

# Properties of Five Types of Plastic Packaging Used in Humanitarian Assistance and the Impact of Plastics on Human Health, Marine Life, and Climate Change



December 2023

This document was prepared by the Joint Initiative's secretariat as part of the initiative's ongoing commitment to promoting more responsible and sustainable packaging practices. This document does not purport to reflect the opinions or views of the Joint Initiative partners.



# Properties of Five Types of Plastic Packaging Used in Humanitarian Assistance

JOINT INITIATIVE FOR  
SUSTAINABLE HUMANITARIAN  
ASSISTANCE PACKAGING  
WASTE MANAGEMENT



## PET

### Polyethylene Terephthalate

Commonly used as packaging bottles for drinks and vegetable oil.

#### ADVANTAGES

- Recyclable material, although colored PET is more challenging to recycle.
- Presence of PET recyclers in humanitarian settings. [1]
- Good resistance to water, oils, and solvents.

#### DISADVANTAGES

- Can be reused only a limited number of times. Over time, use and exposure to heat can generate health hazards (e.g., bacteria can grow in the cracks, and plastic particles are generated).
- Generally, does not work well with small-scale recycling technology that melts and remolds plastics.

#### RECOMMENDATION

- Procure transparent PET bottles.
- Ensure adequate storage conditions and appropriate reuse, bearing in mind PET's low heat resistance, and the risk of wear and tear.



## HDPE

### High-Density Polyethylene

Commonly used as shopping bags, plastic pallets, and jerry cans.

#### ADVANTAGES:

- Recyclable and reusable material.
- Excellent resistance to chemicals, moisture, and impact.
- High tensile strength, stiffness, and resistance to cracking.

#### DISADVANTAGES:

- Susceptible to stress cracking and has a lower stiffness compared to polypropylene.

#### RECOMMENDATION:

- Ensure that HDPE plastic packaging is reused as many times as possible, and then organize a collection for recycling.



## LDPE

### Low-Density Polyethylene

Commonly used as shrink wrapper for pallets.

#### ADVANTAGES

- Good resistance to chemicals, water, and impact.
- Technically recyclable, although soft plastics are rarely recycled in humanitarian settings.

#### DISADVANTAGES

- Lower resistance to heat than other types of plastics.
- Limited reuse applications of shrink wrappers.

#### RECOMMENDATION

- Due to their low heat resistance, ensure that LDPE shrink wrappers are stored and used at appropriate temperatures.
- Reduce the amount of shrink wrap used for pallets and separate it from other plastic waste.



# Properties of Five Common Types of Plastic Packaging Used in Humanitarian Assistance

**JOINT INITIATIVE** FOR  
SUSTAINABLE HUMANITARIAN  
ASSISTANCE PACKAGING  
WASTE MANAGEMENT



**PP**

**Polypropylene**

Commonly used as woven bags to store food such as beans, wheat, and other items.

## **ADVANTAGES**

- Recyclable material.
- Excellent resistance to solvents, acids, moisture, and heat.
- Tough and flexible.

## **DISADVANTAGES**

- Low-temperature resistance. It can become brittle at freezing temperatures, limiting its use in certain applications.

## **RECOMMENDATION**

- Ensure that PP woven bags are reused as many times as possible, and then organize a collection for recycling.

## **Metalized Plastic**

Commonly used as packaging for commodities such as ready-to-use therapeutic food (RUTF) and high-energy biscuits. Made of plastic (PP or PE) film, which is laminated with a thin layer of metal (typically aluminum).

## **ADVANTAGES**

- Good ultraviolet (UV) protection.
- The thin metal layer acts as a barrier to gases, moisture, and odors, helping to protect the contents and extend their shelf life.

## **DISADVANTAGES**

- Technically nonrecyclable because it is made from various materials that are difficult to separate.

## **RECOMMENDATION**

- Optimize the size of laminated packaging to reduce the amount of used materials.

**It's time to  
take action!**

[There are so many ways you can reduce your plastic footprint from humanitarian action. For some great tips, visit the Joint Initiative website.](#)



# Plastics and Human Health

**Many of the additives used to make plastic are toxic and harmful to human health. There is a risk of these additives impairing immune systems, causing cancer, and changing hormone activity in the body. Over time, plastics fragment into microplastics contaminating food, water, and soil. The full extent of microplastics' effects on human health is as yet unknown. [II] [III]**

## 200 million

**of the world's poorest people are at risk of more severe and frequent flooding due to plastic waste. [IV]**

## 5 grams

**of plastic per week is what an average person could be ingesting, which is equivalent to the weight of a credit card. [V]**

## 8 million tons of plastic

**enter the oceans each year. Marine life can ingest or become entangled in plastic debris, potentially affecting the seafood supply chain. [VI]**

[II] [Center for International Environmental Law. 2019. Plastic and Climate: The Hidden Costs of a Plastic Planet.](#)

[III] [Plastics and Human Health | Plastics and the Environment Series.](#)

[IV] [Tearfund 2023. Plastic Pollution Increases Flooding Risk for More than 200 Million of World's Poorest People.](#)

[V] [World Wildlife Fund \(WWF\). 2019. No Plastic in Nature: Assessing Plastic Ingestion from Nature to People.](#)

[VI] [Ellen MacArthur Foundation. 2016. The New Plastics Economy: Rethinking the Future of Plastics.](#)



# Plastics and Marine Life

Every year, 63 million tonnes of plastic end up in landfills, 51 million tons leak into nature, and up to 13 million tonnes of plastic (the equivalent of one garbage truck per minute) leak into the ocean. [VII]

**100,000**

marine animals are killed by  
plastics each year. [VIII]

**40%**

of cetaceans such as whales and  
dolphins have ingested plastics.  
[IV]

**\$13 billion**

in annual environmental damage  
to marine ecosystems is  
estimated due to floating plastic  
particles in the world's oceans.  
[X]

[VII] [United Nations Environment Programme. 2018. The State of Plastics: World Environment Day Outlook 2018.](#)

[VIII] [United Nations Environment Programme. 2018. World Environment Day 2018: Overview.](#)

[IX] [Secretariat of the Convention on Biological Diversity. 2018. Marine Debris: Understanding, Preventing and Mitigating the Significant Adverse Impacts on Marine and Coastal Biodiversity.](#)

[X] [Plastics and Biodiversity. 2023. Plastics and the Environment Series'. Genevaenvironmentnetwork.org.](#)



# Plastics and Climate Change

In 2019 alone, the production and incineration of plastic waste added an estimated 850 million metric tons of greenhouse gas emissions to the atmosphere—equal to the emissions from 189 five-hundred-megawatt coal power plants. [XI]

**56 gigatons**  
is the estimated cumulative  
greenhouse gas emissions from  
plastics by 2050. [XI]

**6%**  
of global oil consumption is  
accounted for by the production  
of plastics. [XII]

**30 %**  
is the approximate increase in  
plastic production in 2050  
compared to 2025. [XIII]

[XI] Center for International Environmental Law. 2019. Plastic and Climate: The Hidden Costs of a Plastic Planet.

[XII] Geyer et al. 2017. Production, use, and fate of all plastics ever made. Science Advances.

[XIII] Statista. 2023. Global Plastics Production Forecast 2025-2050.