.0, Starch resins, Degradable additives (no biodegradability additives), PS, EPS, PVC, PVDC</td>
</tr>
<tr>
<td><strong>Attachments and Closures</strong>&lt;br&gt;Avoid: RFIDs&lt;br&gt;Avoid: Metal, foils, fibers, PET, PLA, PP, PS, PVC, PVDC</td>
</tr>
<tr>
<td><strong>Other</strong>&lt;br&gt;Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see <a href="https://www.plasticspact.org/problematic-andunnecessary-materials">U.S. Plastics Pact Problematic and Unnecessary Materials</a> and <a href="https://www.how2recycle.com">How2Recycle</a> for more information</td>
</tr>
</tbody>
</table>

Typically used for:
- General merchandise
- Home and garden
- Ecommerce

Suppliers are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging.
Foam Cushion, Dunnage, Inserts

- Expanded polystyrene or other resins, nylon
- Mushroom packaging

Challenges

- Expanded polystyrene (EPS) and other foam (expanded PET, expanded PP, expanded PE), nylon, mushroom packaging* for cushion, dunnage, or inserts are not accepted by most communities for recycling

Guidance

Change to:

- A design that doesn’t have the need for cushion, dunnage, and inserts
- A material that is recyclable such as corrugate, paper and paperboard, PE air pillows, and molded fiber

See the applicable guides in this playbook to optimize the new design (e.g., labels, colors) and use the How2Recycle label

*While mushroom packaging is often compostable, recyclable options are preferred for this type of packaging.

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<table>
<thead>
<tr>
<th>OPTIMIZE</th>
<th>CHANGE</th>
<th>ADVANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GUIDES:</strong></td>
<td><strong>TRAYS, CLAMSHELLS, AND THERMOFORMS</strong></td>
<td></td>
</tr>
<tr>
<td>Bags, films, and pouches:</td>
<td><strong>Made from multiple materials</strong></td>
<td></td>
</tr>
<tr>
<td>• Paper (see paperboard guide)</td>
<td>• Plastic: PE, HDPE, MDPE, LDPE, and LLDPE</td>
<td></td>
</tr>
<tr>
<td>• Plastic: nylon, PET, PP, PVC, PVDC</td>
<td><strong>Heat-in-the-bag, advanced barriers, meat film and soaker pads, customer demand</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Bottles, jars, jugs, and tubs:</strong></td>
<td><strong>Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials</strong></td>
<td></td>
</tr>
<tr>
<td>• Glass</td>
<td><strong>Plastic: HDPE, LDPE, PET, PP</strong></td>
<td></td>
</tr>
<tr>
<td>• Plastic: HDPE, LDPE, PET, PP</td>
<td><strong>Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Boxes</strong></td>
<td><strong>Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Canisters and cartons:</strong></td>
<td><strong>Coated paper-based containers for frozen products</strong></td>
<td></td>
</tr>
<tr>
<td>• Simple containers without metal (see paperboard guide)</td>
<td>• Multi-layer containers for shelf-stable products (e.g., aseptic boxes)</td>
<td></td>
</tr>
<tr>
<td>• Multi-layer containers for shelf-stable products (e.g., aseptic boxes)</td>
<td><strong>Coated containers for refrigerated products (e.g., gable top)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Cans</strong></td>
<td><strong>Coated paper-based containers for frozen products</strong></td>
<td></td>
</tr>
<tr>
<td>• Steel, aluminum (including aerosols and others)</td>
<td><strong>Coated paper-based containers for frozen products</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Trays, clamshells, thermoforms:</strong></td>
<td><strong>Plastic: EPS, PS, PVC</strong></td>
<td></td>
</tr>
<tr>
<td>• Paper and fiber-based (see paperboard or molded fiber)</td>
<td>• Plastic: PET, PP</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>• Plastic: PET, PP</td>
<td></td>
</tr>
<tr>
<td>• Foam cushion, dunnage, inserts</td>
<td>• Plastic: PET, PP</td>
<td></td>
</tr>
<tr>
<td>• Flat plastic</td>
<td><strong>Tubes made from multiple materials</strong></td>
<td></td>
</tr>
<tr>
<td>• Small plastic containers or flat plastic (&lt;2” in more than one dimension)</td>
<td><strong>Tubes made from multiple materials</strong></td>
<td></td>
</tr>
</tbody>
</table>

The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures).
Paperboard

Typically used for:
• Food
• Frozen food
• Cleaning products
• Health and wellness (supplements, medicine)
• Personal, hair, and baby care
• Cosmetics
• Pet care
• Office supplies
• Arts and crafts
• Apparel (shoes, baby, women, men)
• Electronics
• General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
• Home and garden
• Party supplies
• Toys

Recyclable best practices: Meets the following

<table>
<thead>
<tr>
<th>Material</th>
<th>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Strength Additives</td>
<td>Compatible with recycling processing as confirmed by Western Michigan University testing</td>
</tr>
<tr>
<td>Coatings</td>
<td>Use no coatings or use clay or varnish coatings</td>
</tr>
<tr>
<td>Adhesives</td>
<td>Minimal adhesives and tape or hydrophobic adhesives</td>
</tr>
<tr>
<td>Attachments</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber</td>
</tr>
<tr>
<td>Labels and Graphics</td>
<td>Paper or direct printed</td>
</tr>
<tr>
<td>Dunnage and Padding</td>
<td>Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber options</td>
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### Paperboard

