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*"Preserve today, Relish tomorrow"*

# Low Acid Canning Basics

## Using Pressure Canners



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**Basic Food Safety & Sanitation**

When preparing food for preservation, cleanliness is essential in preventing food-borne illness, especially when handling raw fish, meat and other foods that won't be cooked (including fruits and vegetables).

**Step 1: Clean Your Work Area**

Wash your sink and countertops with soap and warm water, rinse well, and dry with clean cloths or paper towels. Then apply a sanitizing solution such as bleach (1 scant teaspoon of liquid unscented bleach to 1 quart of water). Spray well and allow to air dry, or let sit for 30 seconds and wipe dry with clean cloths or paper towels. If using commercial sanitizers, be sure to follow the manufacturer's directions. Not all commercial sanitizers are food safe. Wash and sanitize both before and after preparing food.

**Step 2: Wash Your Hands**

Wet your hands, apply soap, lather and then scrub for at least 20 seconds. Rinse well and dry with paper towels or a clean cloth. Wash your hands again when switching tasks. If using food handling gloves, first wash your hands and then put on gloves. Just as with your hands, wash gloves in between tasks or after touching surfaces that could introduce pathogens, or put on a new pair. Dispose of gloves after use.



Image Source: FDA

**Step 3: Avoid Cross-Contamination**

Be sure to use clean cutting boards and kitchen utensils, and wash them thoroughly before switching from one food type to another, or use separate boards and utensils for different types of foods (e.g., use one board for raw fish or meat and another board for vegetables, herbs, etc.). Wipe up spills promptly, and re-clean your work area as often as necessary.



Image Source: Partnership for Food Safety Information

## Basic Food Safety & Sanitation – cont.

### QUICK TIPS FOR AVOIDING CROSS CONTAMINATION:

- use paper towels or a fresh clean dish towel to clean surfaces
- wipe up spills immediately with paper towels or a clean dish towel (and then put that towel straight into the laundry basket)
- change dish cloths and towels **every day**
- sanitize sponges between uses by using one of these 3 methods:
  - moisten the sponge and heat in a microwave for one minute
  - wash in a dishwasher with a drying cycle
  - soak in a bleach solution for one minute
- replace sponges frequently

### Step 4: Prepare Your Food

Do not wash raw seafood, meat and poultry – doing so can spread pathogens and potentially cross-contaminate other foods. Wash **all** fresh produce, even if the skin or rinds won't be eaten. To wash produce, rinse under cool running water in a clean sink – do not soak.

### QUICK TIPS FOR PREPARING FOOD:

- clean produce right before using
- gently rub soft fruits and vegetables (such as tomatoes) with your hands under running water to remove dirt
- scrub firm fruits and vegetables (such as potatoes, carrots, and melons) with a vegetable brush (don't forget to clean the brush!)
- remove outer leaves of lettuce and cabbage before washing
- rinse herbs and sprouts, then shake to remove excess water
- use a kitchen sink sprayer to rinse berries in a colander, gently turning and shaking the colander to remove dirt and excess water

For more information on cleaning and sanitizing the kitchen using inexpensive and food-safe household products, check out this publication:

<https://ucanr.edu/sites/default/files/2024-02/393196.pdf>

## When In Doubt, Throw It Out

Never taste food that looks or smells strange to see if it can still be eaten. Most bacteria that cause foodborne illness are odorless, colorless, and tasteless.

For general information on food safety, here are some good websites to visit:

[www.foodsafety.gov](http://www.foodsafety.gov)

[www.fightbac.org](http://www.fightbac.org)

[CDC.gov Food Safety page](https://www.cdc.gov/foodsafety/)

## Introduction to Canning and Canning Processes

Home canning is about more than creating a quality, shelf-stable product. When it really comes down to it, the home canning process is about making a *safe* product. That goal entails preventing foodborne illness by following canning procedures developed for the specific type of food being canned, whether it be a jam or a pickle or a jar of meat. Of greatest concern is preventing botulism, a very serious (and potentially deadly) disease caused by the bacteria *Clostridium botulinum*.

When canning, jars of food are heated to destroy pathogens, and to expel air and create a vacuum seal. This helps provide the shelf stability, but it also helps create the perfect environment in which *Clostridium botulinum* spores are able to germinate and produce the toxin that causes botulism. This environment includes:

- **moisture** (from the food being canned)
- a **temperature range that allows for growth** (40°F - 120°F)
- **lack of oxygen** (resulting from the air being driven out of the jar during heating)
- a **low acidity** level

When these four factors are present, then the conditions become favorable for *Clostridium botulinum* spores to produce toxin. The only way to destroy *Clostridium botulinum* bacteria is with high heat (240°F), which can only be achieved in a pressure canner. For this reason, low acid foods such as vegetables and meats *must* be processed in a pressure canner. Because *Clostridium botulinum* cannot grow in acidic environments, foods that are naturally high in acid (such as most fruits) or have had acid added to them (such as vinegar added to pickles) can be processed in a boiling water or atmospheric steam canner.

