

Use, Care and Operation of Your Pressure Canner

Becky Hutchings

University of Idaho Extension Educator,
Minidoka County

Lizann Powers-Hammond

Washington State University Extension
Educator, Benton County

Contents

- 1 Introduction
- 2 Equipment for Pressure Canning
- 4 Parts of a Pressure Canner
- 6 Pressure Canners in the Marketplace
- 7 Safety Features of Pressure Canners
- 7 Replacement Parts for Canners
- 8 Additional Equipment
- 8 Taking Care of Your Pressure Canner
- 10 Operation of the Pressure Canner
- 12 Steps for Successful Pressure Canning
- 16 Unsafe, Low-Acid Canned Food
- 17 Further Reading



Introduction

PRESSURE CANNING IS THE ONLY SAFE METHOD for home canning low-acid foods, including meat, poultry, seafood, legumes (dry beans), and vegetables, or mixtures that contain any of these foods. Using boiling water canners for low-acid foods risks developing botulism poisoning.

Botulism poisoning is caused by the toxin produced by the bacteria *Clostridium botulinum*. These bacteria spores cannot be destroyed at boiling-water temperatures (212°F at sea level). The higher temperatures reached in a pressure canner destroy these bacterial spores. Home-canning recommendations for low-acid foods are based on processing at 240°F, a temperature that can only be reached by pressure-canner processing. A boiling-water canner will never reach the temperature necessary to make low-acid canned foods safe.

At a temperature of 240°F, the time needed to destroy pathogenic bacteria in low-acid canned food ranges from 20 to 160 minutes. The exact time depends on the type of food, the way it is packed into jars, and jar size. Processing times for foods have been determined by laboratory research. Be sure to use laboratory-tested recipes when canning foods at home. If a research-based processing time is not available for a specific food or food product, do not attempt to can that food. Freezing is a safe alternative to canning when no processing instructions are available.

Safety Alert

A pressure canner is a specially designed metal kettle with a lockable lid used for heat processing low-acid foods. Proper operation of the canner requires that you follow the operating instructions provided by the canner manufacturer. Improper use or operation of the canner can result in bodily injury, property damage; burns and injuries, in addition to unsafe foods. To avoid serious accidents, please read the instruction manual thoroughly before use.





Figure 1. A pressure canner is a specially designed metal kettle with a lockable lid used for heat processing low-acid foods. Proper operation of the canner requires that you follow the operating instructions provided by the canner manufacturer.

The information in this publication is designed to provide a general overview on the use, care, and operation of a pressure canner for home canning. Many pressure-canner brands are available in the marketplace, as well as a collection of heirloom canners still in circulation. For detailed information on your make and model of canner, contact the customer service department for your canner brand.

Processing information is not included in this publication but can be found in other Extension and United States Department of Agriculture (USDA) publications. Links to that information can be found at the end of this publication. Always use reliable sources that offer current, research-tested procedures, recipes, and timetables. Family recipes and recipes found online may be incorrect.

Equipment for Pressure Canning

The Pressure Canner

The pressure canner is a large kettle with a cover that can be clamped down to make the kettle steam tight. When heating a pressure canner, some of the water in the canner is converted to steam, which creates pressure inside the canner. As the pressure increases, the temperature inside the canner increases, as shown in Table 1. The pressure-canning process utilizes the pressurized steam to reach the temperatures needed for the safe canning of low-acid foods.

To achieve a temperature of >240°F at sea level, you need to achieve a gauge pressure of at least 10.5 psi.

A weighted gauge pressure canner with a 10-pound weight will vent at pressures above 10.5 psi, so this achieves an internal temperature of 240°F. Dial-gauge canners should target a pressure of 11 psi at sea level to achieve >240°F. Adjustments for elevation are also determined by the type of gauge on the canner.

Adjustment for Elevation

The safe processing of home-canned foods is impacted by elevation. When elevation increases, the temperature inside the pressurized canner is lower due to reduced atmospheric pressure. Because of this situation, it is necessary to operate the canner at higher pressures to reach 240°F when processing at higher elevations. To correct for lower atmospheric pressure during the pressure-canning process, operate canners at the increased pressures specified in Table 2 for elevations above 1,000 feet.

Table 1. Temperatures achieved at various pressures in a pressure canner at sea level.

Pressure (psi)	Temperature	
0*	212°F	100°C
5	227°F	108°C
10	239°F	115°C
10.5	240°F	115.5°C
11	241°F	116°C
15	250°F	121°C

*At sea level.

Table 2. Pressure adjustments needed to achieve equivalent temperatures for safe pressure canning at elevations above 1,000 feet.

Pressure Canner Type	Altitude (feet)	psi
Weighted Gauge	Sea level to 1,000 ft	10
	Above 1,000 ft	15
Dial Gauge	Sea level to 2,000 ft	11
	2,001–4,000 ft	12
	4,001–6,000 ft	13
	6,001–8,000 ft	14



Figure 2. A 16-quart pressure canner allows for processing pint and quart jars in a single layer.



Figure 3. A 23-quart canner allows for stacking pint jars for processing.

Canner Size

Pressure canners come in a variety of sizes, with the 16- and 23-quart capacity being the most common. The size is determined by the total volume (space) that the canner will hold, not the number of jars. The size of canner best suited to your needs will depend on the number and types jars you expect to process at one time. A 16-quart pressure canner allows for processing seven quart jars or eight to nine pints per canner load (Figure 2). The 23-quart canner allows for stacking pint jars and can accommodate 7-quart jars or sixteen to eighteen pints jars per canner load (Figure 3). The 23-quart canner comes with two flat racks, one for the bottom of the canner and the other between the tiers of jars. Instructions for stacking jars in a canner can be found in the operations manual for your canner.

