

PACKAGING MATERIAL OPTIONS AND ALTERNATIVES <sup>A</sup>		End of Life Management					Uses & Applications						Challenges					Material Characteristics					
		Recycle #	Compostable - Home	Compostable - Industrial	Reusable	Other Considerations	Circular Economy	Beverage	Food Trays & Containers	Sheets, films & wraps	Mesh bags & other bags	Shipping & Transportation	Other misc. applications	Sourcing	Storage	Lifespan	Compatibility	Other challenges	Good Barrier Properties	High Clarity	Rigidity	Flexibility	
IRY	PREFERRED	<b>HDPE (High-Density Polyethylene)</b> One of the most versatile plastic materials, HDPE plastic known for being both lightweight and strong. It is used in a wide variety of applications, including plastic bottles, milk jugs, shampoo bottles, bleach bottles, cutting boards, and piping.	2 <sup>F</sup>			☒ <sup>C</sup>												☒ <sup>F</sup>	●		●	●	
		<b>LDPE (Low-Density Polyethylene)</b> A flexible, odorless, transparent thermoplastic polymer popular in products like grocery/garbage bags, juice containers, and cling wrap. Its flexibility, toughness, and corrosion resistance combined with its low-cost, high-efficiency production process make it an appealing choice for engineering applications.	4								●	●							☒ <sup>F</sup>	☒ <sup>D</sup>	☒ <sup>E</sup>		●
		<b>PE (Polyethylene)</b> A light, flexible synthetic resin made by polymerizing ethylene, used for plastic bags, food containers and other packaging.	2 <sup>F</sup>																☒ <sup>F</sup>				
		<b>PET (Polyethylene Terephthalate)</b> A synthetic resin, in which the polymer units are linked by ester groups. PET bottles and thermoforms (i.e. clamshells) are used to package beverage, produce, prepared food, personal care and household items.	1					●	●	●		●		☒ <sup>G</sup>					☒ <sup>F</sup>	☒ <sup>B</sup>	●	●	
		<b>rPET (Recycled Polyethylene Terephthalate)</b> Recycled PET plastic that is used to make packaging, such as plastic bottles and food containers. The production of recycled PET requires fewer resources than that of new fibers and generates fewer CO2 emissions.	☒ <sup>H</sup>						●	●	●	●	●	●					☒ <sup>BB</sup>	●	●	●	
	<b>BOPP (biaxially-oriented polypropylene)</b> A polypropylene film material that is stretched in two direction (biaxial). Tends to be used for labels and current replacement for paper labels.	5								●	●							☒ <sup>F</sup>	●	●		●	
	<b>OPP (oriented polypropylene)<sup>X</sup></b> A polypropylene film material that is stretched in one direction (monoxial). Tends to be used for labels and small film bags.	5								●	●							☒ <sup>F</sup>	●	●		●	

PLASTICS CATEGOR	MINI	<p><b>PP (polypropylene)</b> One of the most commonly used thermoplastics in the world. It is a thermoplastic “addition polymer” made from the combination of propylene monomers. It is easily injection molded, blow molded or thermoformed. PP is commonly used in food product packaging and as packaging components, caps, and closures, with other plastics packages.</p>	5 <sup>F</sup>								●	●	●	●		☒ <sup>K</sup>					☒ <sup>F</sup>	☒ <sup>D</sup>	●	●	●	
		<p><b>PVdC (polyvinylidene chloride)</b> A clear thermoplastic known for its excellent cling properties and gas barrier properties against water, oxygen and many gases. Mainly used in packaging of food, drugs, cosmetics and other perishable or delicate products to extend shelf life.</p>										●										●	●			
UNFAVORABLE		<p><b>Black/colored plastics</b></p>	☒ <sup>N</sup>									●										●		●		
		<p><b>Complex laminates &amp; multi-layer films</b></p>	7 <sup>V</sup>										●	●								●			●	
		<p><b>Oxo-degradable plastics</b> A material that is made from conventional plastics and supplemented with specific additives to mimic biodegradation. However, these additives only facilitate a fragmentation of the materials, which do not fully degrade but break down into very small fragments that remain in the environment (i.e. micro plastics).</p>			☒ <sup>O</sup>						●			●										●	●	
		<p><b>PC (polycarbonate)</b> A group of thermoplastic polymers with very good heat resistance used in engineering strong, tough materials such as plastic lenses in eyewear, medical devices, automotive components, protective gear, greenhouses, etc.</p>				☒ <sup>Q</sup>	☒ <sup>S</sup>					●											●	●	●	
		<p><b>PS (polystyrene)</b> A naturally transparent thermoplastic that is available as both a typical solid plastic as well in the form of a rigid foam material. Commonly used in a variety of consumer product applications and commercial packaging.</p>	6									☒ <sup>L</sup>	●										☒ <sup>M</sup>	●		
		<p><b>PVC (polyvinyl chloride)<sup>J</sup></b> A high-strength thermoplastic material that is widely used in applications such as pipes, medical devices, wires and cable insulation.</p>	3										●				☒ <sup>I</sup>						●	●	●	●
	<p><b>Bioplastics</b> Plastics made wholly or in part from bio-based polymers (renewable biomass sources such as sugarcane and corn, or from microbes such as yeast). Bioplastics may or may not be compostable. Standards include the United States’ Department of Agriculture’s USDA Certified Biobased Product label.</p>										●	●	●	●	●							☒ <sup>Z</sup>	☒ <sup>Z</sup>	☒ <sup>Z</sup>	☒ <sup>Z</sup>	
	<p><b>Compostable Polymers</b> Polymers produced from wide ranging materials which meet the criteria including but not limited to the following: EN16640, EN 13432, ASTM D6400, ASTM D6866. Consult local waste management officials for applicable standards.</p>		☒ <sup>T</sup>	●							●	●	●	●	●						●		☒ <sup>Z</sup>	☒ <sup>Z</sup>	☒ <sup>Z</sup>	☒ <sup>Z</sup>

