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What chemicals in food containers harm human reproduction

Certain chemicals that can leach from food containers are known as endocrine-disrupting chemicals (EDCs) and can harm human reproductive health. EDCs interfere with the body's hormonal system, which regulates processes like reproduction, growth, and metabolism. [↗](#)

Key chemicals in food containers that can negatively impact reproduction include: [↗](#)

Bisphenols (e.g., BPA, BPS)

- **Source:** Bisphenols are widely used in polycarbonate plastics and epoxy resins, which line many metal food cans and are found in some plastic food and beverage containers.
- **Mechanism of harm:** Bisphenol A (BPA) can mimic or block the effects of hormones like estrogen and thyroid hormone. BPA and its replacement, Bisphenol S (BPS), have both been identified as reproductive toxicants.
- **Reproductive effects:**
 - **In men:** BPA is associated with lower sperm quality, reduced sperm count, and decreased sperm motility.
 - **In women:** BPA exposure is linked to lower egg quality, lower peak estradiol levels, a reduced number of mature eggs, and implantation failure during in vitro fertilization (IVF).
 - **Both sexes:** Bisphenols can disrupt the hypothalamic-pituitary-gonadal (HPG) axis, a key system for regulating reproductive hormones. [↗](#)

Phthalates

- **Source:** Phthalates are plasticizers that make plastics flexible and durable. They can be found in some plastic food packaging, lids, and adhesives. Polyvinyl chloride (PVC) plastic, indicated by recycling code #3, often contains phthalates.
- **Mechanism of harm:** As EDCs, phthalates interfere with normal hormonal function, particularly by disrupting androgens (male hormones). They can also increase oxidative stress in reproductive tissues.
- **Reproductive effects:**
 - **In men:** Phthalates are linked to testicular damage, reduced sperm quality and count, and altered hormone levels, which can manifest as testicular dysgenesis syndrome.
 - **In women:** Exposure is associated with poor egg quality, ovarian dysfunction, altered hormonal levels, endometriosis, and a higher risk of miscarriage.
 - **In children:** Prenatal exposure to phthalates has been associated with disrupted

Ask anything



for years.

- **Reproductive effects:**
 - **In women:** Higher PFAS levels in the blood are associated with a reduced likelihood of pregnancy, longer time to conception, and increased risk for polycystic ovary syndrome (PCOS) and endometriosis.
 - **During pregnancy:** Prenatal exposure is linked to adverse pregnancy outcomes, including reduced fetal growth and lower birth weight.
 - **Transgenerational effects:** Animal studies show that PFAS exposure can cause developmental and reproductive harm that is passed down to offspring. [↗](#)

Heavy metals (e.g., lead, cadmium)

- **Source:** Heavy metals can enter food from the environment and, in some cases, migrate from packaging materials, such as metal-based components or recycled plastics.
- **Mechanism of harm:** Heavy metals are toxic to the reproductive system and can interfere with reproductive hormones.
- **Reproductive effects:** Prolonged exposure to heavy metals like lead is linked to hormonal effects, reduced fertility, miscarriage, and birth defects. [↗](#)

How to minimize exposure

While it is difficult to eliminate these chemicals completely, you can reduce your exposure by:

- Using glass, stainless steel, or ceramic containers for storing and reheating food instead of plastic.
- Avoiding microwaving food in plastic containers.
- Limiting consumption of canned foods and choosing fresh or frozen options instead.
- Avoiding plastics with recycling codes #3 (PVC) and #7 (miscellaneous, may contain BPA).
- Eating fewer processed and fast foods, as they often come in PFAS-treated wrappers. [↗](#)

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What are the best alternatives for plastic food containers?

Safer and more sustainable alternatives to plastic food containers include **glass**, **stainless steel**, **ceramic**, and **silicone**. Each material offers unique advantages and

 28 sites

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Effects and Mechanisms of Phthalate: Reproductive ...
Abstract. The production of plastic pro... requires phthalate plasticizers, has resu...
 National Institutes of Health (NIH) ... ⋮

Bisphenol A and Human Reproductive PMC
* Summary. Bisphenol A (BPA) is a high volume chemical with adverse endocrir...
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- **Microwave-safe and oven-safe:** Tempered glass containers can go directly from the freezer to the oven or microwave, making them versatile for cooking, reheating, and storage.
- **Non-porous:** Easy to clean and won't absorb food colors, smells, or flavors.
- **Transparent:** Allows you to see the contents without opening the lid, which helps with meal planning and organization.
- **Recyclable:** Glass is a fully recyclable and eco-friendly material. 