Consider the space available in your kitchen area. In some instances, the height of a 23-quart canner will not fit under a range hood.

There is a minimum size for pressure canners. To be safely used for pressure canning, a canner pot must be able to hold a minimum of four quart jars standing upright on a rack, with the lid in place.

Pressure Saucepans

Pressure saucepans are meant for cooking; their use for canning is not recommended (Figure 4).

Historically, pressure saucepans were believed to be an acceptable alternative for processing low-acid foods. During this time, it was thought that adding 10–20 minutes to published processing times for standard pressure canners would produce a safe product. Additional research found pressure saucepans to have problems with inadequate and inconsistent heating. As a result, the use of pressure saucepans for home canning is no longer recommended. Never use a pressure saucepan for canning low-acid foods.



Figure 4. The pressure saucepan is meant for use in cooking, not canning.

PARTS OF A PRESSURE CANNER

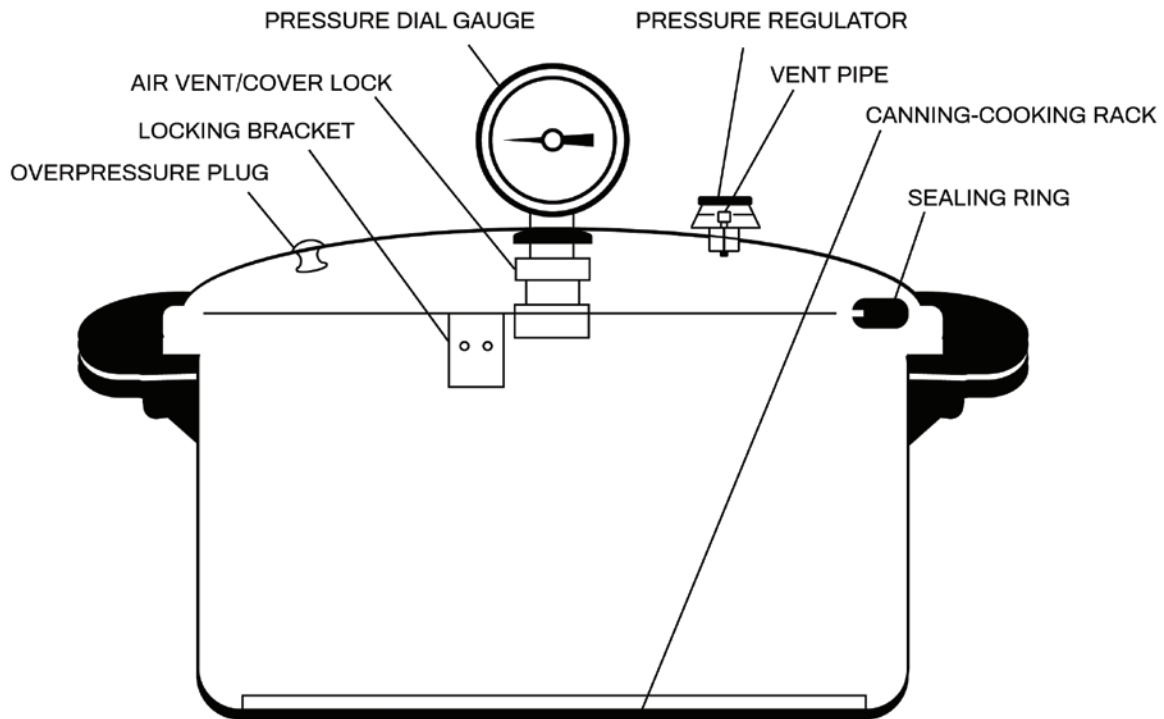


Figure 5. Pressure canners have features in common, including a pressure regulator, vent pipe, a safety fuse/plug, and jar rack. Some brands also have a cover lock.

Parts of a Pressure Canner

Although pressure canners look slightly different from brand to brand, they all have some features in common. These include a pressure gauge (dial or weighted gauge), vent port (steam vent), a safety fuse/plug, and a jar rack; some also have an automatic vent/cover lock (Figure 5).

Canner Types/Pressure Gauges

The first distinguishing characteristic of a pressure canner is the pressure gauge itself. There are two types of pressure gauges used on home pressure canners: the dial gauge and the weighted gauge. The difference between the two is how you monitor the amount of pressure in the canner during operation.

Dial Gauge Canner

The **dial gauge canner** has a gauge attached to the canner lid and a needle points to the amount of pressure inside the canner (Figure 6). The dial gauge is a delicate instrument and must be handled with care. Never submerge it in water, allow it to come in contact with liquid, or subject it to freezing temperatures.

Dial gauges must be checked for accuracy at least once a year. If your dial gauge reads high or low by more than 2 pounds when tested, it should be replaced. If the reading is off by less than 2 pounds, follow the recommendation of the person testing your canner.



Figure 6. The dial gauge is a delicate instrument and must be tested each year for accuracy. Courtesy of Colorado State University.

Safety Alert: Test Your Pressure Canner Dial Gauge Annually for Safely Canning Foods



For safe processing of low-acid foods such as meat, poultry, fish, game, and vegetables, home pressure canner dial gauges must be tested every year to ensure accuracy. The dial gauge should also be tested if it has been bumped or dropped. If the dial gauge is inaccurate by more than two pounds, Extension professionals and the National Center for Home Food Preservation recommend replacement. If the dial gauge is off by two pounds or less, an adjustment can be made. Weighted gauges do not need annual testing.

