Association of Plastics Recyclers
&
The Foodservice Packaging Institute

Design Guide for Foodservice Plastics Recyclability

APR

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Introduction

This document was developed in partnership by the Association of Plastics Recyclers (APR) and the Foodservice Packaging Institute (FPI). It draws heavily on the APR Design® Guide for Plastics Recyclability, the most comprehensive resource outlining the plastics recycling industry's recommendations in the marketplace today. In this document, FPI and APR have adapted the APR Design® Guide to specifically address foodservice packaging and other plastic foodservice items.

The primary intended audience for the APR / FPI Design® Guide for Foodservice Plastics Recyclability is the foodservice packaging supply chain, particularly raw material suppliers, packaging manufacturers and foodservice operators. The guide is designed to provide a basic education on the recycling process and to support decision making related to packaging formats and components that impact recyclability.

Scope

This guide addresses plastic foodservice packaging and other items entering postconsumer collection and recycling systems most widely used in North America today. Collection and recycling systems are comprised of many actors and types of facilities, including municipalities, commercial haulers, single stream and dual stream material recovery facilities (MRFs), plastics recovery facilities (PRFs) and mixed waste facilities, as well as plastics reclaimers.

How to Use this Guide

This guide contains an introduction with information on recycling and recyclability, a section with general guidance that applies to plastic packaging regardless of resin, and resin-specific sections for the types of plastic that are commonly used in foodservice applications. To ensure that the package you design or select is suitable for recovery, please be sure to review both the section entitled "General Guidance for Foodservice Packaging" AND the appropriate resin-specific section.

APR's Definition of Recyclable

An item is "recyclable" per the APR definition when the following three conditions are met:

- at least 60% of consumers or communities have access to a collection system that accepts the item;

- the item is most likely sorted correctly into a market-ready bale of a particular plastic meeting industry standard specifications, through commonly used material recovery systems, including single stream and dual stream MRFs, PRFs, deposit container systems, rigid plastic and film collection systems at grocery stores; and
- the item can be costeffectively processed through a typical recycling system into a postconsumer feedstock suitable for use in identifiable new products.

The first criterion (access to collection system) is outside the scope of this guide. The guide focuses on meeting the technical requirements of the second two criteria (sortation and reclamation).

APR's Recyclability Categories

The APR Design® Guide is categorized by design features commonly used with packaging applications. The recycling impact of each design feature is discussed within the Guide. This guide includes a summary of those features and their impact on recyclability and provides links to the full APR Design® Guide for technical detail. Ratings in this guide rely on the APR's guidance on the design feature, as described in the four impact categories:

APR DESIGN® GUIDE PREFERRED	Features readily accepted by MRFs and recyclers since the majority of the industry has the capability to identify, sort, and process a package exhibiting this feature with minimal, or no, negative effect on the productivity of the operation or final product quality. Packages with these features are likely to pass through the recycling process into the most appropriate material stream with the potential of producing high quality material.
REQUIRES TESTING	In order to determine compatibility with recycling, testing per an APR protocol is required. *Note: there are some areas where APR does not yet provide definitive guidance or a test method.*
DETRIMENTAL TO RECYCLING	Features that present known technical challenges for the MRF or recycler's yield, productivity, or final product quality but are grudgingly tolerated and accepted by the majority of MRFs and recyclers.
RENDERS PACKAGE NON-RECYCLABLE PER APR DEFINITION	The majority of MRFs or reclaimers cannot remove these features to the degree required to generate a marketable end product, or the package cannot be captured at a majority of MRFs or reclaimers due to typical machinery settings or equipment capabilities. **Ultimately, a package exhibiting this design feature will be completely discarded even if it has other Preferred features.**

What's the difference between detrimental and non-recyclable?

APR defines a package attribute as "detrimental" when it causes problems in the recycling system, but "non-recyclable" if the problems are so significant that the package is not recoverable at all. While "detrimental" may sound worse to some than "non-recyclable," it is not used in that way by APR. Detrimental attributes might also be described as problematic, or not preferred. A plastic item may be considered recyclable with Detrimental features, with the understanding that package manufacturers should use the detailed guidance provided by APR to change their design and achieve Preferred status.