Plastic-Free Containers: Steel vs. Glass | The Kitchn

May 2, 2019 — Going plastic-free is not only healthier for you, it's green...

 The Kitchn 



5 Swaps for Healthier and Sustainable Food Storage

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 Prince William County Government (.gov) 



Cons:

- **Heavy and breakable:** Not ideal for travel or for households with young children where dropping is a concern. 

Example products:

- **Pyrex Simply Store Glass Food Storage Containers with Lids:** Available in various sizes and sets, these are a durable and classic choice for everyday food storage.
- **Bentgo Signature Leakproof Glass Food Storage Containers:** Feature an airtight seal and a convenient steam valve for microwaving leftovers.
- **Rubbermaid Brilliance Glass Food Storage Containers:** Come with clear, leak-proof plastic lids that have built-in vents for splatter-free microwaving. 

Pyrex Simply Store 6-pc 4-cup Roun...	Bentgo Signature Glass Food Storag...	Rubbermaid Brilliance 10-pc....
\$15.00	\$44.99	\$46.99
4.4 (36)	4.6 (24)	4.4 (195)

Stainless steel containers

Stainless steel is durable, lightweight, and rust-resistant, making it an excellent option for packing lunches or taking food on the go. 

Pros:

- **Extremely durable:** Withstands being dropped and bumped, and is resistant to rust and stains.
- **Lightweight:** Ideal for portability in lunch bags, backpacks, and briefcases.

Example products:

- **Life Without Plastic Rectangular Stainless Steel Food Storage Container with Seal**: Made of food-grade stainless steel with a leak-proof, food-grade silicone seal.
- **Yeti Rambler 2-Quart Bowl**: Insulated with a leak-resistant lid, these are great for keeping food at a consistent temperature.
- **Mainstays Stacking Food Jar**: A lightweight, multi-compartment option for packing multiple items for lunch. [↗](#)



Stainless Steel Rectangular Food...	YETI Rambler Bowl	Mainstays Stacking Food Jar
\$35.00	\$45.00	\$36.92
	4.6 (69)	4.2 (121)

Ceramic containers

Ceramic containers are often used for dry goods storage and are known for their aesthetics and versatility, especially for countertop displays. [↗](#)

Pros:

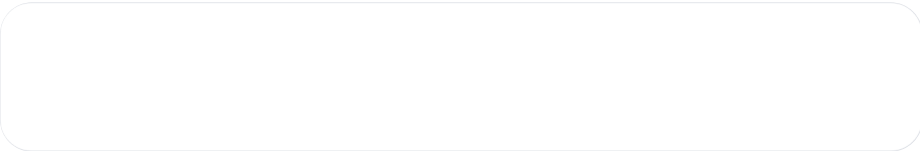
- **Versatile**: Safe for use in the oven, microwave, and freezer (with the right lid), making them suitable for prepping and storing.
- **Aesthetically pleasing**: Many come in stylish designs that look great on a countertop or table.
- **Durable and non-toxic**: Sturdy, long-lasting, and won't leach toxins into your food. [↗](#)

Cons:

- **Heavy and fragile**: Like glass, they are heavier than plastic and can chip or break if dropped.
- **Not all lids are non-toxic**: Some ceramic containers have lids made of plastic, so check the lid material to ensure it meets your non-toxic criteria. [↗](#)

Example products:

- **Lexi Home Brixton Leakproof Porcelain Ceramic Food Storage Containers**: Feature high-quality porcelain and airtight lids with a sleek design.
- **The Container Store Caspian Ceramic Canister**: An airtight canister with a glazed finish, ideal for pantry storage of dry goods.
- **Sweejar Ceramic Food Storage Jar**: Comes with a wooden lid and rubber seal for an



		
LEXI HOME Brixton 6-Piece Leakproof...	The Container Store Caspian...	Sweejar Ceramic Food Storage Jar
\$45.99	\$13.99 \$19.99	\$21.99 \$24.99
5.0 (1)		

Silicone containers and bags

Made from a mix of silicone and plastics, food-grade silicone containers and bags are flexible and can serve as a substitute for single-use plastic bags. [↗](#)

Pros:

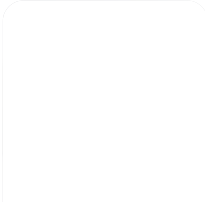
- **Flexible and space-saving:** Collapsible versions are great for storage and organization.
- **Durable and hygienic:** Resists odors and stains, and is generally regarded as safe for food.
- **Versatile:** Can be used in the microwave, freezer, and for sous vide cooking. [↗](#)

Cons:

- **Not biodegradable:** While more eco-friendly than plastic, it is not biodegradable.
- **Potential for leaching:** Some experts caution against heating silicone, especially low-grade varieties, as it could potentially leach chemicals. [↗](#)

Example products:

- **Stasher Premium Silicone Reusable Food Storage Bags:** A popular, structured alternative to traditional plastic sandwich and freezer bags.
- **Tupperware The Ultimate Silicone Stand-Up Bag:** A versatile, reusable, and leak-proof bag for storing, freezing, and cooking food.
- **Vremi Silicone Food Storage Containers with Lids:** Collapsible containers that are great for meal prep and saving cabinet space. [↗](#)

		
Stasher Starter Kit 4-Pack	Tupperware The Ultimate Silicone...	Vremi Silicone Food Storage Container...
\$40.99	\$42.00 \$65.00	\$30.81
	4.8 (124)	4.7 (20)

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Best Non-Toxic Storage Containers, According to an Expert

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 Vinod Stainless Steel [⋮](#)

Plastic, Ceramic, or Glass: Which Food Storage Container Is ...

Jun 2, 2023 — Ceramic food storage containers are a great option for...

 Caraway [⋮](#)

time.

Here is a comparison of glass and silicone for microwave reheating:

Safety

Feature	Glass	Silicone
Leaching concerns	Glass is a completely inert and non-porous material, so it will not leach any chemicals, odors, or flavors into your food when heated. This is especially important for fatty or acidic foods, which can cause other materials to degrade.	Though food-grade silicone is considered safe for cooking, some studies indicate it can leach trace amounts of siloxanes, especially with prolonged exposure to high heat. These risks may be higher with low-quality silicone that contains fillers.
Temperature stability	Glass can handle temperatures much higher than those reached in a microwave without degrading. It is also oven-safe, offering greater versatility for both reheating and cooking.	Food-grade silicone is heat-resistant up to around 428°F (220°C), which is more than sufficient for microwave reheating. However, unlike glass, it is not oven-safe for all applications.
Quality factors	High-quality tempered glass is very durable, but some types of glass can be sensitive to rapid temperature changes, potentially leading to cracking or shattering.	Lower-quality silicone is more likely to contain fillers, which increases the risk of chemical leaching and degradation over time. Pure, platinum-cured silicone is less likely to pose a risk.

Practicality

Is Silicone Safe for Cooking? FAQs, Benefits, & More

May 10, 2024 — We explore silicone safety in foodservice applications a...

WebstaurantStore



They may be convenient, but you should never microwave ...

Dec 14, 2023 — The microwaves reach the food inside the container and...

thelocalnews.news



Feature	Glass	Silicone
Durability	Extremely durable in the long term, but it is fragile and can shatter if dropped.	Highly durable and flexible, resisting breaks, chips, and warping. It is a good choice for travel or situations where dropping is a concern.
Weight and storage	Heavier than silicone, which can be a drawback for packing lunches or storing multiple containers.	Significantly lighter and often collapsible, making it very space-efficient for storage and highly portable.
Cleaning	Non-porous surface is easy to clean and won't absorb food colors or stains. It is generally dishwasher-safe.	Resists staining and odors, but it can sometimes develop a greasy film that requires hand-washing with baking soda to remove. It is also generally dishwasher-safe.
Appearance	Transparent material allows you to see the contents inside, which is helpful for identifying leftovers.	Opaque, so you can't see what's inside without removing the lid. However, it is available in a wide variety of colors.

Which one should you choose?

- For ultimate safety and reliability: Glass is the top choice. It is completely inert,

 17 sites

Is silicone safe for baking at high temperatures? - Facebook

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Plastic, Silicone, Glass: which food storage container is best ...

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Is Silicone Safe to Cook With? What

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What are the best types of glass containers for microwave use?