Typically used for:
- Food
- Frozen food
- Cleaning products
- Health and wellness (supplements, medicine)
- Personal, hair, and baby care
- Cosmetics
- Pet care
- Office supplies
- Arts and crafts
- Apparel (shoes, baby, women, men)
- Electronics
- General merchandise (DIY, sporting goods, automotive, home, kitchen, jewelry)
- Home and garden
- Party supplies
- Toys

### Recyclability challenges

<table>
<thead>
<tr>
<th>Frozen Food Cartons</th>
<th>Frozen foods</th>
<th>Improve end market and systems for collection and recycling of material that can be recovered (e.g., fiber) or innovate to use recycling compatible options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food-Contact and Oily/Liquid-Contact Products</td>
<td>Variety of products</td>
<td>Ensure that the package can be easily cleaned or have no/low contamination/residue (e.g., frozen waffles) otherwise find another recyclable package design (may also consider reviewing the compostable packaging information to see if that option applies)</td>
</tr>
</tbody>
</table>

### Materials to avoid that present recyclability challenges

<table>
<thead>
<tr>
<th>Color, Layers, or Additives</th>
<th>Avoid: Plastic/polymer treatments or layers on fiber-based components (one side is better than both the outside and inside coated), treatments that require plastic/polymers (most holograms, high gloss), wax, bioplastic, metalized films, foils, wet strength additives that haven’t passed Western Michigan University testing, dark colors, fragrances</th>
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<tbody>
<tr>
<td>Attachments and Adhesives</td>
<td>Avoid: Metal, magnetic closures, electronics, PET, PLA, PP, PS, PVC, hot melt adhesives, stickers and adhesives (unless passes Western Michigan University testing)</td>
</tr>
<tr>
<td>Labels</td>
<td>Avoid: Metal foil, metalized printing, PET, PLA, PP, PS, PVC</td>
</tr>
<tr>
<td>Dunnage and Padding</td>
<td>Avoid: EPS and other expanded resin materials (see cushion, dunnage, and insert guidance in this playbook)</td>
</tr>
<tr>
<td>Other</td>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFASs) – see the How2Recycle program for more information</td>
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Molded Fiber

Typically used for:
- Frozen food trays (for some applications)
- Produce trays
- Bakery trays

Recyclable best practices: Meets the following

| Material | Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber |
| Wet Strength Additives | Compatible with recycling as confirmed by Western Michigan University testing |
| Coatings | Use no coatings or use clay or varnish coatings |
| Adhesives | Minimal adhesives and tape or hydrophobic adhesives |
| Attachments | Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber |
| Labels and Graphics | Paper or direct printed |
| Dunnage and Padding | Certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber options |

Feasible post-consumer recycled content levels based on current industry practice

| Minimum (may increase over time) | Use certified responsibly sourced fiber (e.g., FSC*) and/or recycled fiber |
| Maximum | Up to 100% PCR |

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Typically used for:
- Frozen food trays (for some applications)
- Produce trays
- Bakery trays

## Molded Fiber

### Recyclability challenges

<table>
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<tr>
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<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
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<td>Variety of products</td>
<td></td>
<td>Ensure that the package can be easily cleaned or have no/low contamination/residue (e.g., frozen waffles) otherwise find another recyclable package design (may also consider reviewing the compostable packaging information to see that option applies)</td>
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</tr>
<tr>
<td>Labels</td>
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### PET Thermoforms (e.g., Boxes, Clamshells, Cups)

Typically used for:
- Bakery and deli
- Eggs
- General merchandise (sporting goods, automotive, home)

<table>
<thead>
<tr>
<th>Challenges and levers of change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>Remove contaminants</td>
</tr>
</tbody>
</table>

**Both design and system challenges:**
- Collection dropped below levels considered to be widely “recyclable”
- These packages may have contaminating materials (e.g., labels, adhesives)

- Engage in the Association of Plastic Recyclers, The Recycling Partnership, Foodservice Packaging Institute, U.S. Plastics Pact to advance recycling systems
- Optimize design or switch to a recyclable format (e.g., paper bag), see following pages
ADVANCE to a Circular Economy Solution – design elements to utilize

PET Thermoforms (e.g., Boxes, Clamshells, Cups)

Typically used for:
• Bakery and deli
• Eggs
• General merchandise (sporting goods, automotive, home)

### Optimize: Meets the following or passed the applicable APR benchmark and definitive tests

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin</td>
<td>PET bottle grade with a crystalline melting point between 225 and 255°C</td>
</tr>
<tr>
<td>Resin Color</td>
<td>Clear</td>
</tr>
<tr>
<td>Resin Additives</td>
<td>No degradable or biodegradability additives</td>
</tr>
<tr>
<td>Label</td>
<td>PP or PE (that float when printed)</td>
</tr>
<tr>
<td>Attachments</td>
<td>Clear if PET; colored ok for PP or PE</td>
</tr>
<tr>
<td>Tamper Evidence</td>
<td>Easily fully removable, PET, PP, or PE</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Larger than 2” in two dimensions and largely 3-dimensional (vs. flat with one dimension &lt;2”)</td>
</tr>
</tbody>
</table>

### Feasible post-consumer recycled content levels based on current industry practice

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum (may increase over time)</td>
<td>25% PCR</td>
</tr>
<tr>
<td>Maximum</td>
<td>Up to 100% PCR</td>
</tr>
</tbody>
</table>

Use the How2Recycle label

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### PET Thermoforms (e.g., Boxes, Clamshells, Cups)

Typically used for:
- Bakery and deli
- Eggs
- General merchandise (sporting goods, automotive, home)

Suppliers are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging.