Disclaimer

This document was prepared by the Foodservice Packaging Institute using the Association of Plastic Recyclers' Design Guidance, as a service to the plastics industry to promote the most efficient and effective use of the nation's plastic recycling infrastructure and to enhance the quality and quantity of recycled postconsumer plastic. The information in this document is offered without warranty of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, which are expressly disclaimed. APR and its members, as well as FPI and its members, accept no responsibility for any harm or damages arising from the use of or reliance upon this information by any party. Use of the Guide is purely voluntary and does not guarantee compliance with any U.S. law or regulation or that a package or plastic article incorporating the innovation is recyclable or will be recycled.

Understanding the Recycling Process

It is important to have a basic understanding of the recycling process. It may be broken out into the following stages:

Sorting

Materials must first be sorted so they end up in the correct bale and can then be sold to end markets. Mixed material streams, including metal, glass, paper, and various plastics, are sorted at MRFs, PRFs, and mixed waste facilities using a combination of automated equipment and manual labor. Plastic sorting is commonly automated, using equipment such as near-infrared (NIR) sorters, which sort plastics from one another based on their chemical structure and reflected infrared spectrum. The design and construction of a package, including the incorporation of performance, marketing, or convenience features, can impact the ability of the resin to be sorted correctly. Designing a plastic package that can be sorted correctly is very important - if a package doesn't make it through the sorting machines, it doesn't have any chance of getting recycled because it is discarded early in the process.

Separation

Following material sorting, additional separation processes are used to remove contaminant materials and prepare a single resin for reprocessing. Separation is generally done by reclaimers, which are mostly single-resin facilities. The way a package is designed, including the incorporation of performance, marketing, or convenience features, can affect the ability to separate the resin using a common float/sink process.

After sorting and shipment to a plastic reclaimer, recovered resins are ground up into flakes and commonly separated using a float/sink process. This utilizes a liquid tank to separate resin flakes based on their density. Resins with a density greater than water (e.g. PET, PVC, PS, PLA) sink and those with a density less than water (e.g. PP, PE) float. Once separated, the resins are removed using paddles and a screw. Float/sink separation is a fundamental technology used by virtually all reclaimers. Other separation processes might include de-labeling, air separation and screening, depending on the facility.

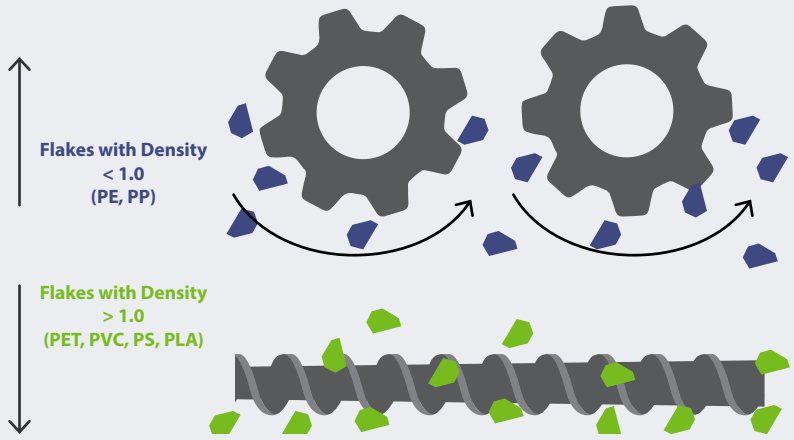

Figure 1: Schematic Diagram of Float/Sink Separation

Reprocessing

Once a resin has gone through separation, it is ready for reprocessing. Reprocessing can include steps such as grinding the material into flakes, washing the flakes, drying it, and in many cases, further refining the material by melt filtration and extrusion pellets. The way a package is designed, including the incorporation of performance, marketing, or convenience features, can cause a negative impact within the processes used to prepare the resin for reuse.

End Use

Once a resin has been sorted, separated and reprocessed, it is ready to be turned into a new product made with recycled content. The way a package is designed, including the incorporation of performance, marketing, or convenience features, can negatively impact the quality or value of the reprocessed resin.