Remember to test a new gauge before use. A gauge should also be checked if it has been dropped, has been submerged in water, has parts that are rusty, if its pointer does not rest at 0, or if you believe for any other reason the gauge may not be accurate or working properly. Inaccurate gauges can result in unsafe food.

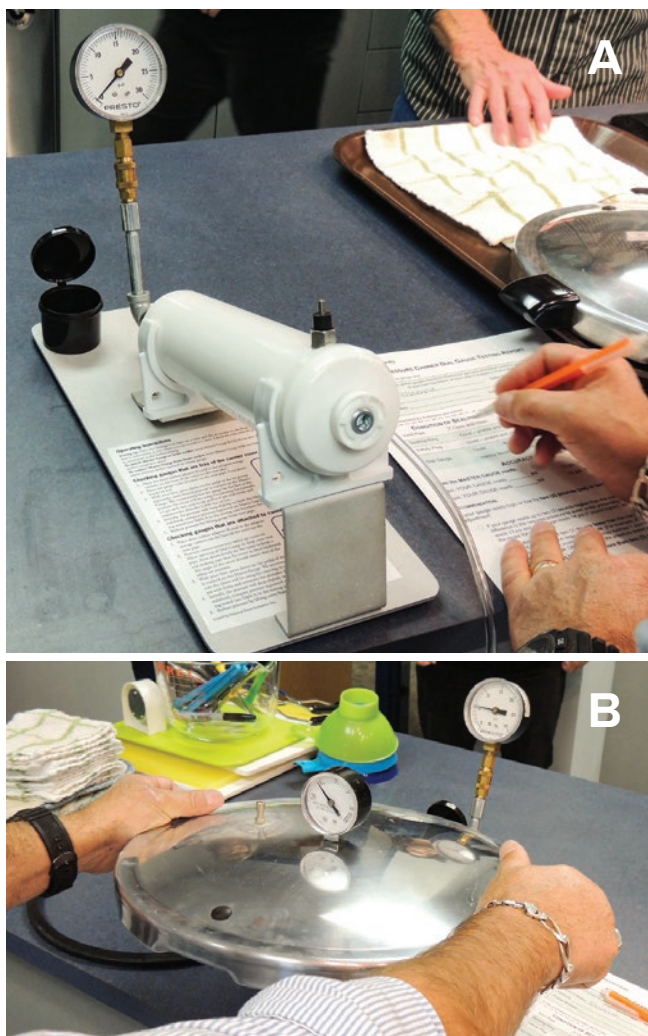


Figure 7. A, dial-gauge testing unit. B, comparison of canner gauge to master gauge.

Gauges may be checked at many county Extension offices; contact the pressure canner manufacturer for other options.

Weighted-Gauge Canner

The **weighted-gauge** canner uses a small round weight or disk placed on the vent pipe to control and monitor internal pressure (Figure 8). During operation, weighted-gauge canners exhaust tiny amounts of air and steam, causing the gauge to rock or jiggle. They control pressure precisely and maintain a constant internal pressure. The sound of the weight rocking or jiggling indicates the canner is maintaining the recommended pressure. The manufacturer's instructions will tell you how often the weighted gauge should rock or jiggle to indicate that the proper pressure is reached and then maintained during processing. Weighted gauges do not need to be tested.



Figure 8. Weighted-gauge canners use a small round weight or disk on the canner vent pipe (inset) to control internal pressure.

Which Canner Is Best—Dial or Weighted Gauge?

Consumers often ask which pressure canner type is best. Comfort level and personal preference are important considerations. Both canners produce a safe product when operated properly. Conversely, both types of pressure canners can produce an unsafe product when used improperly. A comparison of canners is shown in Table 3. Your decision might also be influenced by the availability of gauge testing in your community.

Canner Types/Sealing Surfaces

Some pressure canners have gaskets or sealing rings made of rubber or a similar material to prevent steam from escaping between the lid and the

kettle rim. Others form a tight metal-to-metal seal with the use of clamping mechanisms.

Pressure Canners in the Marketplace

The pressure canner is an important investment for the home canner and a critical piece of equipment for the safety of home-canned, low-acid foods. If home canning is to be done regularly, it pays to have a good-sized pressure canner in perfect working order. Table 4 lists the most common brands of pressure canners in the marketplace today and provides contact information for each manufacturer. Touch base with a manufacturer if you have any questions or concerns about one of their canners.

Table 3. Comparison of pressure canners: weighted gauge versus dial gauge.

Qualities	Weighted Gauge	Dial Gauge
Pressure Monitoring	Audible, can hear rocking or jiggling of weight. NO VISUAL CUES.	Visual, must watch the gauge for processing time to assure that correct pressure is maintained. NO AUDIBLE CUES.
Gauge Testing for Accuracy	No testing needed, always accurate.	Must be tested at least once a year.
Adjustment for Elevation	Not as precise. If elevation is over 1,000 ft, food must be processed at 15 lb. (Gauge has increments of 5, 10, and 15 lb.)	More precise. For elevations over 2,000 ft, processing pressure can be adjusted in 1 lb increments.
Care of Gauge and Canner	Gauge is more resilient, maintains accuracy.	Gauge is a delicate instrument, requires gentle handling.

Table 4. Pressure canners in the marketplace.