*Clostridium botulinum* bacteria are naturally present all around us. They can be found in the dirt or on the surfaces of food, and spores can be carried by air currents. There's just no way to know if the bacteria is in that batch of food you're canning. For this reason, it's imperative to always choose recipes from reputable resources and follow processing recommendations precisely.

For further details on food safety in general, as well as information on a variety of food preservation topics, visit our Food Safety website, where you'll find free, downloadable publications and educational posters: <https://link.ucanr.edu/mfp-cs-foodsafety>.

You can also access the site by scanning this QR code with your smartphone or tablet.



## Introduction to Canning and Canning Processes - cont.

To be sure your home-canned food is safe and of high quality, follow these guidelines.

**USE A REPUTABLE RECIPE:** Always choose an up-to-date, research-based canning recipe from a reputable source that follows the guidelines of the National Center for Home Food Preservation (NCHFP).

**CHOOSE THE CORRECT CANNER:** The method of processing depends on the type of food to be canned. For safety, *always* follow the method specified in the recipe. High-acid foods, such as most fruits and pickles, may be processed in a **boiling water canner**. Recipes that have been developed for boiling water canners may also be processed in an **atmospheric steam canner**, provided that the jar size is no larger than one quart and the processing time (including adjustments for altitude) are 45 minutes or less. Low-acid foods, such as meat, poultry and vegetables, are processed in a **pressure canner**. Some fruits have instructions for canning in a pressure canner. Some recipes have instructions for both boiling water/steam and pressure processing. In those cases you may choose either method. If only one option is given, you must use only that method.

**UNSAFE CANNING PRACTICES:** Some canning methods have been shown to be unsafe and are NOT recommended by the USDA or the NCHFP.

- the **open kettle** method (in which hot food is put into jars, lids are applied and the jars inverted, with no heat processing done)
- the **oven, dishwasher, microwave, or solar methods** (jars of hot food are heated in these ovens, which cannot properly sterilize the food)
- the **dry canning** method (where dry food is processed without liquid, either in a canner or in an oven)

Also **not recommended is inverting jars** when they are removed from the canner. This can allow food to get between the rim of the jar and the lid, resulting in a weakened seal.

## Low Acid Canning

Low acid foods are those that are naturally low in acid, such as meat, poultry, fish, most vegetables, and some fruits. Low acid foods also include combination products, such as high- or borderline-high acid foods that have low-acid foods added to them (e.g., tomatoes with meat or vegetables). Low acid foods have pH values above 4.6, making them unsafe for processing in boiling water or atmospheric steam canners. Low acid foods must be processed in a pressure canner. Some high acid foods (such as fruit) may also be processed in a pressure canner; if so, the recipe will provide instructions.

How do you know which foods must be processed in a pressure canner? As noted on page 4, always choose an up-to-date, research-based canning recipe from a reputable source. Be wary of canning recipes circulating on the internet, and do not make up your own recipes.

The one exception to making up your own recipes is the "Can Your Own Soup" guidelines developed by the NCHFP. These guidelines allow you, *within very strict parameters*, to choose your own soup ingredients. The guidelines may be found on the NCHFP website at:

<https://nchfp.uga.edu/how/can/canning-vegetables-and-vegetable-products/soups/#gsc.tab=0>.

## Canning Basics

**GET READY, BE PREPARED:** A little preparation at the start of a canning session can help ensure success. Here's a few tips on getting started.

- Read the entire recipe thoroughly before you begin.
- Make sure you have all necessary ingredients on hand. Check expiration dates on items such as pectin, bottled lemon juice, etc., as well to make sure they're fresh.
- Measure out all ingredients. Do not change proportions of ingredients or add other ingredients not specified in the recipe unless an allowable exception is available (see *Make No Substitutions* below).
- Have all necessary utensils at hand.
- Inspect and wash jars, and keep them hot until ready to fill. Follow the lid manufacturer's directions for preparing lids. See *Jars and Lids Essentials* below for more information.

**USE THE BEST INGREDIENTS:** Select meat and produce that is fresh and of high quality. Discard any produce that is moldy or shows signs of decay or insect damage. Cut away bruises and blemishes from fruits and vegetables. Young and tender vegetables, processed within several hours of harvesting, produce the best results when canned. Fruit should be firm and ripe; however when making jams and jellies without added pectin, it's recommend to use  $\frac{3}{4}$  ripe fruit and  $\frac{1}{4}$  underripe fruit (underripe fruit has more natural pectin and will help the product to gel). *Do not can overripe fruit as an unsafe product may result.*

**PREPARE AND PACK INGREDIENTS AS SPECIFIED:** Recipe processing times and pressures are determined by not only the type of food being canned, but how it is prepared and packed into the jar. Heat must be able to penetrate throughout the food to the center of the jar. Dirt can harbor bacteria that remain even after washing and are difficult to destroy, so peeling is often required, especially for root crops, underground stem crops, and tomatoes. So, for example, if the recipe says to peel, then peel; if the recipe says to chop in 1" pieces, then the food should be cut in that manner; if the recipe calls for packing loosely or filling the jar only half-way with solids and the rest of the way with liquid, then heed those instructions.