General Guidance for Foodservice Packaging

This section includes general information relevant to all foodservice packaging, regardless of resin type. To ensure that the package you design or select is suitable for recovery, please be sure to review both this section AND the guidance specific to your resin. For resin-specific guidance, please see the appropriate resin-specific information table included following this section.

In addition, the following information resources may be helpful:
- Key definitions
- Test Categories and Tests

Throughout the guide you will see references to testing. Testing can be used to determine which recyclability is category is appropriate – the result of the testing will classify the package feature as Preferred, Detrimental or Recyclable.

Color

Depending on the polymer, clear, white, and unpigmented materials generally have the highest value as a recycled stream as they have the widest variety of end-use applications. They are the most cost effective to process through the recycling system. *For more information on preferred colors, see the appropriate resin-specific section of the guide.*

Black and other dark colored resins require testing to determine the appropriate APR recyclability category. Sorting equipment commonly used by MRFs and reclaimers is not capable of identifying many dark polymers because the colorant absorbs light. Some dark shades may be detected, but these must be tested to determine their sortability (see Evaluation of the Near Infrared (NIR) Sorting Potential of a Whole Plastic Article). Manual sorters are generally also unable to distinguish one dark polymer from another.

Density

Consideration of base polymer density is important as it can impact the ability of a resin to be correctly separated during the recycling process. Float/sink separation relies on PP and PP to float and other polymers to sink. Altering the density of a polymer so that it doesn't behave this way results in contamination.
In addition, processes that change the density of base polymers, such as fillers that increase the density of PP or PE to greater than 1.0 g/cm^3, as well as foaming agents that decrease the density of PET to less than 1.0 g/cm^3, are problematic in the recycling stream as they lead to misdirection in the float/sink process (See Figure 1).

Of particular interest to the foodservice packaging industry is the following:

- The use of fillers in PP should be limited to ensure that the density is not increased to greater than 1.0 g/cm^3, causing the PP to sink with PET and heavier resins.
- The use of foaming agents in PET packaging that causes density to drop below 1.0 g/cm^3 should be avoided because a lower density causes PET to float with the PP and PE, instead of sinking with the remainder of PET in the float / sink separation process.
- Foodservice packaging produced from PP foam, such as cups, are recyclable because foamed PP and rigid PP both have a density of less than 1.0 g/cm^3, and therefore travel together in conventional float/sink sorting.

Resin Identification Code (RIC)

Resin identification code symbols are commonly used on foodservice packaging, and their use on rigid plastic packaging is legislatively mandated in 39 states. It is important that the symbol is of the proper size as detailed in ASTM D7611.

- **#1 – PET**
- **#6 – PS and EPS**
- **#5 – PP**
- **#7 - PLA** –*Note that PLA currently falls under the #7 RIC category. In addition to the #7 appearing on the package, the use of the properly sized "PLA" is encouraged to help in identifying PLA in the mixed plastics*

It is important to note the RICs are not intended for consumer use in determining package recyclability. Rather, the RICs are intended for resin identification only. The presence of the same RIC on two different packages (i.e. a PET bottle and a PET thermoform tray) also does not automatically imply that both packages are recyclable or can be recycled together. Different formulations of the same resin, displaying the same RIC, may be used to enhance the performance properties of a package, but may not be compatible with each other in the recycling process. Although both packages are made from PET, the recycling process used for bottles may not be suitable for the recycling of thermoforms. Further, a thermoform may create the potential for contamination from food or performance, marketing, and convenience features not used for bottles.

Dimensions

Size and shape are critical parameters for sorting in MRFs. Both aspects must be considered when designing foodservice packaging for the recycling stream.

Plastic items that are mostly flat behave more like two-dimensional than three-dimensional objects in the MRF and are considered non-recyclable per APR definition.
Materials must be sorted in a MRF to make sure they end up in the appropriate bales for their respective end markets. MRFs will often have a "paper line" (an array of equipment to sort fiber materials to paper bales) and a "container line" (where commingled containers are directed to bales based on the containers' material). Early in the sorting process, materials are screened by shape and sorted to the appropriate line for further sortation, with two-dimensional items flowing to the fiber line and three-dimensional items to the container line. Plastic items should have a minimum depth of two inches in order to create a three-dimensional shape and allow the item to be sorted to the container line, and not the paper line.