Manufacturer	All American	Mirro	Presto	Granite Ware
Gauge Type	Weighted*	Weighted	Dial- and weighted-gauge models available.	Weighted
Closure	Metal to Metal	Gasket	Gasket	Gasket
Sizes of Canners	10 quart, 15 quart, 21 quart, 25 quart, 30 quart, and 41 quart.	16 quart and 22 quart	16 quart and 23 quart	12 quart and 20 quart
Contact and Customer Service	Wisconsin Aluminum Foundry www.allamericancanner.com 1-800-251-8824	WearEver Cookware 1-800-527-7727	National Presto Industries www.gopresto.com 1-800-877-0441	Columbian Home Products www.columbianhp.com custserv@columbianhp.com
Notes	*Canner lids have both a dial gauge and a weighted gauge. As of 1995, directions advise to use as weighted gauge canner (dial is for reference only, not to be used for processing).	Mirro pressure canners no longer include canning racks.	Contact National Presto with any questions or for parts on canners identified with Presto, National, Maid of Honor, or Magic Seal.	

Safety Features of Pressure Canners

Pressure canners have a number of built-in safety features to protect the consumer during the operation of the canner. First, an **Underwriters Laboratories (UL) seal** means that your pressure canner has passed certain standardized tests for fire, electric shock, and related causes of accidental injury. Before purchasing a new pressure canner, check for the UL seal.

All pressure canners have a **vent pipe** (steam vent) designed to let air out of the canner and release steam as needed. On the weighted-gauge canner, the weight on the vent port allows the pressure to build and controls the release of steam during processing.

Safety Alert:

Always check the vent pipe before use and make certain it is clear prior to operation.

Dial-gauge canners have a vent pipe that is sealed off to pressurize the canner for processing. Depending on the make and model of a canner, the vent pipe will be sealed off by either closing a petcock or adding a counterweight or pressure regulator. On a dial-gauge canner, the counterweight should not be confused with a weighted gauge. The counterweight does not jiggle or rock during processing.

Today's pressure canners have what is referred to as either a safety fuse, safety plug, safety-release plug, or overpressure plug. This is a safety feature that appears as either a thin metal insert or rubber plug. Overpressure plugs are designed to release pressure from a canner if the temperature or

Safety Alert:

Do not pick at or scratch plugs when cleaning lids. Replace the overpressure plug if it becomes hard, deformed, cracked, worn, warped, or pitted. If you experience an overpressure release, consult your owner's manual or contact your canner manufacturer for appropriate action. In some instances, the safety plugs can be reused, but for others they need to be replaced.

pressure becomes dangerously high. The metal alloy plugs melt when the heat is excessive or the canner boils dry. The rubber-type plugs are blown out by excessive pressure. Both can be easily and inexpensively replaced.

Some canners have a locking bracket to prevent the cover from being opened when there is pressure in the unit. Not all canners have this feature.

Finally, the **canning rack** is a metal rack designed to keep jars off the bottom of the canner and to prevent jar breakage. If your canner is taller and you will be stacking jars, you will need two racks, one in the bottom of the canner and the other between tiers of jars.

Safety Alert

Processing Information: All low-acid foods must be canned at pressures and times stated in current, reliable published canning instructions. Make sure you have research-tested instructions for the product you intend to process. Processing information should include preparation instructions and the pressure and processing time for your product, including adjustments for elevation, if needed. Prepare and pack the foods as described in the instructions. Preparation and packing as described in the instructions are critical for the safety of the food.

Important Safety Note: Some commercial canning publications do not include adjustments for elevation with their recipes. Details associated with elevation adjustment are located in Table 2. All pressure canning must be adjusted for elevation.

Replacement Parts for Canners

Replacement gauges and other parts for canners are often available from canner manufacturers or at stores that offer canning equipment. When ordering parts, give your canner model number and describe the parts you need. Use only official replacement parts.

ORPHANED and HEIRLOOM CANNERS

If you are considering purchasing a used pressure canner, make sure it is an up-to-date model that comes with the manufacturer's booklet. Otherwise, operation manuals for most models are available online.

Also make certain all parts are accounted for and in good condition. Replacement parts are available for many canners. However, if extensive refurbishing is necessary, it may be more economical to purchase a new canner.

Before you buy a used pressure canner, check to see that it has all these features:

- A rack for jars.
- A lid that can be locked or clamped down to make it steam tight.
- An accurate pressure gauge that will produce steam at 10 and/or 15 psi or an appropriate pressure.
- A gasket around the rim of the lid to keep the steam from leaking (unless it has a metal-to-metal seal).
- A vent port that can be opened or closed to permit release of air from the pressure canner.
- Availability of replacement parts.

Names of some heirloom canners: Best Quality, Kook Kwick, Magic Seal, Maid of Honor, Montgomery Wards, National, Sears.

National Presto Industries services canners identified with Presto, National, Maid of Honor, or Magic Seal.

Parts for other heirloom canners might be available from Pressure Cooker Outlet, www.pressurecooker-outlet.com, (800) 251-8824

Additional Equipment Standard Canning Jars

Use only standard Mason-type jars manufactured specifically for home canning in the pressure canner. These jars are constructed of heat-tempered glass for durability and reuse. They can withstand the temperature of superheated steam in the pressure canner. Never use jars from commercial food products.

Canning Lids

The most common self-sealing lid is the two-piece system consisting of a flat metal lid held in place with a screw band for processing. The adhesive gasket compound on the underside of the lid softens and forms a seal during processing. Follow the manufacturer's directions for preparing and using the two-piece lid and for testing a proper seal.

Taking Care of Your Pressure Canner

Proper cleaning and care of your pressure canner assures longevity and continued safe operation for many years.

Cleaning and Storage

Before and after each use, wash the canner with hot, soapy water, then rinse and dry. Avoid using strong alkalis such as sodium hydroxide or lye, scouring powder, or baking soda because they darken and stain aluminum. Use fine steel wool to remove particles from difficult-to-clean areas. Never leave water or food in a canner as it may absorb flavors and odors.