### Materials to avoid that present recyclability design challenges

<table>
<thead>
<tr>
<th>Design challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black trays</td>
<td>Bakery and produce</td>
<td>Black currently isn’t detected in sorting for PET, has no valuable end markets, it should be switched to clear or transparent light blue or green if it isn’t 100% PCR</td>
</tr>
<tr>
<td>Non-PET clamshells</td>
<td>Variety of products</td>
<td>Look to switch to a recyclable format (e.g., paper, PET)</td>
</tr>
<tr>
<td>More 2-dimensional</td>
<td>Variety of products</td>
<td>Ensure that the size and shape are compatible with the sorting recycling processes by using the test from the Association of Plastic Recyclers</td>
</tr>
<tr>
<td>Blister packages (e.g., paper and plastic)</td>
<td>Toys, general merchandise, health and wellness</td>
<td>These are often hard to separate or are not used by recyclers, design or innovate to use a recyclable package (e.g., paper, PET, PE film/bag)</td>
</tr>
</tbody>
</table>

### Design challenges

<table>
<thead>
<tr>
<th>Design challenges</th>
<th>Examples</th>
<th>Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin</td>
<td>Avoid: PETG, or Other resins mixed in</td>
<td></td>
</tr>
<tr>
<td>Resin Color or Additives</td>
<td>Avoid: Transparent colors (green should be limited to compostable packaging based on guidance from the State of Washington), opaque colors, dark colors (i.e., with an L value &lt;40 or NIR reflectance &lt;=10% can’t be sorted), degradable additives or biodegradability additives, PETG, PS, EPS, PVC, PVDC</td>
<td></td>
</tr>
<tr>
<td>Attachments/Closures</td>
<td>Avoid: RFIDs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoid: Metal, foils, PS, PVC, PLA, PETG</td>
<td></td>
</tr>
<tr>
<td>Labels and Adhesives</td>
<td>Ensure materials, adhesives, and size of sleeve/label is not problematic for recycling, i.e., use APR “preferred” labels. Avoid the following • Materials: Metal foil, metalized printing, PS, PVC, PLA, PETG, paper labels not APR Preferred or that do not pass APR testing • Label coverage: Those that are not APR Preferred, does not pass APRs near infrared (NIR) Sorting Potential Test, for containers of 550 ml or less labels that cover more than 55% of the bottle surface area with label, for containers greater than 550 ml labels that cover more than 70% of the bottle surface area with label • Inks: Bleeding inks or direct printing that do not pass APR testing, minimize direct printing on the container</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>Avoid intentionally added per- and polyfluoroalkyl substances (PFA5s) – see U.S. Plastics Pact Problematic and Unnecessary Materials and How2Recycle for more information</td>
<td></td>
</tr>
</tbody>
</table>
# Change to a Recyclable Package

## Trays, Clamshells, Thermoforms, Cases

**EPS, PS, PVC, Acrylic**

Typically used for:
- Arts and crafts
- Cosmetics
- Electronics
- Food (e.g., bakery, cookies, deli, frozen, meat)
- General merchandise
- Home Décor and Do It Yourself
- Office
- Personal care
- Toys

### Challenges

- Acrylic, expanded polystyrene (EPS), polystyrene (PS), polyvinyl chloride (PVC) are not accepted by most communities for recycling
- These materials can be detrimental to the recycling of more common plastics and can result in losses due to contamination

### Guidance

**Change to:**
- A similar format that is a recyclable option such as PET, PP, or molded fiber
- A different recyclable format (e.g., box, bag)

See the appendix for information on compostable packaging to see if this option applies

See the applicable guides in this playbook to optimize the new design (e.g., labels, colors) and use the How2Recycle label

---

_Employees are reminded that they are responsible for the compliance of their products, including their products packaging, with all applicable laws and regulations, including laws and regulations applicable to recyclability and compostability, such as the FTC’s Green Guides and California’s Public Resources Code. Walmart does not give its suppliers legal advice. Suppliers should consult their own counsel with questions about the applicability of laws and regulations to their products and packaging._
<table>
<thead>
<tr>
<th>OPTIMIZE</th>
<th>CHANGE</th>
<th>ADVANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GUIDES: OTHER PACKAGES: BLISTER PACKS</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Blister Packs**

(usually with multiple materials such as PET/paper, PVC/metal)

- Typically used for:
  - Arts and crafts
  - Consumables
  - Health & wellness (e.g., supplements, medicine)
  - Electronics
  - General merchandise
  - Home Décor and Do It Yourself
  - Office
  - Toys

### Challenges

- It is difficult for consumers to separate multiple materials
- Commonly used PVC thermoforms are detrimental to plastic recycling

### Guidance

**Change to:**

- A different format with a single material (e.g., paperboard box, PE bag)
- A similar format with materials that are easily separated and recyclable on their own (e.g., PET clamshell or tray with paper insert), or use the acceptable attachments noted in this playbook

Avoid materials that are detrimental to plastic recycling (e.g., PVC, PETG, foils), including adhesives that remain on the plastic that are not compatible with recycling