Plastic items smaller than two inches in two dimensions require testing to determine the appropriate APR recyclability category.
In MRFs, "screens" are used to help sort the material flowing through the facility. When items

smaller than two inches move over standard industry screens, the materials can fall through and end up in a non-plastics stream, causing contamination in that stream or being sent to to the waste stream and get sent to landfills. Please see APR's Evaluation of Size Sorting Potential for Articles with at least 2 Dimensions Less than 2 inches for more details.

Items greater than two gallons in volume are recyclable if they are PP or PE, but are detrimental to recycling if they are PET, PS or another resin.
Recycling machinery, particularly automatic sorting equipment, is not designed to sort items larger than two gallons. Because larger containers jam the systems, most MRFs employ manual sortation before the automatic line to remove the large items. These items are sold and processed as a "bulky rigid mix" that can include polyethylene and polypropylene, since most bulky rigid items are comprised of these polymers. Other polymers (e.g. PET or PS) either negatively affect or are lost by the polyethylene processing.

APR Guidance Recognition Recipients Relevant to Foodservice Packaging

APR Guidance Recognition is presented to those innovators that have developed new products and technology that are compatible with recycling. Critical Guidance Recognition is awarded to innovators whose package designs meet the requirements of technically rigorous, peer-reviewed test protocols. The test data is verified by a Review Committee comprised of APR members including reclaimers. APR has issued Critical Guidance Recognition for recycling compatible packaging to over 30 companies and offers a comprehensive list of these innovations, many of which have been commercialized and are now in widespread use. You can find more information on the APR Recognition Program, and recipients, here.

Design for Recyclability Checklist for Polyethylene Terephthalate (PET)

Due to its clarity and natural CO2 barrier properties, PET is one of the most widely used packaging resins. It is easily formed into a sheet and is therefore the resin of choice for many foodservice packaging applications including cups, trays, egg cartons, clear containers, lids and domes. PET properties can be enhanced with colorants, UV blockers, and other additives. The density of PET is 1.38 g/cm^3 so it sinks in water. Labels on PET items should be made from materials with a density less than 1.0 that will float in water and therefore be readily separated from the PET.

This section provides a summary of the design guidelines. You can find the full document and technical detail here: Full APR Design® Guide for PET

PET Table

Key: Preferred Requires Testing Detrimental Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Base Polymer			
PET and PET variant resins with a crystalline melting point between 225° and 255° C		Reprocessing	
Bio-based PET resin		Reprocessing	
Blends of PET and other resins		Reprocessing	Critical Guidance Protocol for Clear PET Resins and Molded Articles
Color (color impact quick reference table)			
Clear and unpigmented		End Use	
Transparent light blue		Reprocessing, End Use	
Transparent green		Sorting, Separation, End Use	
All other colors and additives creating visual effects in PET		Sorting, Separation, End Use	Evaluation of the Near Infrared (NIR) Sorting Potential of a Whole Plastic Article

PET Table

Key: Preferred | Requires Testing | Detrimental | Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Labels, Inks, and Adhesives (overview of labels and their compability with specific portions of the recycling process)			
PP or PE labels with a specific gravity of <1.0		Separation	
PS labels		Separation, Reprocessing, End Use	PET Packaging Component Sink or Float Evaluation
Label structures that sink in water because of the choice of ink, decoration, coatings, and top layer		Separation	Critical Guidance Protocol for Clear PET Articles with Labels and Closures
Paper labels		Separation, Reprocessing, End Use	
Metal foil, metalized, and metallic printed labels		Sorting, Reprocessing, End Use	Evaluation of Sorting Potential for Plastic Articles Utilizing Metal, Metalized or Metallic Printed Components
PVC and PLA labels		Separation, Reprocessing	
Pressure sensitive labels		Reprocessing, End Use	Screening: Benchmark Test for Clear PET Articles with Labels and Closures Definitive: Critical Guidance Protocol for Clear PET Articles with Labels and Closures
Adhesives		Reprocessing, End Use	Screening: Benchmark Test for Clear PET Articles with Labels and Closures Definitive: Critical Guidance Protocol for Clear PET Articles with Labels and Closures
Non-water soluble/ dispersible adhesives		Reprocessing, End Use	
Label Inks		End Use	Benchmark Test for Clear PET Articles with Labels and Closures
Direct print other than date coding		End Use	Screening: Benchmark Test for Clear PET Articles with Labels and Closures Definitive: Critical Guidance Protocol for Clear PET Articles with Labels and Closures