Select a storage space that is dry and maintains a temperature above freezing. Air should reach the inside the canner to prevent a stale odor from forming. Avoid storing your pressure canner with the cover locked. This can cause unpleasant odors and deform the sealing ring. Place crumpled papers inside the canner to absorb moisture and odors. Invert the lid/cover on the canner body or place the lid in a paper bag or pillowcase and store it right side up on a shelf.

Figure 9. Antique pressure canner.



Temperature and Temperature Fluctuation

Avoid exposing canners to extreme temperatures or wide temperature fluctuations. Rapid changes in temperature can crack aluminum pots. Never move the canner from cold storage directly onto a hot flame. Do not add cold water to a pot that has boiled dry and is still hot. Do not pour cold water on a hot canner to cool it down. Extreme heat can soften aluminum, causing the canner to warp or melt.

Canner Lid Care

Thoroughly clean the canner lid and keep it free of food particles or grease and oils from foods. When removing the lid from the canner, place it on the counter dial gauge up, seal side down. Do not turn the lid upside down when it is hot. Moisture may collect in the gauge and cause it to rust. Never immerse the lid of a dial-gauge pressure canner in water. Water can make the gauge rust or corrode.

Gaskets and Sealing Rings

Handle canner lid gaskets carefully and clean according to the manufacturer's directions. Replace a gasket that is worn, stretched, or hardened. Nicked or dried gaskets allow steam leaks during the pressurization of canners. Small steam leaks between the lid and kettle of a canner during processing will not interfere with processing if the correct pressure can be maintained. If there are small leaks, you may need to put extra water into the canner before processing so it will not boil dry.

If large amounts of steam escape, check the gasket. After each use of the pressure canner, remove the gasket and wash it in warm, sudsy water. Rinse, dry, and replace the gasket in the lid.

Gaskets on older-model canners may require a light coating of vegetable oil once per year. Gaskets on newer-model canners are prelubricated and do not need oiling. Check your manufacturer's instructions for the proper care of your gasket.

Some gaskets can be reversed after a period of time to ensure a tighter seal. Presto suggests replacing the sealing ring and overpressure plug on their canners every three years.

Petcock, Vents, and Weights

Be sure the petcock, vents, and weights are clean. Take off removable petcocks and wash and dry them.

Occasionally, soak these parts in vinegar to remove hard water deposits, then wash and dry them. You can further clean the vent port or petcock opening by inserting one piece of chenille stems (pipe cleaner) or a narrow strip of cloth through it. Be sure to put all parts back together correctly.

Damage to the Canner

Discoloration of Canner

Discoloration inside the canner can be normal and is usually from minerals in your water. It is harmless and cosmetic in nature. To prevent discoloration of aluminum canner interiors and canning racks, add 2 tablespoons of white vinegar to the water used for processing jars of food. This solution also prevents hard water stains on the canning jars. If discoloration of the canner has already occurred, use an aluminum cleaner to remove the stain. Other options are available for removing discoloration inside the canner. Instructions vary from manufacturer to manufacturer, so follow your manufacturer's directions.

Pitting

Aluminum is porous and will pit (corrosion of the metal, caused by the interaction of aluminum with other metals in the presence of moisture, see Figure 10). To minimize pitting, dry the canner body thoroughly after every use. If pitting is excessive, replace your canner.



Figure 10. Pressure canner with corrosion and pitting.

Operation of the Pressure Canner

Consult the owner's manual for the proper operation of your pressure canner.

Building Pressure for Processing *Heating the Canner*

When operating a pressure canner, the heat applied to the canner from the cooktop builds and maintains the pressure. Control the pressure by controlling the heat: If at any time your pressure is too high or building too quickly, turn down the heat. If you cannot build pressure, the heat source may be inadequate.

Never lift the pressure regulator or counterweight to control the pressure. Turn the heat down or remove the canner from the heat source if the pressure is excessive.

Compatible Cooktops

Pressure canners and processing times were developed for indoor cooktops.

Before canning, check the recommendations of the manufacturer of both your stovetop and pressure canner regarding their use. Some stovetops or heat sources may be inappropriate for pressure canning or certain makes of pressure canners. If you no longer have your owner's manual, contact the manufacturer's customer service department or look online for a replacement manual. Proper use and operation of both the stovetop and canner is imperative. Improper use can result in bodily injury and property damage, in addition to unsafe foods.

Glass and Ceramic Cooktops

In recent years, the popularity of glass and ceramic smooth cooktops has raised the question about their suitability for pressure canning. There are two types of smooth cooktops, a radiant heat cooktop and an induction cooktop. The radiant heat cooktops work by passing heat through the smooth/glass surface to the pot on top of the burner. The heating elements get hot to the touch and burners cycle off and on to maintain the burner temperature during use.

Electric Multicookers

Electric multicookers are not suitable for home canning. No pressure-canning processes have been developed for this type of appliance. USDA canning processes were not designed for use with electric multicookers with "canning" or "steam canning" buttons on their front panels. USDA pressure canning-processing directions were designed for the stovetop pressure canner which holds four or more quart-size jars standing upright.

According to the National Center for Home Food Preservation there are several reasons electric multicookers are questionable with regard to safety for pressure canning:

1. The thermal process canning research conducted by the USDA connects the temperature inside the jars to the temperature inside the canner during the processing time. The temperature and heat distribution inside the jars are responsible for the destruction of the microorganism in the food product. No USDA thermal process work has been done with jars inside an electric pressure cooker to track the actual temperatures inside the jars throughout the process inside the multicooker.