See the applicable guides in this playbook to optimize the new design (e.g., labels, colors) and use the How2Recycle label

**Exception for Drugs:** When drugs require individual dosing with tamper evidence and product protection that another option cannot provide, blister packs with multiple materials are acceptable, but the company should have a development pipeline that aims to replace this design with recyclable alternatives (supplements are not included in this exception)

### Example recyclable formats to consider

<table>
<thead>
<tr>
<th>Paperboard box</th>
<th>Paperboard display</th>
<th>PE bag</th>
<th>PET clamshell, tray</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Paperboard box" /></td>
<td><img src="image" alt="Paperboard display" /></td>
<td><img src="image" alt="PE bag" /></td>
<td><img src="image" alt="PET clamshell, tray" /></td>
</tr>
</tbody>
</table>

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GUIDES: OTHER PACKAGES: PLASTIC TUBES WITH MULTIPLE MATERIALS
**ADVANCE to a Circular Economy Solution (usually a longer-term approach)**

### Tubes

- Plastic and made of multiple materials (aluminum, plastic)

<table>
<thead>
<tr>
<th>Challenges and levers of change</th>
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<tbody>
<tr>
<td><strong>Design</strong></td>
</tr>
<tr>
<td>Use single resin</td>
</tr>
<tr>
<td><strong>Collection</strong></td>
</tr>
<tr>
<td>Expand collection</td>
</tr>
<tr>
<td><strong>Sortation</strong></td>
</tr>
<tr>
<td>Improve sortation</td>
</tr>
<tr>
<td><strong>Processing</strong></td>
</tr>
<tr>
<td>Improve processing</td>
</tr>
<tr>
<td><strong>End-Market</strong></td>
</tr>
<tr>
<td>Improve end market</td>
</tr>
</tbody>
</table>

**Both design and system challenges:** Tubes often are a mixture of materials not collected for recycling

- Design tubes from a single PE resin and engage in the Association of Plastic Recyclers Tube Working Group, The Recycling Partnership, and the U.S. Plastics Pact to advance recycling systems
- Or switch to a recyclable format

**Work to advance innovation in recyclable packaging or the development of an appropriate circular economy solution**

- Use a different package material and format that is recyclable (e.g., paperboard box, PE bag)
- Or design tubes from a single PE resin optimized for recycling (e.g., use compatible additives such as limited EVOH, see [APR Design® Guide For Plastics Recyclability](#), see Colgate Palmolive toothpaste tube development, and engage in the industry to advance its recycling (see above)

If a recyclable option is not feasible, help advance the development of an appropriate circular economy solution (e.g., reuse, composting, take-back) for the current package (e.g., packages with significant product residue detrimental to recycling or not compatible with recycling, packages smaller than 2" in more than one dimension).

**Use the How2Recycle label**

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### Bags, films, and pouches:
- Paper (see paperboard guide)
- Plastic: PE, HDPE, MDPE, LDPE, and LLDPE

### Bags, films, and pouches:
- Made from multiple materials
- Plastic: nylon, PET, PP, PVC, PVDC

### Bottles, jars, jugs, and tubs:
- Glass
- Plastic: HDPE, LDPE, PET, PP

### Bottles, jars, jugs, and tubs:
- Plastic: acrylic, PETG, PC, PS, PVC, miscellaneous plastics, and multiple materials

### Boxes:
- Paperboard, corrugate, molded fiber

### Canisters and cartons:
- Paper-based including:
  - Simple containers without metal (see paperboard guide)
  - Multi-layer containers for shelf-stable products (e.g., aseptic boxes)
  - Coated containers for refrigerated products (e.g., gable top)
- Paper-based containers with metal tops or bottoms
- Coated paper-based containers for frozen products

### Cans:
- Steel, aluminum (including aerosols and others)

### Trays, clamshells, thermoforms:
- Paper and fiber-based (see paperboard or molded fiber)
- Plastic: PET, PP
- Plastic: EPS, PS, PVC

**The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures)**

---

### Other:
- Blister packs (multiple materials)
- Foam cushion, dunnage, inserts
- Flat plastic
- Tubes made from multiple materials
- Small plastic containers or flat plastic (<2” in more than one dimension)

**GUIDES: OTHER PACKAGES: FLAT OR SMALL PLASTIC**
Flat plastic has 2 dimensions or is more 2-dimensional than 3-dimensional

Flat plastic found across the store as a window on a package or the package itself.
- Grocery (e.g., bakery, pasta)
- Consumables (e.g., cosmetics)
- General merchandise (e.g., electronic accessories)
- Toys

Challenges
- Flat plastic may end up with paper recycling in which case it potentially contaminates paper or does not get recycled

Guidance

**Change:**
- Design out flat plastic packaging components (e.g., windows)

For PET thermoforms that are not a window but more of a plastic box or container that could be more 2-dimensional than 3-dimensional, see PET thermoform guidance and:
- Ensure that the size and shape are compatible with the recycling process by using the test from the Association of Plastic Recyclers
- Or **Change** to a recyclable format (e.g., box, bag)

See the applicable guides in this playbook to optimize the new design (e.g., labels, colors) and use the How2Recycle label

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ADVANCE to a Circular Economy Solution (usually a longer-term approach)