PET Table

Key: Preferred | Requires Testing | Detrimental | Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Barrier Layers, Coatings, and Additives			
Non-PET coatings		Separation, Reprocessing, End Use	Screening: PET Heat History and Discoloration Evaluation Definitive: Critical Guidance Protocol for Clear PET Resin and Molded Articles
Degradable additives (photo, oxo, or bio)		End Use	PET Degradable Additives Test
Other additives (De-nesting, anti-static, anti-blocking, anti-fogging, UV barrier, impact modifiers, thermal stabilizers, lubricants)		End Use	Screening: PET Heat History and Discoloration Evaluation Definitive: Critical Guidance Protocol for Clear PET Resin and Molded Articles
Optical brighteners		End Use	
Attachments			
Clear PET attachments		End Use	
Non-PET attachments		Separation	Screening: Pet Packaging Component Sink or Float Evaluation Definitive: Critical Guidance Protocol for Clear PET Articles with Labels and Closures
PVC and PLA attachments		Separation, Reprocessing	
Metal, metalized, and metal containing attachments		Sorting, Reprocessing, End Use	Evaluation of Sorting Potential for Plastic Articles Utilizing Metal, Metalized, or Metallic Printed Components
Paper attachments		Separation, Reprocessing, End Use	
Tamper evident sleeves or seals		Separation, Reprocessing, End Use	Screening: Pet Packaging Component Sink or Float Evaluation Definitive: Critical Guidance Protocol for Clear PET Articles with Labels and Closures

Labels for PET Thermoforms

APR's has developed guidance to help stakeholders determine the impact of label and adhesive choices on PET containers. APR's guidance for pressure sensitive labels on PET bottles is applicable to thermoforms with no special thermoform test. The PET bottle Benchmark and Critical Guidance tests are appropriate. Please refer to the Pressure Sensitive Resource Document.

Design for Recyclability Checklist for Polypropylene (PP)

Due to its balance of impact, heat, and chemical resistance, along with stiffness and close dimensional tolerance, PP is one of the most widely used packaging resins. It is easily injection molded or thermoformed into common foodservice packaging items, including cups, lids, containers, and cutlery, and extruded into sheet/film for labels. Unlike some other polymers, the versatility of PP allows all components (label, body, and lid) of many foodservice PP packages to be made of PP, a practice that is beneficial to recycling. The properties of PP are commonly enhanced with colorants, additives and fillers, or PP is placed alongside other polymers in a multi-layer package. The density of PP is 0.90-0.92 g/cm^3 so it floats in water. Of concern are mineral fillers or additives that cause the overall density of the blend to be greater than 1.00 g/cm^3.

This section provides a summary of the design guidelines. You can find the full document and technical detail here: Full APR Design® Guide for PP.

PP Table

Key: Preferred Requires Testing Detrimental Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Color			
Unpigmented		End Use	
Translucent and opaque		End Use	
Labels, Inks, and Adhesives			
PP or PE labels		Reprocessing, End Use	
Paper labels		Separation, Reprocessing, End Use	
In-mold labels of a compatible polymer		Reprocessing, End Use	
Label Inks		End Use	HDPE Bleeding Label Test, HDPE-S-01
Direct printing other than date coding		End Use	PP Benchmark Test