2. The temperature is the most important consideration, not the pressure. Pressure alone is not sufficient data for validating canning recommendations.
3. For the safety of the final product, the temperature must stay consistent and constant during the entire processing time. Information on the consistency of the temperature inside the multicooker, however, is not available.
4. One of the big concerns is that USDA low-acid pressure-canning processing times rely upon the combined heat from the time the canner comes up to pressure, during the processing time, and during the early stages of the cooldown of the canner and the jars. All three phases are important for the destruction of deadly pathogens.

The concern is reaching high enough temperatures for the recommended length of time needed to ensure a safe, shelf-stable product when canning. For more information, visit the National Center for Home Food Preservation website at <https://nchfp.uga.edu/>. Some electric pressure-cooking appliances have recommendations to can foods, but Cooperative Extension programs do not support this claim.

Radiant heat burners often have an automatic shut-off mechanism. When the burner gets too hot, the burner cycles off. If the burner under a canner shuts off during processing, the device likely will struggle to build or maintain adequate heat (and subsequently pressure) for the entire duration of the processing time.

The second type of smooth cooktop is an induction cooktop. With induction burners, heat is generated through a magnetic field and the burners stay relatively cool to the touch. The magnetic energy heats the cookware, in turn, heating the contents. Induction cooking is very different from conventional gas or electric cooking and only certain types of pans will work on an induction burner. If a magnet can stick to the pot, it will work on an induction burner.

Most pressure canners are cast aluminum and will not work on an induction burner. There is one induction-compatible canner available in the marketplace. It is constructed of heavy-gauge polished aluminum with a stainless steel-clad base.



Figure 11. Check manufacturer's instructions for cooktop and canner when canning on a smooth cooktop.

The canner is compatible with gas, electric, smooth-top, and induction ranges.

For any smooth cooktop, either radiant heat or induction, the weight and heat of pressure canners might cause damage to the cooktop. Manufacturers all caution against sliding the pressure canner over the cooktop surface because it could lead to scratches and other damage. There can also be damage to the cooktop from excessive heat reflected around the canner, especially if the canner is larger than the burner circle. The damage can range from discolored, light-colored tops to the cracking of the glass top. Damage to the wiring and heating element in the stovetop can also occur because of excessive heat exposure.

Mirro pressure cooker/canners are not designed to be used on a flat top (glass or ceramic) range because they have concave bottoms. On a flat-top range, a large area of the bottom is out of contact with the heat source, preventing the transfer of heat and the buildup of pressure.



Figure 12. Induction-compatible pressure canner with stainless steel-clad base for use on an induction cooktop.

Alternative Heat Sources

Portable Electric Burners

Portable burners need to approximate household range burners that are typically 1750W or higher. It is important to have the canner stable and not top-heavy so overhang and height must be considered. Carefully consider the location of a portable burner so the surface the burner is sitting on is not damaged by heat.

Outdoor Canning

Pressure canners designed for home canning are intended for use indoors on an indoor cooktop. It is not safe to assume the processing recommendations created for indoor canning are appropriate for conditions outdoors. Canner manufacturers caution against using canners on an outdoor liquid propane burner or on a gas range calibrated over 12,000 BTUs because excessive heat may soften the metal, warping the canner bottom and ruining the canner for future use.

Digital Electric Pressure Canner

National Presto Industries recently released a digital electric pressure canner in the marketplace called the *Presto Precise Digital Pressure Canner* (Figure 13). The canner was developed specifically to follow the protocols and procedures established by the USDA for the safe canning of low-acid foods.

The digital electric pressure canner is not a multicooker and is designed for canning only. Directions for operation of the canner should be followed to achieve the conditions necessary for the pressure-canning process. To date, Cooperative Extension has not conducted independent testing of this product. Contact Presto Industries for additional information on research and testing protocol.



Figure 13. *Presto Precise Digital Pressure Canner.*

Great Idea! Test Run

To familiarize yourself with the operation of any pressure canner, do a test run. Before canning for the first time, pour 1–2 quarts of water into the canner and follow the step-by-step instructions in your owner’s manual. Note the heat setting on your range that maintains the proper pressure for canning. Remove the canner from the heat and cool until the pressure fully decreases.

Steps for Successful Pressure Canning

Proper canning begins with the selection of the right equipment, top-quality food, a safe recipe, and adequate time to complete the process. Make sure your equipment is in good working order, so that you can complete the process from start to finish without interruption.

1. Add Water to Canner

Your pressure-canner manual will tell you how much water the canner needs to generate steam. Some manufacturers specify how much water to add or provide a water fill line inside the canner.

Follow the manufacturer’s recommendation. A general rule of thumb is to begin with two to three inches of hot water in the canner. When canning times are long, some directions ask that you start with more water in the canner so that it does not lose all of the water before the end of the processing time. Always follow the directions with processes for specific foods if they require adding more water to the canner.

Great Idea!

Hard water deposits on jars can be eliminated by adding 1–2 tablespoons of white vinegar to the water in the canner before processing your jars.



Figure 14. Place filled jars on the rack in the canner, using a jar lifter.



Figure 15. Exhaust all air from the cooker with the vent port open. While maintaining the high-heat setting, allow steam to flow out of the canner continuously for ten minutes.



Figure 16. Once venting is complete, place the counterweight on the canner and begin to slowly build pressure.

2. Add Jars of Food

Prepare a canning recipe by following the guidelines for preparation and packing foods, including adjusting lids and rings. Place filled jars on the rack in the canner, using a jar lifter (Figure 14). Keep the jar upright at all times. Tilting the jar could cause food to spill and fall in-between the sealing compound of the lid and the glass lip, which could prevent a proper seal.

3. Fasten the Lid

Fasten the canner lid securely according to manufacturer's instructions. Leave weight off the vent port or open the petcock. Heat the canner at the highest setting on the cooktop until there is a constant, strong funnel of steam flowing from the open petcock or vent port.