Small plastic containers
- Small packages are <2” in more than one dimension

Challenges and levers of change

<table>
<thead>
<tr>
<th>Design</th>
<th>Collection</th>
<th>Sortation</th>
<th>Processing</th>
<th>End-Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use single resin</td>
<td>Improve sortation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Primarily a system challenge: Small packages can fall through recycling sorting steps to end up as waste

- Optimize design and engage in the Association of Plastic Recyclers, The Sustainability Consortium, and the U.S. Plastics Pact to advance recycling systems for these harder to recycle items
- Or switch to a recyclable format

Work to advance innovation in recyclable packaging or the development of an appropriate circular economy solution

- Design small packages to pass the test for sorting. Ensure that the size and shape are compatible with the recycling process by using the test from the Association of Plastic Recyclers. However, increasing the package size and material use are not recommended. Also, ensure that the overall design is optimized for recycling the material (e.g., labels, color, caps). Refer to the applicable green/gray design pages (e.g., HDPE bottle, etc.).
- If cannot meet requirement for sorting, help advance the development of an appropriate circular economy solution
- Or switch to a recyclable format

Use the How2Recycle label

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Bags, films, and pouches:
- Made from multiple materials
- Plastic: nylon, PET, PP, PVC, PVDC

Bottles, jars, jugs, and tubs:
- Plastic: HDPE, LDPE, PET, PP

Canisters and cartons:
- Paper-based containers with metal tops or bottoms
- Coated paper-based containers for frozen products

Cans: steel, aluminum (including aerosols and others)

Trays, clamshells, thermoforms:
- Paper and fiber-based (see paperboard or molded fiber)
- Plastic: PET, PP

Other:
- Blister packs (multiple materials)
- Foam cushion, dunnage, inserts
- Flat plastic
- Tubes made from multiple materials
- Small plastic containers or flat plastic (<2” in more than one dimension)

COMPOSTABLE PACKAGING

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WHEN IS COMPOSTABLE PACKAGING AN OPTION?

When packaging, food waste, and end-of-life impacts are balanced & reusable and recyclable options do not work

Do you have a packaged food product that leaves food residue on the package?

- **YES**
  - Is there a reusable or recyclable option that does not have major trade-offs with package material impacts?
    - **YES**
      - Is food spoilage about the same or reduced with using the reusable or recyclable option?
        - **YES**
          - Explore innovative options for a reusable or recyclable package, ensuring food spoilage is minimized
        - **NO**
          - Consider a compostable package that does not look like a recyclable option and does not interfere with existing recycling systems
    - **NO**
      - Use a reusable or recyclable package
  - **NO**
    - Consider a compostable package that does not look like a recyclable option and does not interfere with existing recycling systems

Example products that might consider compostable packaging:
- Single serve condiments
- Chips and snack foods

What looks like a recyclable option or could interfere with existing recycling systems?
- Rigid plastic packages (a composter would dispose it thinking it was not compostable; a consumer would recycle it thinking it was recyclable; or where recyclable options are likely available)

This information applies to retail product packaging (e.g., does not refer to food service, products)
WHAT TO WATCH FOR: COMPOSTABLE PACKAGING

Composting is a natural degradation process that produces a soil conditioner from organic materials

INDUSTRIAL COMPOSTING: Consumers currently do not have enough access to industrial composting programs
  • Approximately 5% of U.S. households have access to curbside food waste collection; not all programs accepting compostable packaging
  • Look for Biodegradable Products Institute (BPI) certified compostable packaging (or equivalent)

COMMUNITY AND HOME COMPOSTING: Usually a long process with small volumes and with some technical limitations
  • Look for BPI certified compostable packaging PLUS TUV’s OK compost home certification

If compostable packaging proves to be the best way to balance end-of-life management, packaging material impacts, and food waste be sure to* support the expansion of composting access for consumers (e.g., engage with and/or fund organizations, policy development, and other efforts increasing composting access)

*Applicable for countries with composting in countries that do not have any consumer composting access or that ban packaging in composting should not use compostable packaging (e.g., South Africa).
**COMPOSTABLE PACKAGING IS NOT THE SAME AS BIODEGRADABLE**

*Do not make claims about biodegradability of packaging, only refer to compostability (when applicable)*

---

**Compostable**

Biodegrades into compost at a rate consistent with other known compostable materials and without visible residue as verified through standard tests.

**Biodegradable**

Under appropriate conditions, breaks down into carbon dioxide, minerals and other materials found in nature. *Note: packages can be biodegradable but are not compostable; biodegradation cannot expect to happen in a landfill; making biodegradable claims are not instructing a responsible end-of-life behavior and are confusing to consumers.*

---

**Biodegradable additives:** Used to help something partially biodegrade but does not enable compostability and should be avoided in packaging.

- Do not use in petroleum-based plastics since compromises the recycling stream (Source: Sustainable Packaging Coalition).
- Do not use in compostable packaging since they are not needed.

**Marine degradability:** This is a subset of biodegradability, where the material can effectively break down in marine environments, and while is a desirable attribute for some materials, this is not a claim that should be made on any packaging.

**PFAS:** Long and short chain per- and poly-fluorinated alky substances (PFAS) are often used to grease and water-proof fiber-based packaging and should be avoided. BPI compostable certification does not allow for intentional addition of PFAS. (Source: BPI).
### WHAT SYSTEMS ARE COMMONLY AVAILABLE FOR COMPOSTING PACKAGING?