PP Table

Key: Preferred · Requires Testing · Detrimental · Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Labels, Inks, and Adhesives Cont.			
Adhesives		Reprocessing, End Use	
Labels Using an Adhesive that Does Not Release During Washing			
Metal Foil Labels		Sorting, Separation, Reprocessing, End Use	
PVC Labels		Separation, Reprocessing	
PLA		Separation, Reprocessing	
PS		Separation, Reprocessing, End Use	
Labels Using an Adhesive that Releases During Washing			
Metal, metalized and metal containing labels		Sorting, Separation, Reprocessing, End Use	
PVC Labels		Separation, Reprocessing	
PLA		Separation, Reprocessing	
PS		Separation, Reprocessing, End Use	
Barrier Layers, Coatings, and Additives			
EVOH layers		End Use	
Non-PP layers and coatings other than EVOH		Separation, Reprocessing, End Use	PP Benchmark Test
Degradable additives		End Use	HDPE/PP Degradable Additives Test

PP Table

Key: Preferred | Requires Testing | Detrimental | Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Barrier Layers, Coatings, and Additives Cont.			
Workhorse additives historically used without issue (De-nesting, anti-static, anti-blocking, anti-fogging, anti-slip, impact modifiers, thermal stabilizers, lubricants)	Preferred	End Use	
Fillers (attention should be paid to blend density)	Preferred	Separation and Reprocessing	
Additive concentration causing the overall blend to sink	Non-Recyclable	Separation	
Optical brighteners	Detrimental	End Use	
Attachments			
PP and PE tamper evident safety sleeves and seals	Preferred	Reprocessing, End Use	
PETG tamper evident safety sleeves and seals	Preferred	Separation, Reprocessing	
PVC tamper evident safety seals	Detrimental	Separation, Reprocessing	PP Benchmark Test, PP-B-01
Non-PP attachments	Requires Testing	Separation	Metal Sorting Potential Test, Sort-B-03
Metal, metalized, and metal-containing attachments	Requires Testing	Sorting, Separation, Reprocessing, End Use	
Plastic attachments with a density > 1.00 expect for PVC	Preferred	Separation, Reprocessing	
PE attachments	Detrimental	Separation, Reprocessing, End Use	
PLA attachments	Preferred	Separation, Reprocessing	
PVC attachments	Detrimental	Separation, Reprocessing	

Design for Recyclability Checklist for Polystyrene (PS)

Polystyrene is typically used in applications requiring its stiffness, resistance to cracking, and ease of modification. For foodservice packaging applications, this includes clamshells and containers, lids, cups, and cutlery. This section of the Design® Guide applies to rigid PS. Expanded PS (EPS) is addressed in its own dedicated section below.

This section provides a summary of the design guidelines. You can find the full document and technical detail here: Full APR Design® Guide for PS.

PS Table

Key: Preferred | Requires Testing | Detrimental | Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Color			
Clear unpigmented		End Use	
Other colorants		N/A	
Labels, Inks, and Adhesives			
PP or PE labels with a specific gravity < 0.95		Reprocessing, End Use	
PS labels		Reprocessing, End Use	
Label structures that sink in water because of the choice of substrate, ink, decoration, coatings, and top layer		Separation	PET Sink/Float evaluation, PET-S-05
High melting temperature plastic labels such as PET		Separation, Reprocessing	
PVC labels		Separation	
PLA labels		Separation, Reprocessing, End Use	
Pressure sensitive labels		Separation, Reprocessing	

PS Table

Key: Preferred · Requires Testing · Detrimental · Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Labels, Inks, and Adhesives Cont.			
Paper labels	Detrimental	Separation, Reprocessing, End Use	
Label Inks	Requires Testing	End Use	
Direct printing other than date coding	Requires Testing	End Use	
Adhesives	Requires Testing	Reprocessing, End Use	
Barrier Layers, Coatings, and Additives			
Non-PS layers and coatings	Requires Testing	Separation, Reprocessing, and End Use	
Degradable additives	Requires Testing	End Use	
Other additives (de-nesting, anti-static, anti-blocking, anti-fogging, anti-slip, impact modifiers, thermal stabilizers, lubricants)	Requires Testing	End Use	
Fillers (overall blend density should be >1.0)	Preferred	Separation	
Attachments			
Clear PS attachments	Preferred	End Use	
Non-PS attachments	Requires Testing	Separation	PET-S-05
Metal, metalized, and metal containing attachments	Requires Testing	Sorting, Reprocessing, End Use	Metal Sorting Potential Test, Sort-B-03
Paper attachments	Detrimental	Separation, Reprocessing, End Use	
PVC attachments	Non-Recyclable	Separation, Reprocessing	
PLA attachments	Non-Recyclable	Separation, Reprocessing	
Tamper evident sleeves and safety seals	Requires Testing	Separation	PET-S-05