**MAKE NO SUBSTITUTIONS:** Do not switch the type of pectin called for in jam/jelly recipes, or they may not gel correctly. Ingredients should not be substituted or amounts changed, with very limited exceptions (a list of safe changes and substitutions when canning can be found at: <https://www.ndsu.edu/agriculture/extension/publications/play-it-safe-safe-changes-and-substitutions-tested-canning-recipes>).

**RESIZING JARS:** Jars may be safely sized down and processed in *smaller* jars, however larger jars may only be used if a recipe specifically calls for it.

- When sizing jars down, process the smaller jars for the same amount of time as for the next largest size jar (e.g., if a recipe calls for 16-oz jars, process 8-oz jars for the same amount of time).
- When canning "in-between" jars, the process time is the same as the next largest allowable size jar (e.g., process 4-oz jars for half-pint times; 12-oz jars for pint times; and 24-oz jars for quart times).
- Use larger jar sizes only if a reputable recipe specifies them (e.g., if a recipe specifies half-pint or pint jars, you may use the larger pint jars, but you may not safely substitute larger quart jars).

## Canning Basics – cont.

**STERILIZING JARS:** Sterilizing jars for canning is essential only when processing times are less than 10 minutes. Since all pressure canning processing times are greater than 10 minutes, pre-sterilization is not required, as the jars become sterilized during processing.

**HOT PACK VS. RAW PACK METHODS:** There are two methods of packing food into jars for canning. In the *raw pack* method, raw unheated food is tightly packed into jars (except when liquid is added, which must be very hot). In the *hot pack* method, food is heated and loosely packed into jars. The hot pack method is preferred when canning in a boiling water or steam canner, because of several advantages: It removes more air; shrinks the food more (thus more food fits in a jar); helps keep food from floating; increases the vacuum seal; and it improves the shelf life, with better color and flavor retention during storage. The raw pack method is more suitable for processing vegetables in a pressure canner. When a recipe presents both options, you may choose either one, however note that the different pack methods may have different processing times, so be sure to follow the recipe carefully.

**ADJUST FOR ALTITUDE:** Canning recipes are developed using sea level as the criteria for processing times and pressures. At sea level, water boils at 212°F. As elevation increases, water boils at a lower temperature. When pressure canning, higher temperatures are required. At sea level to 2,000 feet, 11 pounds of pressure will achieve 240°F (which is the temperature needed to destroy *Clostridium botulinum* spores). Above 2,000 feet elevation, the pressure must be increased to reach this temperature.

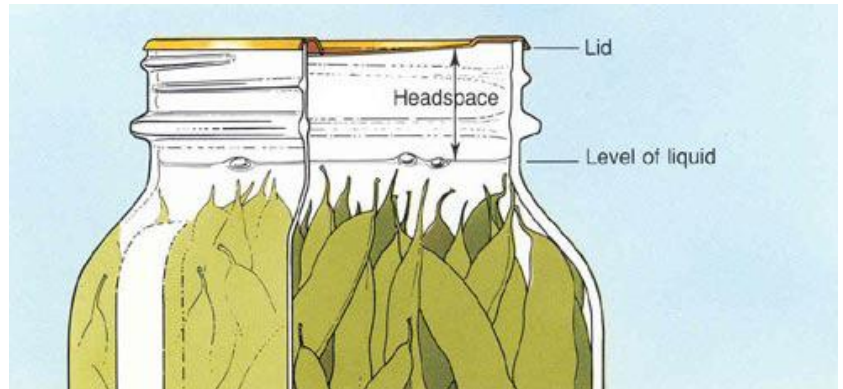
Follow the instructions for making altitude adjustments that are specified in the recipe's instructions. If none are given, follow the adjustments in the chart below.

Altitude	Dial Gauge (lbs. pressure)	Weighted Gauge (lbs. pressure)
1,001 – 2,000 feet	11	15
2,001 – 4,000 feet	12	15
4,001 – 6,000 feet	13	15
6,001 – 8,000 feet	14	15
8,001 – 10,000 feet	15	15

**FILLING JARS:** The general recommendation is to remove jars one at a time from wherever they're being kept hot. Fill each jar with product and apply the lid and screw band quickly. The band should be tightened just until it is finger-tip tight (unless otherwise directed by the manufacturer). Place the filled jar into the canner. Proceed until all jars are filled.

## Canning Basics – cont.

**HEADSPACE:** The empty space between the top of the food or liquid in the jar and the underside of the lid is known as *headspace*. This space allows for food to expand during canning without being forced out from under the lid, and it also allows for a good vacuum seal to be formed. Each recipe will specify the amount of headspace that should be left after filling the jar. It's important to follow the headspace amount to ensure that the food maintains good quality during storage. If too little headspace is allowed the food may expand and bubble out when air is being forced out from under the lid during processing. The bubbling food may leave a deposit on the rim of the jar or the seal of the lid and prevent the jar from sealing properly. If too much headspace is allowed, the food at the top is likely to discolor. Also, the jar may not seal properly because there will not be enough processing time to drive all the air out of the jar.



