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The 7 Types of Plastics: Their Toxicity and What They are Most Commonly Used For



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Plastic is used to create many of the products we use every single day, from the containers our food and medicine is packaged in to eyeglasses, toys, car parts, and household materials. But with plastic toxicity becoming a rising concern, how safe are the plastic products we're constantly using?

This chart explores the many products that are commonly made from the seven different types of plastics and the properties that differentiate them. It also takes a hard look at the toxicity of each of the seven types of plastic to determine which are the safest and which should be avoided at all costs.

THE 7 TYPES OF PLASTICS THEIR TOXICITY AND WHAT THEY ARE MOST COMMONLY USED FOR

TOXICITY CODE: LOW HIGH

Polymer Name	POLYETHYLENE TEREPHTHALATE	HIGH-DENSITY POLYETHYLENE	POLYVINYL CHLORIDE	LOW-DENSITY POLYETHYLENE	POLYPROPYLENE	POLYSTYRENE	All other plastics, including acrylic, low-density polyethylene, polypropylene, and bioplastics
Resin Identification Code	1	2	3	4	5	6	7
Abbreviation	PET or PETE	HDPE	PVC	LDPE	PP	PS	OTHER
Recyclable?	Commonly Recycled	Commonly Recycled	Sometimes Recycled	Sometimes Recycled	Occasionally Recycled	Commonly Recycled (but difficult to do)	Difficult to Recycle
Percentage Recycled Annually	36%	30-35%	<1%	6%	3%	34%	Low
How Long to Decompose Under Perfect Conditions	5-10 Years	100 Years	Never	500-1,000 Years	20-30 Years	50 Years	Majority of these plastics: never Polylactic acid: 6 months
Maximum Temperature	70°C (158°F)	120°C (248°F)	70°C (158°F)	80°C (176°F)	135°C (275°F)	90°C (194°F)	Polycarbonate: 135°C (275°F) Polylactic acid: 150°C (302°F)
Brittleness Temperature	-40°C (-40°F)	-100°C (-148°F)	-30°C (-22°F)	-100°C (-148°F)	0°C (32°F)	-20°C (-4°F)	Polycarbonate: -135°C (-211°F) Polylactic acid: 60°C (140°F)
Toxicity Level							
Most Commonly Leached Toxins	Antimony Oxide, Bromine, Decabromodiphenyl Ether Oxide, Nickel, Ethylene Oxide, and Benzene	Chromium Oxide, Benzyl Peroxide, Hexane, and Cyclohexane	Benzene, Carbon Tetrachloride, 1,2-Dichloroethane, Phthalates, Ethylene Oxide, Lead Chromate, Methyl Acrylate, Methacrylate, Phthalic Anhydride, Tetrahydrofuran, and Ethanol, Lead Sulfate, Mercury, Cadmium, Bisphenol A (BPA)	Benzene, Chromium Oxide, Cadmium, Hydrogen Peroxide, Acid, and Ter-butyl Hydroperoxide	Methanol, 2,6-di-tert-butyl-4-methyl Phenol, and Nickel Dibutyl Dithiocarbamate	Styrene, Ethylbenzene, Bromine, Diphenyl Carbon Tetrachloride, Polystyrene, Antimony Oxide, and Ter-butyl Hydroperoxide, Benzoquinone	BPA, BPS, as well as all other toxins mentioned

POLYETHYLENE TEREPHTHALATE (PET or PETE)

COMMONLY USED FOR

- Soda bottles
- Water bottles
- Beer bottles
- Salad dressing bottles
- Peanut butter jars
- Jelly jars
- Rope
- Combs
- Toiletries
- Medicine jars
- Clothing and carpet fiber
- Prepared food trays and roasting bags
- Some shampoo and mouthwash bottles

PROPERTIES

- Good gas and moisture barrier
- High heat resistance
- Tough
- Good microwave transparency
- Solvent-resistant

TOXINS/HEALTH RISKS

PET is the most commonly used plastic in the world, but it can leach the toxic metal antimony. When this plastic sits on a shelf for a long time or is exposed to sunlight or higher temperatures, this can lead to a larger amount of antimony leaching into the contents. Antimony is considered a carcinogen. Bromine is another compound found to leach out of PET bottles. It acts as a central nervous system depressant and can trigger psychological symptoms.