4. Vent the Canner for 10 Minutes

While maintaining the high-heat setting, allow steam to flow out of the canner continuously for ten minutes (Figure 15). Once venting is complete, place the counterweight on the vent pipe or close the petcock (Figure 16).

Safety Alert:

A full ten minutes of venting is required to ensure the canner is full of steam and that all the air has been driven out. Any air trapped in the canner lowers the internal temperature, resulting in underprocessing. To be safe, all types of pressure canners must be vented for ten minutes before they are pressurized, regardless of what their instructions may say.

5. Pressurize the Canner

The canner will begin to pressurize during the next 3–5 minutes. Start counting your processing time when the correct pressure is reached; either the dial gauge indicates the recommended pressure or the weighted gauge begins to jiggle or rock as the canner manufacturer describes (Figure 17).

Great Idea!

To more easily control pressurization, turn the heat down when the pressure building begins and build pressure slowly to avoid the loss of liquid from the jars.

6. Maintain Pressure for the Entire Processing Time

Regulate the heat under the canner to maintain a steady pressure at or slightly above the recommended pressure. Make changes to the heat setting in small increments, since rapid or large fluctuations in pressure can result in liquid loss from the jars. Follow the manufacturer’s instructions for how a weighted gauge should indicate it is maintaining the desired pressure.

Safety Alert:

If at any time the pressure drops below the required level, turn up the heat and bring the canner back up to the recommended pressure. Reset the timer for the full processing time.

7. Cool and Depressurize

When the timed process is complete, turn off heat and remove the canner from the heat source, if possible (Figure 18). Allow the canner to cool naturally and depressurize without assistance (Figure 19). A small, fully loaded canner takes about 30–45 minutes for the pressure to drop; a large canner about 45–60 minutes.

To test if the pressure is down, **gently** nudge the control. If steam releases, it hasn’t reduced adequately enough. Let the canner continue to cool naturally.



Figure 17. The canner will begin to pressurize during the next 3–5 minutes. Build pressure slowly to prevent liquid loss from the jars.



Figure 18. Turn off the burner or remove the canner from the heat.



Figure 19. Allow the canner to depressurize normally without assistance.

Safety Alert:

The cooldown time is an essential part of the processing time; never force-cool the canner. Food is underprocessed if the canner is cooled by running water over it, laying wet towels over it, or opening the vent port before the canner depressurizes by itself. In addition, liquid will spurt from the jars, causing low liquid levels and jar-seal failure (Figure 20). Forced cooling may also warp the canner lid, causing steam leaks.

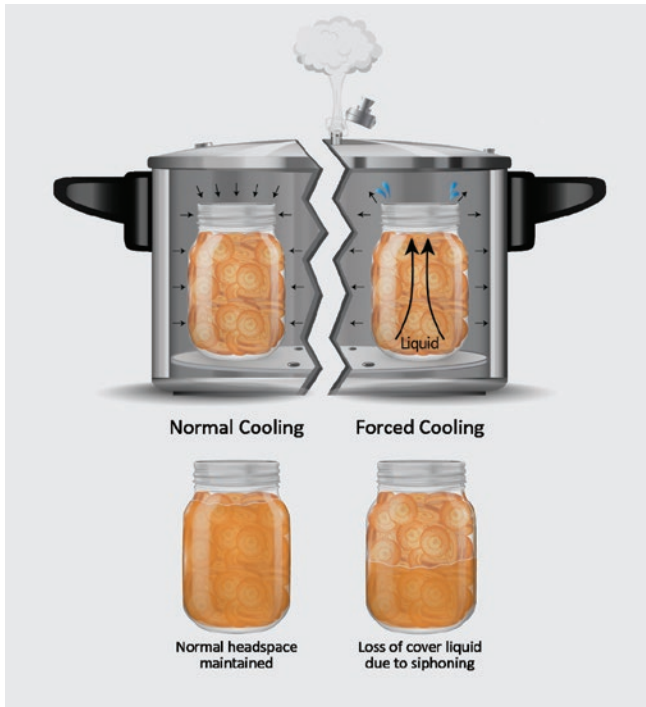


Figure 20. This diagram illustrates the importance of allowing the canner to cool normally, without force cooling. The jar on the left has equalized pressure inside and outside. When the canner cools gradually, the pressure remains equal. Note how the jar on the right is losing liquid due to the rapid depressurization of the canner. Higher pressure inside the jar forces liquid out.

8. Remove Weight or Open Petcock

Once the canner has depressurized, remove the weight from the vent port or open the petcock. Wait 10 minutes. After 10 minutes, unfasten the lid and remove it carefully. Lift the lid away from you so that the steam does not burn your face or arms (Figure 21).

9. Remove the Jars

Remove jars with a jar lifter and place them on a clean towel, leaving at least 1 inch between the jars during cooling (Figure 22). Do not place jars on a cold or wet surface because they might break. Let the jars sit undisturbed to cool at room temperature for 12–24 hours.



Figure 21. After cooling the canner, open the vent port. Wait 10 minutes; then open the canner, lifting the lid away from you so the steam does not burn your face or arms.



Figure 22. Remove jars with a jar lifter and place them on a clean towel, leaving at least 1 inch between.

10. Inspect the Seal

Within 24 hours of processing, remove the ring bands from the jars and check to determine that all the lids have sealed. Put any unsealed jars in the refrigerator or freezer or reprocess for full processing time within 24 hours of initial processing.

Safety Alert:

It is only safe to refrigerate jars that are properly processed. If the food is not processed correctly, either eat it immediately, freeze it, or process it properly within 24 hours from the original processing time.