- There are ~1,000 industrial composting facilities that accept waste from consumers in the U.S., of which ~16% currently accept compostable packaging.
- The most common systems include windrow, aerated static pile (ASP), or in-vessel systems.

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
<th>Timeframe to finished compost</th>
<th>Advantages</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WINDROW</strong></td>
<td>Waste is formed into rows of long piles -called windrows – and periodically turned, manually or mechanically.</td>
<td>6-9 months</td>
<td>Can process large volumes of material and creates large amounts of finished compost.</td>
<td>Requires larger parcels of land to site and scale. Requires regulatory zoning, siting, and enforcement (e.g., odor, size, water quality, etc.) Requires higher operating cost (e.g., fuel use)</td>
</tr>
<tr>
<td><strong>AERATED STATIC PILE (ASP)</strong></td>
<td>Waste is pre-mixed and placed in large piles where fans push or pull air through the pile.</td>
<td>3-6 months</td>
<td>Requires less land and labor than windrow composting. Shorter timeframe and controlled environment for materials to breakdown. Odor treatment can be integrated.</td>
<td>Requires more infrastructure and technical insight to correctly install and maintain. Requires regulatory zoning, siting, and enforcement (e.g., odor, size, water quality, etc.) May pose a challenge for bioplastics composting.</td>
</tr>
<tr>
<td><strong>IN-VEssel</strong></td>
<td>Waste is fed into a drum, silo, concrete-lined trench, or similar equipment. May include aeration, agitation, or temperature control systems.</td>
<td>In vessel 3 days- 6 weeks followed by windrow or ASP to finish</td>
<td>Can be small enough to be sited directly on-site at institutions. Shorter timeframe and controlled environment for materials to breakdown. Odor treatment can be integrated.</td>
<td>More expensive on a per unit basis. May require more technical expertise to operate.</td>
</tr>
</tbody>
</table>

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Source: Sustainable Packaging Coalition: Compostable Packaging Collaborative
WHAT PACKAGING MATERIALS ARE COMPOSTABLE?
Not all materials are compatible with common industrial composting systems

<table>
<thead>
<tr>
<th>Material *</th>
<th>Windrows</th>
<th>Aerated Static Pile (ASP)</th>
<th>Covered in-vessel (IVC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starch</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PLA (Polylactic acid)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Paper and Card</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Recycled Paper Pulp</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Molded Bagasse Pulp</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Molded Palm Fiber</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Molded Bamboo Fiber/Pulp</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Paperfoam</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High Amylose Corn Starch</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Thermoplastic starch (TPS)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Polyhydroxyalkanoate (PHA) - Canola oil base</td>
<td>Sometimes**</td>
<td>Sometimes**</td>
<td>Sometimes**</td>
</tr>
<tr>
<td>Polyhydroxybutyrate (PHB)</td>
<td>Sometimes**</td>
<td>Sometimes**</td>
<td>Sometimes**</td>
</tr>
<tr>
<td>Uncoated Cellulose-based Films</td>
<td>Sometimes**</td>
<td>Sometimes**</td>
<td>Sometimes**</td>
</tr>
</tbody>
</table>

* Raw material only, does not consider other packaging attributes such as closures, format, etc.
** May depend on packaging compositions & thicknesses

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1. Clearly indicate that the package is certified for industrially composting by including the BPI Certification Mark. The BPI Certification Mark and the How2Compost label can be included to reinforce on-product claims and differentiate between certified items and non-compostable packaging for certified items. All compostable claims must be qualified to make clear that:
   • The item is not home compostable unless it is certified specifically for home compostability
   • Commercial compost facilities are not available to a majority of consumers or communities where the item is sold
2. If you are using a compostable label, avoid making claims about any of the following**:
   • Biodegradable
   • Decomposable
   • Degradable
   • Marine degradable
   • Oxo-degradable
   • Recyclable (recyclable packages should not be labeled with compostable labels since recyclable packages should be recycled)

**Adapted from Washington State

3. Follow applicable laws, such as (but not limited to):
   • US Federal Trade Commission Green Guides
   • Washington State law on the marketing the degradability of products

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<td><strong>APPENDIX</strong></td>
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</table>

The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures)

**Other**:
- Blister packs (multiple materials)
- Foam cushion, dunnage, inserts
- Flat plastic

**Other**:
- Tubes made from multiple materials
- Small plastic containers or flat plastic (<2” in more than one dimension)

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A LOOK AT THE RANGE AND EVOLVING RECYCLING STATUS OF PACKAGING

According to How2Recycle, there are core package types that the current recycling system was designed for and are widely recyclable (e.g., corrugated boxes, aluminum cans, HDPE bottles, etc.); other package types may have barriers to recycling, which can change from time to time and impact the recyclability label in the How2Recycle program. This playbook contains references suppliers can use to help effectuate change to increase the recyclability of non-core package types.*

For plastic packaging, detailed guidance is provided in the APR Design™ Guide for Plastic Recyclability.

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*How2Recycle figure source: https://how2recycle.info/futureguide
Packages that are very minimal (e.g., product stickers) are low in priority to design for recyclability. Reduce cost by simplifying packaging, e.g., number of material types, weight, and components.
Packaging design (i.e., structural vs. label graphics) changes have a wide range of timelines, sometimes taking over 18 months. **Plan for the time to make the needed design changes** when looking to meet targets or launch dates.
A CLOSER LOOK AT SORTATION

After collection, packaging goes to a Material Recovery Facility (MRF) for sorting:

Components of a package are not separated at this stage of processing and if not compatible with the material stream, may contaminate it resulting losses. Refer to the appropriate guide in this playbook for more information.