CAN BE RECYCLED INTO

PET is commonly recycled, although it should not be reused. It can be recycled into:

- Fleece garments
- Carpets
- Stuffing for pillows, winter jacket, sleeping bags
- Bean bags
- Storage containers
- Rope
- Car bumpers
- Tennis ball felt
- Combs
- Cassette tapes
- Sails for boats
- Furniture
- Other plastic bottles

HIGH-DENSITY POLYETHYLENE (HDPE)

COMMONLY USED FOR

- Milk jugs

PROPERTIES

- Excellent moisture barrier

TOXINS/HEALTH RISKS

HDPE is the most commonly

CAN BE RECYCLED INTO

HDPE is the most commonly

recycled plastic and is considered one of the safest forms of plastic. It is recycled into:

- Plastic bottles and jugs
- Plastic lumber
- Outdoor furniture
- Trifurcated equipment
- Fencing
- Rope
- Toys

Some studies have shown that HDPE can leach estrogen-mimicking chemicals that could disrupt your hormones and even alter the structure of human cells.

recycled plastic can also be reused.

Non-carbonated drink bottles
Motor oil containers
Shampoos and conditioner bottles
Soap bottles
Detergent bottles
Bleach bottles
Snack food boxes
Cereal box liners
Toys
Buckets
Rigid pipes
Crates
Plant pots
Garden furniture
Refuse bins and compost containers
Park benches
Truck bed liners

Excellent chemical resistance
Hard to scratch and strong
Soft waxy surface
Permeable to gas
HDPE films crinkle to the touch
Pigmented bottles are stress-resistant

POLYVINYL CHLORIDE (PVC)

COMMONLY USED FOR

- Plumbing pipes
- Credit cards
- Carpet backing
- Floor covering
- Window and door frames
- Rain gutters
- Pipes and fittings
- Wire and cable sheathing
- Synthetic leather products
- Clear plastic food wrapping
- Cooking oil bottles
- Teething rings
- Children's and pets' toys
- Garden hoses

PROPERTIES

- Excellent transparency
- Hard and rigid (flexible when plasticized)
- Good chemical resistance
- Long term stability
- Good weathering ability
- Stable electrical properties
- Low gas permeability

TOXINS/HEALTH RISKS

PVC is the most hazardous plastic and has been dubbed the "poison plastic" because it contains numerous toxins that it can leach throughout its entire life cycle. It has been found to leach BPA, phthalates, lead, mercury, and many other toxins. These chemicals can cause cancer and disrupt the hormonal system and have been linked to chronic conditions like allergies, asthma, and autism.

CAN BE RECYCLED INTO

Almost all products using PVC require virgin material for their construction; less than 1% of PVC material is recycled. Specialized programs do recycle PVC and use it for:

- Flooring
- Paneling
- Roadside gutters
- Traffic cones
- Credit cards
- Pipes

LOW-DENSITY POLYETHYLENE (LDPE)

COMMONLY USED FOR

- Plastic wrap
- Sandwich bags
- Bread bags
- Squeezeable bottles
- Plastic grocery bags
- Garbage bags
- Food storage containers and lids
- Bubble wrap
- Irrigation pipes
- Thick shopping bags
- Wire and cable covering
- Coatings for paper milk cartons
- Hot and cold beverage cups

PROPERTIES

- Tough and flexible
- Waxy surface
- Soft; scratches easily
- Good transparency
- Low melting point
- Stable electrical properties
- Good moisture barrier

TOXINS/HEALTH RISKS

LDPE is considered to be less toxic than other plastics and relatively safe for use, although some studies have shown that LDPE could leach estrogen-mimicking chemicals, similar to those found in HDPE. These chemicals can disrupt hormones and potentially alter the structure of human cells.

CAN BE RECYCLED INTO

LDPE is difficult to recycle, although more plastic recycling programs are starting up to handle this material. When recycled, LDPE is used for:

- Compost bins
- Trash cans
- Floor tiles

POLYPROPYLENE (PP)

COMMONLY USED FOR

- Prescription bottles
- Misc bottle tops
- Ketchup and syrup bottles
- Yogurt and margarine containers
- Potato chip bags
- Drinking straws
- Hinged lunch boxes
- Fabric/carpet fibers
- Heavy-duty bags
- Hot food containers
- Packing tape
- Thermal vests
- Car parts
- Disposable diapers
- Sanitary pad liners

PROPERTIES

- Excellent chemical resistance
- High melting point
- Hard but flexible
- Waxy surface
- Translucent
- Strong

TOXINS/HEALTH RISKS

PP is considered a safer plastic option for food and drink use, as it can withstand high temperatures and thus is less likely to leach chemicals. However, studies have found that PP could potentially leach some chemicals that could lead to asthma or hormone disruption.