*Image Source: U.S. Department of Agriculture*

In general, fruit spreads require  $\frac{1}{4}$ " headspace; tomatoes, pickles and other high-acid foods require  $\frac{1}{2}$ " headspace; meat and vegetables need 1" headspace; and starchy vegetables need  $1\frac{1}{4}$ " to  $1\frac{1}{2}$ " headspace. Again, check your recipe (from a reputable source) for the specified headspace level and measure correctly.

**PROCESSING TIME:** Always process food for the entire time specified in the recipe, starting from when the canner comes to a full rolling boil, full steam, or full pressure depending on the canner you are using. **If at any time the water stops boiling, a full column of steam stops, or pressure falls, bring the canner back to the correct level and re-start the processing time from the beginning.** This is important to ensure that the food has been correctly processed and is safe to eat.

**REMOVING AND COOLING JARS:** After the processing time is up, carefully remove jars from the canner *without tilting*. Do not be tempted to pour off the water on the top when lifting jars from the canner, as tilting the jars can cause food to become lodged between the rim of the jar and the sealing compound on the lid, preventing proper sealing. The water will evaporate quickly and is of no concern. Jars should not be left in the canner to cool, as this could also result in improper sealing and food spoilage. The lid's gasket needs to dry on the jar lid, finishing the seal.

When removing the jars from the canner, set them on a heavy towel or a rack placed away from drafts. Leave at least 1" of space between jars during cooling. Don't put towels over the jars while they're cooling; the jars need to cool naturally in still, ambient air. Allow the jars to cool for 12 to 24 hours.

## Canning Basics – cont.

**CHECK THE SEALS:** After the jars have cooled, check to see that each one has sealed. To do so, remove the screw band and press the middle of the lid with your finger. If the lid springs up when you release your finger, the lid is unsealed. If you are unsure that a jar is sealed, carefully lift the jar by the lid after removing the screw band. If not properly sealed, the lid will come off. If using a reusable lid, follow the manufacturer’s instructions for testing for seals.



Image Source: U.S. Department of Agriculture

**CLEAN, LABEL AND STORE:** After the jars have cooled and the seals have been checked, remove the screw bands. Clean the jars with warm soapy water, rinse, and dry the jars. Wash and dry the screw bands. Thoroughly dry bands can be loosely placed back onto the jars, although it’s generally recommended that this not be done when storing jars. Label the jars with the contents, processing date, and processing method (BW = boiling water; ST = steam canner; PC = pressure canner) and store in a cool, dark, dry place.

**REPROCESSING:** If a jar does not seal, refrigerate it and use the product within a few days, or freeze it for longer term storage. The jar can also be reprocessed within 24 hours. Use a new lid and check the jar for flaws (replace it if necessary). Reprocess using the method originally advised and for the full length of time.

## General Canning Supplies

Most everything you need for successful canning you likely already have in your kitchen. Specialty tools, such as de-bubblers and headspace measurers, are very helpful but can be easily improvised. Here’s the basics of what you’ll need.

- a canner or stock pot with a rack
- standard canning jars and two-piece lids (metal flat lids with sealing compound or reusable flat lids with rubber gasket, and metal screw bands [aka rings]).
- funnel
- headspace measurer
- bubble removing tool ("de-bubbler")
- jar lifter or heat-proof gloves
- ladle and long-handled slotted spoon
- paper and/or clean cloth towels
- heavy cloth towel or rack for cooling jars
- reputable recipe that follows NCHFP guidelines



## Jar and Lid Essentials

**INSPECTING AND WASHING JARS:** Whether used or fresh out of a new box, all jars should be inspected and washed. Check that there are no cracks, chips or large bubbles in the glass or debris inside the jar. Wash the jars with hot soapy water and rinse well (either by hand or in a dishwasher). Jars need to be sterilized only when the processing time is less than 10 minutes (see *Sterilizing Jars on page 6*). **Keep jars hot until ready to fill.**



Photo Credit: L. Crowley

**LIDS:** The most common home canning lids are two-piece metal lids, consisting of a flat lid with sealing compound around the outer edge and a metal screw band (aka ring). Inspect lids to make sure there are no buckles and that the sealing compound has no gaps. Follow the lid manufacturer's directions for preparing lids (most just need washing; some may still require heating after they have been washed). Check the screw bands for dents and rust. The flat metal lid may be used only once for canning; the screw bands may be used multiple times. There are other lid systems available that have reusable plastic or glass lids and rubber rings which are held in place with metal clamps or standard metal screw bands; check with the manufacturer for preparation and use instructions.



Image Source: U.S. Department of Agriculture

**REMOVING AIR BUBBLES:** After filling a jar to the required headspace, use a bubble-removing tool to release any air pockets that are trapped in the jar (*this is not necessary for jellies or completely liquid products*). De-bubbling is an important final step after filling jars, as trapped air can be expelled during heat processing and increase the amount of headspace beyond what you started with. Be sure to fill the jars to the correct level, de-bubble, and adjust the headspace by adding or removing product as necessary.

## Pressure Canner Essentials

Pressure canners are designed to can foods under pressure, which generates higher heat than that which can be achieved in boiling water or atmospheric steam canners. This heat level (at least 240°F) – not the amount of pressure itself – is what is required to destroy pathogenic microorganisms that can survive in canned low-acid foods.