Design for Recyclability Checklist for Expanded Polystyrene (EPS)

The light bulk density of expanded polystyrene (EPS) provides outstanding insulation and cushioning and is frequently used in applications requiring these properties. This includes foodservice packaging items like cups, clamshells, various trays including those used for meat, egg cartons, and some other containers. EPS is a highly recyclable material once the product arrives at the reclaimer. Collection and transportation challenges (because of its light-weight nature) should not be confused with processability and reusability of this material.

This section provides a summary of the design guidelines. You can find the full document and technical detail here: Full APR Design® Guide for EPS.

EPS Table

Key: Preferred Requires Testing Detrimental Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Color			
Unpigmented or white		End Use	
Light pink or light blue		End Use	
Labels, Inks, and Adhesives			
PS labels		Reprocessing, End Use	
High melting temperature plastic labels such as PET		Separation, Reprocessing	
Paper labels		Separation, Reprocessing, End Use	
PP or PE labels		Separation, Reprocessing, and End Use	
PVC labels		Separation, Reprocessing	
Direct printing on EPS		End Use	
Adhesives		Separation, Reprocessing	

EPS Table

Key: Preferred Requires Testing Detrimental Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Barrier Layers, Coatings, and Additives			
Degradable additives		End Use	
Barrier layers and coatings other than PS		N/A	
Other additives (de-nesting, anti-static, anti-fogging, impact modifiers, thermal stabilizers, lubricants)		N/A	
Attachments			
Clear PS attachments		End Use	
Non-PS attachments		Separation	
Metal and metal containing attachments		Sorting, Reprocessing, End Use	
PVC attachments		Separation, Reprocessing	

Design for Recyclability Checklist for Polylactic Acid (PLA)

PLA is typically used in applications requiring stiffness, resistance to cracking, clarity and ease of modification. It is easily formed into sheet and is thermoformable, making it useful for a variety of foodservice packaging, including cups, lids, and clamshells and containers. PLA is often chosen as a packaging material because it is made from renewable resources and is compostable in an industrial composting facility. PLA properties can be enhanced with colorants, impact modifiers, and other additives.

At this time, PLA collection systems are limited in North America so this material does not currently meet the collection accessibility criteria established in "APR's definition of recyclable." In consideration of potential future development and growth of PLA recycling programs, this section has been included. Test methods are currently under development by APR.

This section provides a summary of the design guidelines. You can find the full document and technical detail here: Full APR Design® Guide for PLA.

PLA TABLE

Key: Preferred · Requires Testing · Detrimental · Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Color			
All non-dark colors		End Use	
Optical brighteners		Reprocessing, End Use	
Labels, Inks, and Adhesives			
Adhesives PLA Labels		Reprocessing, End Use	
PP or PE labels		Separation, Reprocessing	
Label structures that sink in water because of the choice of substrate, ink, decoration, coatings, and top layer		Separation, Reprocessing, End Use	

PLA Table

Key: Preferred | Requires Testing | Detrimental | Non-Recyclable

Feature	Recyclability Category	Relevant Section of the Recycling Process	Tests
Labels, Inks, and Adhesives Cont.			
High melting temperature plastics labels that sink in water		Separation, Reprocessing, End Use	
Paper labels		Separation, Reprocessing, End Use	
PVC labels		Separation, Reprocessing	
Pressure sensitive labels		Separation, Reprocessing, End Use	
Label inks		End Use	
Direct printing other than date coding		End Use	
Adhesives		Separation, Reprocessing	
Barrier Layers, Coatings, and Additives			
Non-PLA layers and coatings		Separation, Reprocessing, End Use	
Fillers (overall blend density should be >1.0)		Separation	
Other additives (de-nesting, anti-static, anti-fogging, impact modifiers, thermal stabilizers lubricants		N/A	