*Facilities have different equipment and technologies resulting in variations in the order or result of sorting (e.g., glass sorted before paper) – this figure is a generalized representation.

*Labels, pigments, and inks may interfere with the optical sensor leading to PET or other recyclable plastic being discarded; testing is recommended.
WHICH GUIDE TO START WITH?

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*Some rigid PP containers fall in “advance” and some in “optimize”; refer to the corresponding pages in the playbook for more information.*
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QUICK TIPS FOR DESIGNING PLASTIC PACKAGING FOR RECYCLABILITY

Is the package PET*, HDPE, LDPE, LLDPE, PE, or PP*?

Is the package a natural, lighter, or transparent color?

Are degradable additives added?

Is the label the same resin as the package?

Is the closure the same resin as the package?

Are the attachments the same resin as the package?

Is there post-consumer recycled content?

If plastic, consider redesigning to be one of these resins or shift to a non-plastic material.

Consider redesigning to be a lighter or transparent color.

Consider redesigning to be a lighter or transparent color.

Redesign to not include these.

If it doesn’t have the opposite floating property (sink/float) as the package resin, need to test for recycling compatibility or consider redesign.

Add as much as is feasible (typically at least 25% PCR for non-films/bags) and permitted by FDA as applicable.

*How2Recycle currently classifies non-bottle rigid PET and some rigid PP packages with a “Check Locally” label.

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THE U.S. PLASTIC PACT PROBLEMATIC AND UNNECESSARY MATERIALS
The playbook includes these items in the “materials to avoid” sections for plastic packages

U.S. Pact Activators will take measures to eliminate these items by 2025, please visit: https://usplasticspact.org/problematic-materials/

- **Cutlery**
- **Intentionally added** Per- and Polyfluoroalkyl Substances (PFAS)²
- Non-Detectable Pigments such as Carbon Black
- Opaque or Pigmented PET – Polyethylene Terephthalate bottles (any color other than transparent blue or green)
- Oxo-Degradable Additives, including oxo-biodegradable additives
- PETG – Polyethylene Terephthalate Glycol in rigid packaging
- Problematic Label Constructions – This includes adhesives, inks, materials (e.g., PETG, PVC, PLA, paper). Avoid formats/materials/features that render a package detrimental or non-recyclable per the APR Design Guide. Labels should meet APR Preferred Guidance for coverage and compatibility and be tested in any areas where this is unclear.
- PS – Polystyrene, including EPS (Expanded Polystyrene)
- PVC – Polyvinyl Chloride, including PVDC (Polyvinylidene Chloride)
- Stirrers
- Straws

*When non-reusable, non-recyclable, or non-compostable per U.S. Pact definitions and provided as an ancillary item to the primary container. For instance, a packet of plastic cutlery provided with a prepared salad or a straw/stirrer provided with an on-the-go beverage would be defined as problematic whereas cutlery, straws, or stirrers sold as a product would not.

¹ “Intentionally added” either in the package or in the manufacturing of that package.

² “PFAS” or perfluoroalkyl and polyfluoroalkyl substances are defined as the class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom at or above 100 parts per million, as measured in total organic fluorine.

The 11 items listed are not currently reusable, recyclable, or compostable with existing U.S. infrastructure at scale and are not projected to be kept in a closed loop in practice and at scale by 2025.

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Source: U.S. Plastic Pact’s Problematic and Unnecessary Materials List
Bags, films, and pouches:
- Made from multiple materials
- Plastic: nylon, PET, PP, PVC, PVDC

Bottles, jars, jugs, and tubs:
- Glass
- Plastic: HDPE, LDPE, PET, PP

Canisters and cartons:
- Paper-based containers with metal tops or bottoms
- Coated paper-based containers for frozen products

Cans:
- Steel, aluminum (including aerosols and others)

Trays, clamshells, thermoforms:
- Paper and fiber-based (see paperboard or molded fiber)
- Plastic: PET, PP

Other:
- Blister packs (multiple materials)
- Foam cushion, dunnage, inserts
- Flat plastic
- Tubes made from multiple materials
- Small plastic containers or flat plastic (<2" in more than one dimension)

The following pages provide guidance on how to optimize package design for recycling (e.g., color, labels, closures)

GLOSSARY
WALMART UTILIZES ELLEN MACARTHUR FOUNDATION’S DEFINITION FOR RECYCLABILITY AND ISO DEFINITIONS FOR RECYCLED CONTENT, COMPOSTABILITY, AND REUSE FOR PURPOSES OF MEASURING PROGRESS ON WALMART’S GLOBAL SUSTAINABILITY GOALS

The below are Walmart’s simplified definitions. For the full definitions, please visit: https://www.ellenmacarthurfoundation.org/assets/downloads/13319-Global-Commitment-Definitions.pdf

**Recyclable**

**Definition:** If its successful post-consumer collection, sorting, and recycling is proven to work in practice and at scale (1).

1. In practice and at scale threshold: Does that packaging achieve a 30% post-consumer recycling rate in multiple regions, collectively representing at least 400 million inhabitants.