These devices consist of (besides the pot and lid) the following:

- a jar rack (and sometimes an optional jar stacking rack)
- a dial or a weighted gauge
- a vent port
- safety valves or overpressure plugs
- a safety lock
- a flexible gasket/sealing ring in the lid (some models have a metal-to-metal seal)

**Important! Please Note:** A pressure cooker is NOT a pressure canner (although a pressure canner may be used as a pressure cooker). Also not safe for pressure canning are electric multi-use cookers. Despite some manufacturer's claims, these devices have not been shown to reach and sustain the temperatures necessary to kill the spores of *Clostridium botulinum*, which can produce the toxin that causes botulism.

A new device, the Presto Digital Pressure Canner, was released a few years ago. Presto performed their own internal research in developing this canner and claims that it meets USDA guidelines for pressure processing. As of this writing, the marketing statements made by Presto for its Digital Pressure Canner have not been independently evaluated. Those who wish to use this pressure canner must be willing to trust the manufacturer. The NCHFP has noted that there are at least two USDA low acid canning processes that are different from those in the USDA manual. Therefore, it is recommended that users follow the instructions in the Presto manual and not USDA or NCHFP processing instructions. For further information, see <https://enewsletters.k-state.edu/youaskedit/2021/03/17/presto-digital-pressure-canner/>.

**PRESSURE CANNER REQUIREMENTS:** To be considered a pressure canner, it must:

- hold **a minimum of 4 quart jars standing upright on the rack with the lid secured.**
- have a vent to allow air to be released during pressurizing
- a mechanism (either a dial or a weighted gauge) to indicate that the target pressure is maintained throughout the entire processing time.

**PRESSURE CANNER MINIMUM LOAD:** A few years ago, Ball published new guidance for the minimum number of jars ("**minimum load**") that should be processed in each pressure canner load, stating that in order to ensure that proper pressure and temperature is achieved for safe processing, the pressure canner should be filled with at least 2 quart or 4 pint jars. As of this writing, this guidance has not been endorsed by the NCHFP, and a few major pressure canner manufacturers that we contacted informed us that they had not tested this for themselves. Thus while the 2 quart/4 pint minimum load may not be required for safety, it's certainly not a bad practice: The more jars there are in a pressure canner, the more space is filled and the quicker it will vent (and the less time the food in the jars will be subjected to heat). Our experience has also shown that a very small canner load can be difficult to bring up to required pressure and risks the water in the canner running dry.

## Pressure Canner Essentials – cont.

If you are pressure canning a small batch of food, you can add jars of water to meet the minimum load (and if you don't plan on saving the canned water, there is no need to apply a lid). **Note that this minimum load guidance is different from the minimum physical size requirements of a pressure canner.** As noted above, to be considered a pressure canner, the device should be able to hold at least 4 quart jars standing upright on a rack with the lid secured.

**VENTING THE PRESSURE CANNER:** A critical step in the pressure canning process is venting the canner prior to bringing it to the proper pressure for the food/recipe you are processing. Even if your pressure canner's manual does not include instructions for venting, **always vent the pressure canner for 10 minutes prior to closing the petcock or applying the weighted gauge/counterweight to the vent pipe to bring the canner to pressure.**

Why is this step so important? During the pressure canning process, it's actually the *temperature* that matters, not the pressure. Pressure is used to achieve the high temperatures needed to destroy *Clostridium botulinum* spores in low acid foods. Without proper processing, these spores can germinate and produce a toxin that causes botulism, a potentially fatal disease.

If air is trapped in the canner during processing, the temperature obtained at a given pressure can be lowered, resulting in underprocessing. Thus, to ensure the safety of the food being canned, pressure canners should be vented to release all air before being pressurized.

To vent a pressure canner, add the appropriate amount of water to the canner, add your filled jars, and lock the lid in place. Leave the vent pipe uncovered or manually open the petcock. Heat the canner on high, and when a full stream of steam continuously exits the vent or petcock, set a timer for 10 minutes. Make sure the canner continuously exhausts for the entire 10 minutes. Once the time is up, place the counterweight or weighted gauge on the vent pipe or close the petcock to begin pressurizing the canner. Continue with the pressure canning process, referring to your canner's manual and a research-based recipe for specific processing instructions.

**HOW LONG DOES IT TAKE?** While the pressure canning process is straightforward, there's no doubt that it is a long process, even for foods with short processing times (such as tomatoes or fruit). Besides cleaning and sanitizing your work area, washing and heating the canning jars, and preparation of the food itself, account for the following:

- heating the filled canner until a full stream of steam exits from the vent pipe (about 10 minutes or so)
- venting the canner for 10 minutes
- bringing the canner up to the proper processing pressure (about 20 minutes)
- processing time (anywhere from about 10 minutes for fruit to 100 minutes for seafood; average processing times are 60 to 90 minutes)
- depressurizing the canner (about 30 to 45 minutes, depending on your canner and how full the load is)
- cooling 10 minutes after the pressure drops to zero

## Pressure Canner Essentials – cont.

**SIPHONING:** Loss of liquid from jars during the canning process is known as “siphoning”. This can be caused by overfilling or packing jars too tightly; not applying jar lids correctly; or by sudden changes in pressure or heat during the canning process. To avoid siphoning:

- Fill jars with food according to the recipe’s instructions and measure headspace accurately.
- Apply jar lids “finger-tip tight” or follow the manufacturer’s instructions (see page 7).
- Slowly adjust the heat under the canner until the proper temperature or pressure is reached, and then slowly make any adjustments necessary to maintain that level.