There are two primary types of glass used for containers that are safe for microwave use: **borosilicate glass** and **tempered glass**. The best type for you depends on whether you prioritize maximum thermal shock resistance or durability against impacts. [ⓘ](#)

Borosilicate glass

Borosilicate glass contains boron trioxide, which gives it a low thermal expansion rate and high resistance to temperature changes. [ⓘ](#)

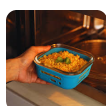
Pros:

- **Thermal shock resistance:** Borosilicate glass can handle going from the freezer to the microwave without shattering, making it an excellent choice for meal prep.
- **Oven-safe:** It is also suitable for use in a preheated oven, adding versatility beyond just microwave use.
- **Chemical resistant:** The chemical makeup makes it resistant to corrosion and leaching.
- **Lighter weight:** Compared to tempered glass, borosilicate is often lighter and thinner. [ⓘ](#)

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Can Borosilicate Glass Be Used in the Microwave? * Follow these safe and...

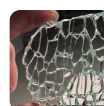
 Glasafe [⋮](#)



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Cons:

- **Brittle:** While it resists thermal shock well, borosilicate can be more brittle than tempered glass if dropped.
- **Cost:** Products made with borosilicate glass can be more expensive. [ⓘ](#)

Example products:

- **Anyday Glass Food Storage Set with Lids:** Made from durable borosilicate glass, these dishes with tempered glass lids are specifically designed for cooking and reheating in the microwave.
- **Prep & Savour 24-Piece High Borosilicate Glass Food Storage Containers with Lids:** This set is made of borosilicate glass and is freezer, oven, and microwave-safe. [ⓘ](#)

tempered glass

Tempered glass is a type of safety glass that is heat-treated to make it more durable and resistant to breakage than untreated soda-lime glass. 

Pros:

- **Impact resistance:** It is stronger and more resistant to impact from being bumped or dropped than borosilicate glass.
- **Safety shattering:** When tempered glass does break, it shatters into smaller, blunter pieces, reducing the risk of injury.
- **Versatility:** Tempered glass is also oven-safe and can handle hot food, but sudden temperature changes can still pose a risk. 

Cons:

- **Thermal shock risk:** While more resistant than standard glass, it is more susceptible to breaking from rapid temperature changes than borosilicate glass.
- **Weight:** Tempered glass tends to be heavier than borosilicate glass. 

Example products:

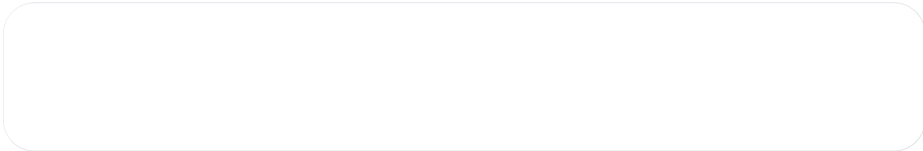
- **Pyrex Simply Store Glass Food Storage Containers:** A classic and trusted brand, Pyrex containers are made with tempered glass and are dishwasher, microwave, and freezer safe.
- **Anchor Hocking Classic Glass Food Storage Containers with Lids:** Another dependable option, these tempered glass containers are microwave and dishwasher-safe.
- **Rubbermaid Brilliance Glass Food Storage Set 10pc:** These glass containers feature secure, clear plastic lids with a built-in vent, allowing you to microwave food splatter-free. 

Pyrex Simply Store 4-pc Large Glass...	Anchor Hocking Classic Glass Foo...	Rubbermaid Brilliance Glass...
\$14.00	\$7.97	\$54.99
4.8 (26)	4.6 (285)	4.2 (366)

Key safety tips for microwaving glass

To safely use any glass container in the microwave, follow these guidelines from Pyrex and other sources: 

- **Avoid extreme temperature changes:** Don't put a dish directly from the freezer or refrigerator into a hot microwave or oven. Let it come to room temperature first.



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- ↪ What are other uses for borosilicate glass in the kitchen?
- ↪ What are the main differences in thermal shock resistance between borosilicate and tempered glass?
- ↪ Tell me more about microwave-safe lid options

Jan 17, 2025 — A good food storage container can make all the differenc...

 Better Homes & Gardens ⋮

Borosilicate Glass VS Tempered Glass

Sep 5, 2024 — Let's dive into the differences between these two type...

 www.tubularglass.com ⋮

Can You Microwave Glass? Safe Tips to Avoid Shattering ...

Dec 17, 2021 — Can you put glass in the microwave? You can put certain...

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