

Dry-Pack Food Storage Using PETE Plastic Containers

PETE refers to a type of clear plastic bottle commonly used for many foods sold in grocery stores. The bottles are identified on the bottom, next to the recycle emblem, with the letters PETE. This type of container has good oxygen barrier qualities and can be used with oxygen absorbers to store shelf stable, bulk dry foods. The low oxygen content of the sealed containers protects the stored food from insect infestation and helps preserve product quality. These containers are well suited

for products that are rotated on a regular basis, while still providing several years of storage capability.

Instructions for Re-use:

1. Use only PETE bottles that have been previously commercially packaged with food. Bottles need to have screw-on lids with plastic, not paper or foam, lid seals. Verify that the lid seal will not leak air by placing a sealed empty bottle under water and pressing on it.
2. Wash and rinse bottles to remove any residue. Drain and dry bottles.

3. Place an oxygen absorber packet into each bottle.
4. Fill bottles with bulk dry products that are low in moisture and oil content.
5. Wipe top sealing edge clean.
6. Screw lids on tightly. Tape the lid edge to prevent loosening.
7. Store the products in a cool, dry location, away from sunlight.
8. Use a new oxygen absorber packet each time a bottle is re-filled for storage.



Oxygen Absorbers

How are they used? To lower the oxygen content in containers of dry packaged foods. For successful long-term storage, commodities stored must be shelf stable and low in moisture and oil content.*

To protect the stored food from insect infestation and help preserve product quality.

What are they made of? Elemental iron mixed with a moisture absorbing material.

Packet covers are made of a semi-permeable material that allows oxygen and moisture to enter, but does not allow the contents of the packets to leak out.

How do they work? When moisture is absorbed into the packets, it causes the iron to rust. The process of oxidizing the iron absorbs the oxygen from the package atmosphere.

Temperature and the moisture level in the container determine the rate of the reaction.

Mitsubishi Ageless ZPT 300E absorbers are rated for 300cc of oxygen each. With their reserve capacity, each absorber has adequate capacity for up to 1 gallon (4 liters) of properly packaged food.

Is this the same as vacuum packaging? Not quite, the absorbers remove only the oxygen.

Air is about 20% oxygen and 80% nitrogen. The residual air [volume] in the container is mostly nitrogen, which will not affect the food.

What types of containers can be used with oxygen absorbers for food storage? Containers that provide an effective barrier against moisture and oxygen. Examples include:

Foil pouches (such as those provided by Church home storage centers)

Metal cans with seamed lids

PETE plastic bottles with screw on lids.

Glass canning jars with gaskets in metal lids

Oxygen absorbers are not an effective treatment method for plastic buckets, milk bottles or other types of plastic containers not identified as PETE or PET under the recycle emblem.

Directions for using Oxygen Absorbers:

Cut open the top of the bag of absorbers. Do not cut open the individual absorber packets.

Remove the number of absorbers from the bag that you will use in the next 20 to 30 minutes and spread them out on a tray. Do not repeatedly open and reclose the bag for a few absorbers at a time.

Reseal the remaining supply of absorbers by one of the following methods:

- Seal the absorber bag temporarily with the special blue clamp provided by the home storage center.
- Seal the bag of absorbers with an impulse heat sealer. Do not store absorbers in zip lock bags.
- For longer storage, if an impulse sealer is not available, remove the absorbers from the bag and place the absorbers into a glass canning jar with a gaskets in the metal lid. One pint (500 ml) will hold 25 absorbers.

Place one absorber into each container of food as it is packaged. Remove additional groups of absorbers from the supply, as needed, during packaging.

*Caution: Products that are too high in moisture should not be stored in oxygen-free containers because they may produce lethal botulism toxin.



Longer-Term Supply

For longer-term needs, and where permitted, gradually build a supply of food that will last a long time and that you can use to stay alive, such as wheat, white rice, and beans.

These items can last **30 years or more** when properly packaged and stored in a cool, dry place. A portion of these items may be rotated in your three-month supply.

Longer-Term Storage—30 Years or More

Properly packaged, low-moisture foods stored at room temperature or cooler (75°F/24°C or lower) remain nutritious and edible much longer than previously thought according to findings of recent scientific studies. Estimated shelf life for many products has increased to 30 years or more (see chart for new estimates of shelf life). Previous estimates of longevity were based on "best-if-used-by" recommendations and experience. Though not studied, sugar, salt, baking soda (essential for soaking beans), and vitamin C in tablet form also store well long-term. Some basic foods do need more frequent rotation, such as vegetable oil every 1 to 2 years.