CAN BE RECYCLED INTO

PP is one of the least recycled plastics and a majority of it ends up in a landfill. When recycled PP is used for:

- Shipping pallets
- Automotive battery cases
- Brooms
- Shovels
- Watering cans
- Mixing bowls
- Cutting boards
- Ice scrapers
- Storage bins

POLYSTYRENE (PS)

COMMONLY USED FOR

- Disposable foam cups
- Take-out food containers
- Plastic cutlery
- Egg cartons
- Fast-food trays
- Video cases
- Seed trays
- Coat hangers
- Low-cost, brittle toys
- Foam packaging (packing peanuts)
- Rigid foam insulation
- Underlay sheeting for laminate flooring

PROPERTIES

- Clear to opaque
- Glassy surface
- Rigid or foamed
- Hard
- Brittle
- High clarity
- Affected by fats and solvents

TOXINS/HEALTH RISKS

PS is commonly known as Styrofoam and is considered a highly toxic form of plastic. PS leaches many toxins, including styrene which can cause cancer and damage to the nervous system and could also affect genes, the lungs, the liver, and the immune system. Heat plays a role in the amount of styrene that is leached from PS, so it is advised to not use this form of plastic to hold hot food or drinks.

CAN BE RECYCLED INTO

Recycling is not widely available for polystyrene, and it accounts for 35% of U.S. landfill material. It can be recycled into:

- Cassette tapes
- Rigid foam insulation
- Egg cartons
- Picture frames
- Moldings
- Home decor products
- Foam protective packaging

OTHER

COMMONLY USED FOR

- Baby bottles
- Sippy cups
- Large, multiple-gallon water bottles
- Medical storage containers
- Eyeglasses
- Exterior lighting fixtures
- Metal food can linings
- CDs and DVDs
- Dental sealants

PROPERTIES

This category is a catchall for other plastic resins not described above or a combination of these plastics.

TOXINS/HEALTH RISKS

It is difficult to know exactly which toxins can be found in this category of plastics, but there is a good chance that they will leach bisphenol A (BPA) or bisphenol S (BPS). BPA and BPS are both endocrine disruptors, which can affect hormones and cause issues with growth and development, tissue function, obesity, sexual function and reproduction, brain and neurological functions, and more.

CAN BE RECYCLED INTO

Items made from #7 plastics are a combination of various plastics and are difficult to recycle, but some can be recycled into plastic lumber and specialized products. Products marked #7 with "PLX" on the bottom cannot be recycled but can be composted.

Sources:
www.kiplastics.com | www.waste4change.com | www.keeptruckgreen.org
www.qualitylogoproducts.com | www.leanmanufacturing.com | www.plasticsmakelifebetter.com
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Alan's FACTORY OUTLET

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What Are the 7 Types of Plastic?

- #1: Polyethylene Terephthalate (PET or PETE)
- #2: High-Density Polyethylene (HDPE)
- #3: Polyvinyl Chloride (PVC)
- #4: Low-Density Polyethylene (LDPE)
- #5: Polypropylene (PP)
- #6: Polystyrene (PS)
- #7: Other

#1: Polyethylene Terephthalate (PET or PETE)

Polyethylene terephthalate is the most commonly used plastic in the world. It's a good gas and moisture barrier, keeping oxygen out and carbonation in, and is mainly used to package food and drinks. Packaging made from this type of plastic can be difficult to clean, and higher temperatures can cause toxins to leach, so it is recommended to **not reuse** (<https://www.thoughtco.com/reusing-plastic-bottles-serious-health-hazards-1204028>), products made from PET.