As long as the jar has sealed, minor liquid loss is not a safety issue (although any food that is above the liquid may discolor). If 50% or more of the liquid is gone, refrigerate the jar and consume its contents within 2-3 days.

**FLAT SOUR:** A type of food spoilage known as “flat sour” results in food having an unappealing tasteless or off-flavor and a sour-like vinegar aroma. It is caused by thermophilic (“heat loving”) bacteria surviving the canning process because the jars of food were kept hot after canning for too long a period. These particular bacteria produce no gas (unlike some others), so even if the jar originally sealed, there will be no buldges which later cause the lid to become unsealed. Food with flat sour show no signs of spoilage until the jar is opened. While not harmful, this food should be discarded. Flat sour can be avoided by following proper cooling procedures:

- Promptly after the processing time is completed and any requisite waiting time has elapsed (5 minutes after the lid is removed for boiling water or steam canners; 10 minutes after the weight is removed for pressure canners), remove jars to a cooling rack or towel – do not let them sit in the canner overnight.
- Leave sufficient space between jars – at least 1” to 3” – on the cooling rack.
- Do not cover the cooling jars with a towel or anything that will maintain heat – allow the jars to cool naturally.

## Getting to Know Your Pressure Canner

The first step when acquiring a pressure canner is to review the manual. If the canner did not come with one, manuals are available online or by contacting the manufacturer. Each manufacturer will have specific recommendations for using their particular style and model of canner. Become familiar with the parts of the canner and its safety features. Know how to properly secure the lid on the canner and how to determine that the safety lock is engaged.

If your pressure canner is a dial gauge canner, have the gauge tested before using it for the first time (even if it’s new out of the box). If your pressure canner is a weighted gauge canner (or you are converting a dial gauge canner to a weighted gauge), review how often the weight should rock, jiggle, hiss, or otherwise indicate the proper pressure.

If you have never pressure canned before, or are using a new canner for the first time, we recommend canning jars of water before processing any food. This will help you become familiar and comfortable with the operation of your canner.

## Getting to Know Your Pressure Canner – cont.

We also recommend keeping a record of how long it takes your canner to come up to pressure, and how long it takes to depressurize. Knowing your canner's normal operation times will help you identify if it is malfunctioning.

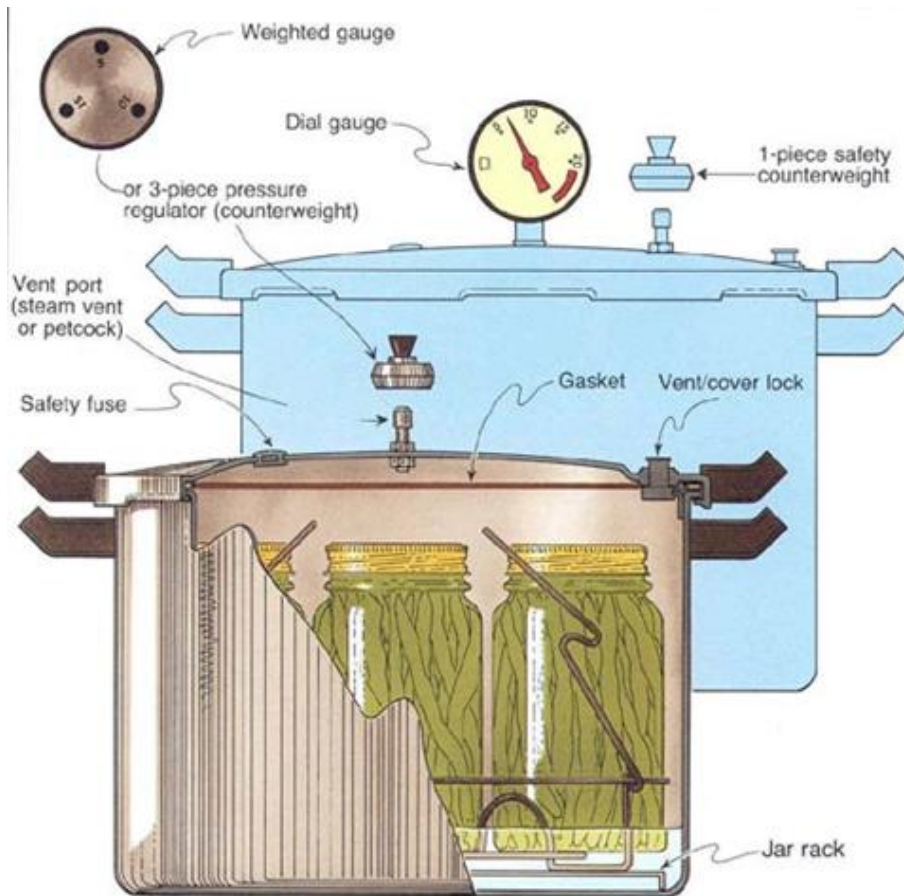


Image Source: U.S. Department of Agriculture

### Before each use of your pressure canner:

- inspect the vent, safety valve and gaskets and clean/replace as necessary; if your canner has a metal to metal seal, check that the edge is smooth and grease-free
- dial gauges: replace if there are cracks, rust or missing glass
- weighted gauges: make sure they move (or "jiggle") freely
- review the manual before each canning session