**What to look for:**
- Meets the “green pages” of the Recycling Playbook (though in practice and at scale may not be met in all cases)
- Reviewed by How2Recycle as Optimally or Recyclable but needs improvement

**Post-Consumer Recycled (PCR) Content**

**Definition:** Proportion, by mass, of post-consumer (1) recycled material in a product or packaging (ISO 14021:2016).

1. Post-consumer recycled (PCR) content is material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.
   - PCR material differs from pre-consumer in that pre-consumer consists of materials that were never in use before being recycled (e.g., Production scrap).

**What to look for:**
- Pre-consumer not pre-consumer recycled content

**Compostable**

**Definition:** If it is in compliance with relevant international compostability standards and if its successful post-consumer collection, (sorting), and composting is proven to work in practice and at scale.

- Undergoes degradation by biological processes during composting to yield, carbon dioxide, water, inorganic compounds, and biomass (humus-like substance) at a rate consistent with other known compostable materials and leaves no visible, distinguishable or toxic residue (Source: ISO 17088: 2012, ISO 14021: 2016)

**What to look for:**
- BPI Certified industrially compostable (or equivalent*)
- BPI Certified plus TUV’s OK compost Home

*Outside of the North America, BPI can be used or other programs that follow similar standards (e.g., ASTM D6400/D6868, EN 13432, or CAN/BNQ 0017-088) and prohibit added PFAS (e.g., TUV)

**Reuse**

**Definition:** Operation by which packaging is refilled or used for the same purpose for which it was conceived, with or without the support of auxiliary products present on the market, enabling the packaging to be refilled (ISO 18603:2013).

- Reusable packaging is packaging which has been designed to accomplish or proves its ability to accomplish a minimum number of trips or rotations in a system for reuse.
SIMPLIFIED VERSION OF ELLEN MACARTHUR FOUNDATION’S NEW PLASTICS ECONOMY GLOBAL COMMITMENT DEFINITION FOR RECYCLABILITY OF PLASTICS

Simplified version of EMF Definition for Recyclability

Step 1: Does a ‘system for recycling’ exist in practice and at scale for this packaging category? Yes

Step 2: Do the various packaging components fit that ‘system for recycling’? Yes

Packaging recyclable

Packaging not recyclable

At least 30% recycling rate achieved for over 400 million inhabitants

Optimize design for existing recycling systems and work to increase recycling rates above 30%

The Recycling Playbook is a resource to answer Step 2 of EMF’s global recyclability definition

Recyclable in some regions (e.g., U.S.), but does not meet the definition for being globally recyclable
ADDITIONAL TERMS AND ACRONYMS

• **Biodegradable**: Breakdown of an organic chemical compound by micro-organisms in the presence of oxygen to carbon dioxide, water, and mineral salts of any other elements present (mineralization) and new biomass or in the absence of oxygen to carbon dioxide, methane, mineral salts, and new biomass (Source: ISO 18606: 2013).

• **Circular economy solution (for packaging)**: Packaging that is recycled or composted (or both), ideally after several reuse cycles. This may include package deposit programs, take-back programs, municipal recycling, or other systems (e.g., educational campaign to encourage the placement of smaller packages into larger ones of same material composition, collection for chemical recycling) where the material is recovered and processed so the material is kept in use in the economy (Adapted from: Ellen MacArthur Foundation New Plastics Economy Global Commitment).

• **Miscellaneous plastics**: There are plastics that are not typically recyclable or are not commonly used in notable quantities, such as acrylonitrile butadiene styrene, polybutylene terephthalate, polylactic acid, polyoxymethylene, and styrene-acrylonitrile.

• **Package**: Any product to be used for the containment, protection, handling, delivery, storage, transport and presentation of goods, from raw materials to processed goods, from the producer to the user or consumer, including processor, assembler or other intermediary (Source: ISO 21067:2007).

• **Packaging components**: Part of packaging that can be separated by hand or by using simple physical means (Source: ISO 18601:2013).

• **Preferred**: Attributes that support recycling by the majority of the Materials Recovery Facilities and recyclers with minimal, or no, negative effect on the productivity of the operation or final product quality (Source: APR Design ® Guide for Plastics Recyclability)

• **ASTM**: American Society for Testing and Materials

• **BPI**: Biodegradable Products Institute

• **CAN/BNQ**: Canada Bureau de Normalisation du Québec

• **EN**: European Standards

• **EPS**: expanded polystyrene

• **EVA**: ethylene vinyl acetate

• **EVOH**: ethylene vinyl alcohol

• **FSC**: Forest Stewardship Council

• **HDPE**: high density polyethylene

• **LDPE**: low density polyethylene

• **LLDPE**: linear low density polyethylene

• **MDPE**: medium-density polyethylene

• **PE**: polyethylene

• **PET**: polyethylene terephthalate

• **PETG**: polyethylene terephthalate glycol

• **PC**: polycarbonate

• **PFAS**: Per and polyfluoroalkyl substances

• **PLA**: polylactic acid

• **PP**: polypropylene

• **PS**: polystyrene

• **PVDC**: polyvinyl chloride

• **RFID**: Radio-frequency identification

• **TPE**: thermoplastic elastomer

• **UV**: ultraviolet

Resin Identification Codes

1. PETE
2. HDPE
3. V
4. LDPE
5. PP
6. PS
7. OTHER