Polyethylene terephthalate is commonly used to make:

- Soda bottles
- Water bottles
- Beer bottles
- Salad dressing bottles
- Peanut butter jars
- Jelly jars
- Rope
- Combs
- Tote bags
- Medicine jars
- Clothing and carpet fiber
- Prepared food trays and roasting bags
- Some shampoo and mouthwash bottles

PET is the most commonly recycled plastic. Although it should not be reused, it can be recycled into:

- Fleece garments
- Carpets
- Stuffing for pillows, winter jackets, and sleeping bags
- Bean bags
- Storage containers
- Rope
- Car bumpers
- Tennis ball felt
- Combs
- Cassette tapes
- Sails for boats
- Furniture
- Other plastic bottles

#2: High-Density Polyethylene (HDPE)

High-density polyethylene is considered to be one of the safest forms of plastic, and it's also the most commonly recycled plastic. It's a great moisture barrier with excellent chemical resistance, and it's a more stable form of plastic than PET. While it is considered a safer option for food and drink products, it's never safe to reuse HDPE plastic for food or drinks if it did not originally contain either.

High-density polyethylene is commonly used to make:

- Milk jugs
- Non-carbonated drink bottles
- Motor oil containers
- Shampoos and conditioner bottles
- Soap bottles
- Detergent bottles
- Bleach bottles
- Snack food boxes
- Cereal box liners
- Toys
- Buckets
- Rigid pipes
- Crates
- Plant pots
- Garden furniture
- Refuse bins and compost containers
- Park benches
- Truck bed liners

HDPE is the most commonly recycled plastic and can be reused. It can be recycled into:

- Plastic bottles and jugs
- Plastic lumber
- Outdoor furniture
- Playground equipment

- Fencing
- Rope
- Toys

#3: Polyvinyl Chloride (PVC)

Polyvinyl chloride is a hard plastic that is known for its long-term stability, good weathering ability, and chemical resistance. These properties make it a good choice for household products like pipes, frames, gutters, and more. PVC is known to leach toxins throughout its entire life cycle, making it one of the most poisonous plastics.

Polyvinyl chloride is commonly used to make:

- Plumbing pipes
- Credit cards
- Carpet backing
- Floor covering
- Window and door frames
- Rain gutters
- Pipes and fittings
- Wire and cable sheathing
- Synthetic leather products
- Clear plastic food wrapping
- Cooking oil bottles
- Teething rings
- Children's and pets' toys
- Garden hoses

Almost all products using PVC require virgin material for their construction; less than 1% of PVC material is recycled. Specialized programs do recycle PVC and use it for:

- Flooring
- Paneling
- Roadside gutters
- Traffic cones
- Credit cards
- Pipes

#4: Low-Density Polyethylene (LDPE)

Low-density polyethylene's ability to be tough and flexible while also acting as a good moisture barrier allows it to be an excellent choice for food storage products like bags, containers, bottles, and plastic wrap. LDPE is considered to be one of the less toxic plastics and can be reused for food products.

Low-density polyethylene is commonly used to make:

- Plastic wrap
- Sandwich bags
- Bread bags
- Squeezable bottles
- Plastic grocery bags
- Garbage bags
- Food storage containers and lids
- Bubble wrap
- Irrigation pipes
- Thick shopping bags
- Wire and cable covering
- Coatings for paper milk cartons
- Hot and cold beverage cups

LDPE is difficult to recycle, although more plastic recycling programs are gearing up to handle this material. When recycled, LDPE is used for:

- Plastic lumber
- Compost bins

- Trash cans
- Floor tiles

#5: Polypropylene (PP)

Polypropylene is a hard but flexible plastic with a high melting point and excellent chemical resistance. These properties make it one of the safer plastic options to use for food and drink products at a higher temperature.

Polypropylene (PP) is commonly used to make:

- Prescription bottles
- Most bottle tops
- Ketchup and syrup bottles
- Yogurt and margarine containers
- Potato chip bags
- Drinking straws
- Hinged lunch boxes
- Fabric/carpet fibers
- Heavy-duty bags
- Hot food containers
- Packing tape
- Thermal vests
- Car parts
- Disposable diapers
- Sanitary pad liners

Polypropylene is commonly recycled and can be used for:

- Shipping pallets
- Automotive battery cases
- Brooms
- Shovels
- Watering cans
- Mixing bowls
- Cutting boards
- Ice scrapers
- Storage bins

#6: Polystyrene (PS)

Polystyrene, commonly known as Styrofoam, is a rigid plastic that is commonly found foamed and can be brittle. It is a highly toxic plastic that is affected by fats, solvents, and heat and should avoid being used for fatty or hot food and drinks.