While there is a decline in nutritional quality and taste over time, depending on the original quality of food and how it was processed, packaged, and stored, the studies show that even after being stored long-term, the food will help sustain life in an emergency.

For tips on how to best preserve longer-term food storage products, see [Longer-Term Supply](#).

Food	New "Life Sustaining" Shelf-life Estimates (In Years)
Wheat	30+
White rice	30+
Corn	30+
Pinto beans	30
Apple slices	30
Macaroni	30
Rolled oats	30
Potato flakes	30
Powdered milk	20

* With proper packaging and storage in a dry place at or below 75 degrees F (24 degrees C).

Three-Month Supply

Build a small supply of food that is part of your normal, daily diet. One way to do this is to purchase a few extra items each week to build a one-week supply of food. Then you can gradually increase your supply until it is sufficient for three months. These items should be rotated regularly to avoid spoilage.



Drinking Water

Store drinking water for circumstances in which the water supply may be polluted or disrupted.

If water comes directly from a good, pretreated source, then no additional purification is needed; otherwise, pre-treat water before use.

Store water in sturdy, leak-proof, breakage-resistant containers. Consider using plastic bottles commonly used for juices and soft drinks.

Keep water containers away from heat sources and direct sunlight.

Source: ProvidentLiving.org

Foil Pouches—Filling, Sealing, and Testing

Filling pouches—

Fill pouch with one gallon (4 liters) of product*. Overfilling will result in poor seams. A 2 quart (or 2 liter) pitcher, cut off at the 2 quart line, is a good measure to use in filling pouches. Fill with two level, tapped down, measures.

Place an oxygen absorber packet on top of product in each pouch.

Wipe product dust from inside seal area using a dry towel. (Powdered products)

Sealing pouches—

Turn power switch on. (Do not allow small children in area when sealer is on.)

Place pouch, in an upright posi-

tion, in front of sealer. Rest the weight of the pouch on the table or shelf, not hanging.

Close pouch opening by grasping side seams and pulling outward firmly. Bend top 1 ½ inch (30 - 40 mm) of pouch over at a right angle and push down on the pouch to evacuate air out of headspace, settle product, and flatten the pouch opening. If the top will not flatten out and bend over easily, check for overfill.

Hold pouch by side seams and insert pouch top into jaw opening (**keep fingers clear of jaw**).

Position pouch to seal near top. Stretch outward on side seams to remove wrinkles. Press foot switch to

activate. Release hold on pouch after jaw closes. Remove pouch when cycle is completed.

Testing Seals—

Visually inspect seams for complete seals and absence of burned spots. The seam should be similar in appearance to the factory seams.

Check to see if seam can be pulled apart. Push on pouch to see if air or product can be forced out.

If seams pull apart, check for inadequate cleaning of seam area or overfill. If necessary, increase sealing setting by 1/4 step. (Example: From 4 to 4.25) Verify that congealing setting is at 6.

If seams are burned, decrease sealing setting 1/4 step.

Source: Bishops' Storehouse Services

Plastic Buckets for Longer-Term Food Storage

Plastic buckets may be used to store food commodities that are dry (about 10 percent moisture or less) and low in oil content. Only buckets made of food-grade plastic with gaskets in the lid seals should be used. Buckets that have held nonfood items should not be used.

To prevent insect infestation, dry ice (frozen carbon dioxide) should be used to treat grains and dry beans stored in plastic buckets. Treatment methods that depend on the absence of oxygen to kill insects, such as oxygen absorbers or nitrogen gas flushing, are not effective in plastic buckets. Avoid exposing food to humid, damp conditions when packaging them.

Dry Ice Treatment Instructions

1. Use approximately one ounce of dry ice per gallon (7 grams per liter) capacity of the container. Do not use dry ice in metal containers of any kind or size because of the potential for inadequate seals or excessive buildup of pressure.
2. Wear gloves when handling dry ice.
3. Wipe frost crystals from the dry ice, using a clean dry towel.
4. Place the dry ice in the center of the container bottom.
5. Pour the grain or dry beans on top of the dry ice. Fill the bucket to within one in. (25 mm) of the top.
6. Place the lid on top of the container and snap it down only about halfway around the container. The partially sealed lid will allow the carbon dioxide gas to escape from the bucket as the dry ice sublimates (changes from a solid to a gas).
7. Allow the dry ice to sublimate completely before sealing the bucket. Feel the bottom of the container to see if the dry ice is all gone. If the bottom of the container is very cold, dry ice is still present.
8. Monitor the bucket for a few minutes after sealing the lid. If the bucket or lid bulges, slightly lift the edge of the lid to relieve pressure.
9. It is normal for the lid of the bucket to pull down slightly as a result of the partial vacuum caused when carbon dioxide is absorbed into the product.