### After each use of your pressure canner:

- wash the canner (including the gaskets and gasket trough) with hot soapy water and dry thoroughly (avoid getting the dial gauge wet)
- remove the gasket in the lid (if applicable) before storage, and if the canner has a dial gauge, loosen the nut and washer underneath it (these steps are to avoid the gaskets stretching or getting permanent indentations that could affect seals)
- put crumpled paper towels in the canner bottom to absorb moisture and odors, and then put the lid upside down (not closed or sealed) on the canner
- store the canner in a dry area; some pressure canners should be stored at above freezing temperatures (check the manual or with the manufacturer)

## Getting to Know Your Pressure Canner – cont.

### As necessary:

- The insides of aluminum pressure canners can discolor over time due to the buildup of minerals in water. This is not harmful, but the discoloration can be removed if desired by using a solution of water and cream of tartar. See pg. 17 for instructions.

### Annual (or longer) tasks:

- have dial gauge tested yearly for accuracy and replace if necessary (see below for testing information, including how to self-test a dial gauge)
- change the gaskets every 3 years under normal usage

See page 18 for step-by-step pressure canner processing.

## Self-Testing a Pressure Canner Dial Gauge

Pressure canner dial gauges\* should be tested annually for accuracy to ensure that food is not under-processed (and thus potentially unsafe) or over-processed (resulting in lower-quality food). A gauge that reads off by more than 2 pounds (high or low) should be replaced. If the accuracy is off by less than 2 pounds, adjustments can be made to ensure that the correct pressure inside the canner is achieved. Many Cooperative Extension services will test pressure canner gauges at no or minimal cost, or provide advice on where to send your dial gauge for testing.

If your pressure canner has both a dial gauge and a weight, it can be tested at home. To self-test such a canner:

- Fill your canner with water according to the manufacturer's instructions. Add a minimum load of 4 pint jars or 2 quart jars filled with water (no lids are necessary). Heat and vent the pressure canner normally.
- Place the 5-pound weight on the vent pipe and bring to pressure (as determined by the appropriate rocking rate of the weight). Set a timer for 10 minutes. Read the dial gauge, and write down the pressure reading.
- Add the 10-pound weight and bring to pressure. Set a timer for 10 minutes. Read the dial gauge, and write down the pressure reading.
- Add the 15-pound weight and bring to pressure. Set a timer for 10 minutes. Read the dial gauge, and write down the pressure reading.

If the gauge reading is off by 2 pounds or more in either direction, it needs to be replaced.

*\*Many pressure canners are actually weighted-gauge canners and have dial gauges for use only as a reference tool. For example, All American pressure canners are weighted-gauge canners; pressure is determined by the rocking of the weight and the dial is used as a reference. Presto canner models equipped with a dial are dial-gauge pressure canners (which can be converted to a weighted-gauge canner by using their 3-piece weighted gauge purchased separately; check to be sure it fits your canner model).*

## Cooktop and Portable Burner Considerations

When evaluating pressure canners, not only the style and capacity need to be considered: The cooking surface used it must be considered as well. Not all cooktops are appropriate for canning. The amount of heat generated during canning and whether a burner can accommodate the weight of a canner impact the ability of cooktops to be used for canning purposes. Additionally, the material the canner is made from must be able to work on the cooktop's heating type. Before canning on any cooktop, check the manual for your canner and for your cooktop, or contact the manufacturers for guidance.

Specific concerns for fixed ranges include:

- The diameter of the canner should be no more than 4" greater (2" on each side) than the burner size.
- Smooth top ranges may not be able to support the weight of a loaded pressure canner. Further, the heat generated by pressure canners may damage the cooktop. Be sure to check with the manufacturer of the cooktop.
- Newer electric cooktops have safety features which cycle the burner on and off to prevent damage from high temperatures, and may even shut the burner off after a set amount of time. This could cause pressure to drop during canning, potentially leading to an unsafe product.
- Most pressure canners are made from aluminum, which will not work on induction burners. At least one manufacturer (Presto) has developed a pressure canner with a stainless steel-clad bottom that will work on some induction burners (check with Presto for further information).
- Gas burners should not exceed 12,000 BTUs.
- If your range has a hood, it should have sufficient clearance to accommodate the height of the canner and allow the lid to be safely opened.