Polystyrene (PS) is commonly used to make:

- Disposable foam cups
- Take-out food containers
- Plastic cutlery
- Egg cartons
- Fast-food trays
- Video cases
- Seed trays
- Coat hangers
- Low-cost, brittle toys
- Foam packaging (packing peanuts)
- Rigid foam insulation
- Underlay sheeting for laminate flooring

Polystyrene can be recycled, but it is difficult to do and programs to recycle it are not widely available. When recycled, it is used for:

- Cassette tapes
- Rigid foam insulation
- Egg cartons
- Picture frames
- Moldings

- Home décor products
- Foam protective packaging

#7: Other

This category of plastics is a catch-all for other types of plastic resins that don't belong in any of the other six categories or a combination of these plastics. Some of the plastics in this category include polycarbonate, acrylic, fiberglass, nylon, and acrylonitrile styrene. This category also includes a newer type of plastic, [polyactic acid](https://en.wikipedia.org/wiki/Poly(lactic_acid)) ([https://en.wikipedia.org/wiki/Poly\(lactic_acid\)](https://en.wikipedia.org/wiki/Poly(lactic_acid))) (PLA), a bioplastic that is non-recyclable but can be composted.

The plastics in this category are commonly used to make:

- Baby bottles
- Sippy cups
- Large, multiple-gallon water bottles
- Medical storage containers
- Eyeglasses
- Exterior lighting fixtures
- Metal food can linings
- CDs and DVDs
- Dental sealants

Items made from #7 plastics are combinations of various plastics and are difficult to recycle, but some can be recycled into plastic lumber and specialized products. Products marked #7 with "PLA" should be composted instead of recycled.

Which Plastics Are Toxic?

While all seven types of plastic have a degree of toxicity, some are far more toxic than others. PVC is the most hazardous plastic and has been dubbed the "poison plastic" because it contains numerous toxins that it can leach throughout its entire life cycle.

PS is also considered to be a highly toxic form of plastic. Heat plays a role in the amounts of toxins that are leached from it, so it is advised to not use this form of plastic to hold hot food or drinks. PET can leach toxins if it has been exposed to sunlight or higher temperatures, which is why products made from this type of plastic should not be reused. It can be difficult to know exactly which toxins can be found in #7 plastics, but there is a good chance that most of these plastics will leach toxins like [bisphenol A](https://www.niehs.nih.gov/health/topics/agents/sya-bpa/index.cfm) (<https://www.niehs.nih.gov/health/topics/agents/sya-bpa/index.cfm>) (BPA) or bisphenol S (BPS).

The safer plastics are those with a lower chance of leaching toxins. HDPE is one of the safest forms of plastic due to its stability. LDPE is also considered to be less toxic than other plastics and is relatively safe for use. PP is another safer plastic option for food and drink use, as it can withstand high temperatures and thus is less likely to leach chemicals.

Toxins Found to Leach From Plastics

- **#1 Polyethylene Terephthalate (PET or PETE)** – antimony oxide, bromine, diazomethane, lead oxide, nickel ethylene oxide, and benzene
- **#2 High-Density Polyethylene (HDPE)** – chromium oxide, benzoyl peroxide, hexane, and cyclohexane
- **#3 Polyvinyl Chloride (PVC)** – benzene, carbon tetrachloride, 1,2-dichloroethane, phthalates, ethylene oxide, lead chromate, methyl acrylate, methanol, phthalic anhydride, tetrahydrofuran, and tribasic lead sulfate, mercury, cadmium, bisphenol A (BPA)
- **#4 Low-Density Polyethylene (LDPE)** – benzene, chromium oxide, cumene hydroperoxide, and tert-butyl hydroperoxide

- **#5 Polypropylene (PP)** – methanol, 2,6-di-tert-butyl-4-methyl phenol, and nickel dibutyl dithiocarbamate
- **#6 Polystyrene (PS)** – styrene, ethylbenzene, benzene, ethylene, carbon tetrachloride, polyvinyl alcohol, antimony oxide, and tert-butyl hydroperoxide, benzoquinone
- **#7 Other** – BPA, BPS, as well as all other toxins mentioned

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