Storage of Plastic Buckets

- Store plastic buckets off the floor by at least ½ inch (1.3 cm) to allow air to circulate under the bucket.
- Do not stack plastic buckets over three high. If buckets are stacked, check them periodically to ensure that the lids have not broken from the weight.

NOTE: Plastic buckets explanation of information change

Source: Bishops' Storehouse Services
—March 2008

- The absence of oxygen (nitrogen remains) kills food borne insects, but not the eggs.
- Plastic allows oxygen (gases) to pass through in small amounts over time. Oxygen absorbers cannot get oxygen level low enough to kill food borne insects.
- Dry ice (carbon dioxide) acts like a fumigant to kill food borne insects and eggs. It kills before oxygen re-enters and carbon dioxide levels decrease in the porous plastic containers.
- Nitrogen gas is not toxic to food borne insects eggs. The absence of oxygen prevents eggs from hatching, but once oxygen re-enters the container over time the eggs may hatch. Food kept in these containers may be lost to food borne insects over a longer period of time. Nitrogen gas flushes are not effective (especially if done at home) in killing food borne insects.
- Commercial companies sell food-grade Mylar bags that may be used to line the plastic buckets before adding product for longer-term storage. These bags cannot be sealed with stake pouch sealers as they are a thinner material (3ml. instead of the 7ml. bags sold by the Church). These must be sealed with a household iron by placing a board on the bucket after placing 6 oxygen absorbers inside bag, fold over the excess Mylar bag, seal, check seal and replace the lid. See illustration on page 4.

Packaging Option Summary—approved by the Bishops’ Storehouse Services

Source: Juanita Smith

New Information—It was once thought that rubber-gasket food-grade buckets using oxygen absorbers were safe for longer-term storage until new information was received from the Bishops’ Storehouse Services explaining that the plastic buckets are porous which allows the transfer of gases over time.

All containers must be stored in a dry place at or below 75 degrees F (24 degrees C) away from heat sources and off of concrete surfaces. When using oxygen absorbers, the nitrogen left inside any container will not kill the food borne insect eggs. Opened containers of any food product using any of the approved methods are expected to be used in a reasonable amount of time. It is unknown how long it takes for eggs to hatch and the insects to eat the product.

Some grains and legumes can be stored safely for 30+ years, but ideally, we would be using it up and ordering new product before that long.

Food Storage Options—See page one for complete explanation of information obtained.

- **Bucket Option 1:** Food-grade viable rubber gasket plastic buckets using dry ice as directed. Kills food borne insects and the eggs. Once bucket is opened and oxygen is reintroduced food is still safe unless new bugs are allowed to enter container through bad seal or negligence.



- **Bucket Option 2:** Food-grade viable rubber gasket plastic buckets using commercial food-grade Mylar bags and oxygen absorbers (6 per 5 gal bucket). The lack of oxygen kills the insects, but not the eggs. If the seal using the household iron fails or when oxygen is reintroduced to the container of food by opening container, the food borne insects may hatch.

- **Bucket Option 3: (only option not approved by Bishops’ Storehouse Services)** Food-grade viable rubber gasket plastic buckets using oxygen absorbers (6 per 5 gal bucket) alone may be safe while sealed.

Mylar bags and other food storage items may be purchased online at these or other online websites—

SurvivalUnlimited.com
FrontierSurvival.net
BePrepared.com

SorbentSystems.com
FrugalSquirrels.com

- **#10 can:** Safe for longer-term storage. Cans are not rust proof
- **Mylar Pouches:**
Safe for longer-term storage. Reusable pouches are not rodent proof ; it is recommended that pouches are stored in a container that will prevent rodent entry if rodents are a concern in your area
- **PETE Containers:**
Safe for longer-term storage. These containers are reusable. Check to be sure lids/seals are not damaged and containers are not broken. Follow usage instructions on page 1
- **Canning Jars:**
Safe for longer-term storage when using new lid and a fresh oxygen absorber. Only concern is possibility of breakage if living in areas prone to earthquakes, etc. Breakage may also happen during a move or other circumstances