<p><b>Paper, Cardboard, Corrugate</b> A material that consists of three fiberboard layers: two linerboards on the outside and a middle sheet sandwiched on the inside that features a wave-shaped pattern of arches known as flutes. The flutes are anchored to the linerboard with an adhesive glue.</p>	☐ <sup>U</sup>	☐ <sup>T</sup>	●			●	☐ <sup>U</sup>	●	●	●	●						☐ <sup>V</sup>		●	●
<p><b>PLA (Polylactic Acid)</b> A biodegradable and bioactive thermoplastic derived from renewable resources such as corn, potatoes or sugarcane.</p>		☐ <sup>T</sup>	●					●								☐ <sup>CC</sup>	●	●		●
<p><b>PBAT (Polybutyrate Adipate Terephthalate)</b> A fully biodegradable polymer derived partly from petrochemicals that is an active ingredient in many compostable packaging.</p>											●		●							
<p><b>Renewable polymers</b> Polymers produced via chemical/physical modification of renewable sources such as starch, cellulose or sea-based resources (i.e. chitin, seaweed).</p>	7	☐ <sup>T</sup>	●				●	●			●	●				☐ <sup>W</sup>	●	●	●	●

- A. Material uses, characteristics and life cycle considerations relate to base materials; variants or modified materials referenced in footnotes.
- B. Low to medium barrier to moisture and oxygen unless treated.
- C. Reusable shipping containers frequently produced with HDPE, e.g., milk crates.
- D. Provides low moisture absorption; poor oxygen barrier.
- E. Medium to high clarity, depending on production methods.
- F. Recycling of flexible PE/PP and other “minimize” plastics can vary significantly across the country. Consult local recycling officials to confirm.
- G. Suitable for heat resistant applications.
- H. Although PET is the leading plastic available with recycled content, other materials are increasing in availability; consult material vendors to confirm availability for your use case.
- I. Applications include commercial stretch wrap.
- J. PVC uses, properties and life cycle considerations can vary considerably between unplasticized and plasticized variants; consult material vendors to confirm.
- K. Includes micro-wave ware.
- L. Includes vending cups.
- M. Medium oxygen and moisture barrier; risk of stress cracking when exposed to oils.
- N. Most recycling services unable to process due to lack of sorting capabilities which can handle black/coloured plastics.
- O. Where industry composting capabilities are available; consult local waste management officials for further details.
- P. A broad range of rigid water-soluble plastics are available for various applications, with post-use disposal and environmental impacts varying considerably; consult your material vendor for further details.
- Q. Reusable water cooler bottles are the most common food and beverage-related application.
- R. Food-related applications largely in the processing or handling of foods during preparation. Limited packaging applications.
- S. Recycling possible in very limited circumstances; consult local waste management officials to confirm.
- T. Home composting can be of limited effectiveness in many regions due to climate; consult local waste management officials for home composting options.
- U. Coated paper provides options for beverage and other applications. Coating choices may adversely impact recyclability; consult local waste management officials to confirm.
- V. Very poor moisture and oxygen barrier properties in uncoated forms.
- W. Barrier properties highly material and structure dependent. May require multi-lamination or metallization to improve.
- X. Biaxially oriented PP is emerging as a promising alternative to traditional PP materials. Consult material vendors for benefits of OPP vs. traditional PP.
- Y. In some jurisdictions, complex laminate/multi-laminate films are alternatively labelled “5”. Consult local waste management officials to confirm.
- Z. Properties can vary diversely based on source material or coatings; consult material vendors for specific details.
- AA. Insufficient information or lack of consensus is available at the time of publication to provide a recommendation for the alternate materials identified. Additional materials and/or recommendations may be provided in future versions as new information becomes available. Consult the IFPA for the most up to date packaging materials selection guide.
- BB. Often more expensive than virgin PET and challenges with color variability.

CC. Often more expensive than fossil based plastics. Has a higher permeability than other plastics. Moisture and oxygen will go through it more easily than other plastics. This will result in faster food spoilage.