Just as with ranges, not all portable burners are appropriate for pressure canning. Before selecting a burner, keep the following in mind:

- Some pressure canner manufacturers do not recommend the use of portable burners, so first check the manual or with the manufacturer directly.
- The diameter of the canner should be no more than 4" greater (2" on each side) than the burner size.
- The burner should be level and secure, and able to support the weight of a loaded canner.
- The burner must be high enough to allow air to flow underneath the burner. It must also be able to withstand the high heat generated during long processing periods, as well as not damage the countertop or surface below it.
- If the burner is electric, its wattage should be 1750W or higher (about that of a typical household electric range). Some burners may not have sufficient wattage to bring a loaded canner to full pressure.
- If the burner is gas, it should be 12,000 BTUs or less. Amounts higher than this can damage the canner.
- If canning foods with long processing times on propane burners, you should add a little more water than normal.
- If you are considering an induction burner, make sure that your canner will work with it.
- Camp stoves may have baffles on their sides that prevent the canner from being properly centered over the flames.

## Cooktop and Portable Burner Considerations – cont.

Lastly, if you planning on using a portable burner outside, note that wind or breezes can impact the temperature of the water in the canner, potentially allowing the pressure to drop.

For further information, see:

<https://nchfp.uga.edu/newsflash#gsc.tab=0>

<https://nchfp.uga.edu/blog/do-you-have-a-smooth-cooktop-and-still-want-to-can-at-home#gsc.tab=0>

[PSU Extension article on canning on a portable burner.](#)

## Removing Mineral Deposits from Pressure Canners

Aluminum pressure canners can become darkened on their insides over time. This discoloration, which is caused by the accumulation of mineral deposits (or by interactions with food if you use your canner as a cooker) is not harmful. But should you find it unsightly, it's fairly easy to remove.

Your pressure canner's manual may recommend specific cleaning steps, but a general method is to fill the pressure canner to a level above the darkened area with a mixture of 1 tablespoon of cream of tartar per each quart of water. Cover and bring the mixture to a boil, and continue boiling until the dark deposits disappear. Add more cream of tartar if the deposits are particularly stubborn. Then empty the canner, wash it with hot soapy water, rinse well, and dry. Adding 1 to 2 tablespoons of white vinegar to the water placed in the canner when processing jars can help reduce mineral deposits if you have hard water.

## Resources

UC Master Food Preservers of Central Sierra [https://ucanr.edu/sites/mfp\\_of\\_cs/](https://ucanr.edu/sites/mfp_of_cs/)

UC Master Food Preserver Program <https://mfp.ucanr.edu/>

National Center for Home Food Processing <https://nchfp.uga.edu/>

USDA Complete Guide to Home Canning <https://nchfp.uga.edu/resources/category/usda-guide>

So Easy to Preserve <https://setp.uga.edu/>

Ball Blue Book Guide to Preserving. ©2024. Newell Brands Inc.

Ball Complete Book of Home Preserving. ©2024. Newell Brands Inc.

All New Ball Book of Canning and Preserving. ©2023. Newell Brands Inc.

Ball website: <https://www.ballmasonjars.com/>

Bernardin website: <https://www.bernardin.ca/>

## Pressure Canner Processing

*Be sure to read Pressure Canner Essentials beginning on page 11 before following these processing steps.*

1. Clean lid gaskets and other parts according to the manufacturer's directions. Make sure all vent pipes are clear.
2. Add 2-3 inches of water to the canner (follow the manufacturer's specific recommendations).
3. Heat water in canner to 140°F for raw pack or 180°F for hot pack.
4. Placed filled jars on the canner rack.
5. Place lid on the canner and fasten securely. Leave the weight off the vent pipe or open the petcock.
6. Turn heat to high until steam flows in a steady stream from the open vent pipe or petcock.
7. Allow the canner to vent for 10 minutes. *Always vent for 10 minutes, regardless of the manufacturer's instructions.*
8. Place the counterweight or weighted gauge on the vent pipe, or close the petcock.
9. Begin to count processing time when the pressure on the dial gauge indicates that the recommended pressure has been reached, or for canners without dial gauges, when the weighted gauge begins to jiggle or rock as the manufacturer describes.
10. Regulate the heat to maintain a steady pressure at or slightly above the correct gauge pressure or weighted gauge rocking motion.
  - If at any time during processing the pressure goes below the recommended amount, bring the canner back to pressure and re-start the timing process from the beginning.
11. When the time is up, turn off the heat, remove the canner from the heat element (electric burner) if possible, and allow the canner to cool down naturally and the pressure to drop to 0. **Do not force cool the canner.**

**Pressure Canner Processing – cont.**

12. After the canner has completely depressurized, remove the weight from the vent pipe or open the petcock. **Wait 10 minutes**, then unfasten the lid and remove it, carefully lifting it away from you.
13. Carefully remove the jars to a cooling rack or heavy cloth towel.
  - Straight up – Straight Over – Straight Down
  - Do not invert jars!
14. Dry the canner, lid and gasket. Take off removable petcocks and safety valves and wash and dry them thoroughly. Follow the maintenance and storage instructions that come from your canner manufacturer.
15. Allow jars to cool in still, ambient air away from drafts for 12-24 hours.
16. Test jars for seals.
  - If a jar did not seal, refrigerate it and use within a few days, or reprocess it within 24 hours using a new lid.
17. Clean and dry jars and screw bands.
18. Label jars and store in a cool, dry, dark place.