11. Wash

Wash the jars and lids to remove residues.

12. Label

Label the jars and store them in a cool, dry, dark place.

13. Clean the Canner

Wash and dry the canner, lid, and gasket. Take off the removable petcocks and safety valves; wash and dry them thoroughly. Follow maintenance and storage instructions that come from your canner manufacturer.

Unsafe, Low-Acid Canned Food Identifying Potentially Hazardous Foods

Underprocessed or improperly processed low-acid foods are unsafe and have the potential to cause botulism poisoning (Figure 23). The fatal errors listed below have the potential to lead to illness, disability, or even death.

Pressure-Canner Operating Errors

- Improper equipment (i.e., electric pressure cooker, pressure saucepan, or boiling water canner)
- Inaccurate dial gauge
- Lack of adjustment for elevation
- Failure to vent canner for a full 10 minutes
- Improper operation of the canner
- Loss of pressure during the canning process or the inability to maintain pressure for the entire processing time

Processing Errors

- Incorrect timing
- Outdated canning instructions
- No tested recipe for product (i.e., original recipe)
- Force cooling the canner

Any low-acid food canned with one or more of the above errors can be remedied within the first 24 hours after processing. Once the 24-hour reprocessing limit has passed, however, treat the jars as contaminated (containing the botulinum toxin) and dispose of them as described below.

Disposal of Unsafe, Low-Acid Foods

There are two methods for safely disposing of the jars. If the jar is sealed, write on the jar, **Poison Danger: Do Not Eat**. Place the jars in a heavyweight garbage bag. Close and place the bag in a regular trash container or dispose it in a landfill. If the jar is unsealed, detoxify the contents before disposal.

Detoxifying Procedure

- Wear rubber or heavy plastic gloves when handling foods and cleaning up. Wear an old apron to protect your clothing from strong bleach.
- Carefully remove the jar lids. Without splashing, place the lids and jars on their sides in a stockpot, pan, or boiling-water canner (8-quart volume or larger). Wash gloved hands well. Carefully add water to the pot without splashing, until water is 1 inch above the jars. Put a lid on the pot and heat water to boiling. Boil for 30 minutes. Cool and discard the detoxified food, cooking liquid, and lids. Wash the jars and pot, then treat with mild chlorine bleach solution as described below for utensils.



Figure 23. Jars containing contaminated jalapeño pepper preserves, in a 1977 botulism outbreak in Pontiac, Michigan.

- Clean up the work area and utensils. Spray or wet kitchen surfaces with a strong chlorine bleach solution (1 part household unscented 5%–6% sodium hypochlorite bleach to 5 parts clean room-temperature water) and let stand for 30 minutes. Wearing gloves, wipe up treated spills with paper towels. Dispose of these paper towels by placing them in a plastic bag before putting them in the trash. Next, apply the bleach solution to all surfaces and equipment again and let equipment stand for 30 minutes more.
- Soak the jars, pot, cutting boards, and small items such as tongs, spoons, and knives that may have had contact with suspect food in the chlorine solution. Rinse utensils. As a final step, thoroughly wash all detoxified counters, containers, equipment, and clothing (Figure 24).
- Dispose of used paper towels and gloves when detoxification is complete by putting them in a plastic bag before discarding them in the trash. Wash all surfaces and equipment with soap and water.



Figure 24. Wear protective clothing and equipment when you clean up the work area and your utensils.

Safety Alert:

Bleach at this concentration is an irritant, so avoid contact with your skin or inhaling its vapor.

Further Reading

Healthy Canning. 2021. “Canning on Glass and Induction Stove Tops,” <https://www.healthycanning.com/canning-on-glass-and-induction-stove-tops/>, accessed 7 February 2022.

United States Department of Agriculture/National Institute of Food and Agriculture. 2015 (rev.). *USDA Complete Guide to Home Canning*. Agriculture Information Bulletin (AIB) No. 539. https://nchfp.uga.edu/publications/publications_usda.html, accessed 8 February 2022.

Websites

- National Center for Home Food Preservation: www.homefoodpreservation.com
- Wisconsin Aluminum Foundry (via All American Canner): <https://allamericancanner.com>
- National Presto Industries: <https://www.gopresto.com>
- Pressure Cooker Outlet: <https://www.pressurecooker-outlet.com>

Instructions for pressure canning specific foods are available in the following Pacific Northwest Extension publications, available through Oregon State University Extension Service:

PNW 172, *Canning Vegetables*:

<https://catalog.extension.oregonstate.edu/pnw172>

PNW 194, *Canning Seafood*: <https://catalog.extension.oregonstate.edu/pnw194>

PNW 300, *Canning Tomatoes and Tomato Products*:

<https://catalog.extension.oregonstate.edu/pnw300>

PNW 361, *Canning Meat, Poultry, and Game*:

<https://catalog.extension.oregonstate.edu/pnw361>

PNW 450, *Canning Smoked Fish at Home*:

<https://catalog.extension.oregonstate.edu/pnw450>

Photo credits

Figures 1, 8 inset, 12, and 13 courtesy of Presto Industries.

Figures 2, 3, and 14–22 courtesy of Washington State University, College of Human, Natural and Resource Sciences (CAHNRS) Communications.

Figure 4 courtesy of Bigstock, gcafotoografo.

Figures 6–8 courtesy of Colorado State University.

Figure 9 courtesy of Bigstock, tolxaton.

Figure 10 courtesy of Bigstock, mwookie.

Figure 11 courtesy of iStock, Jani Bryson, 166381836.

Figure 23 courtesy of the Centers for Disease Control and Prevention Public Health Image Library (Image 3355).

Figure 24 courtesy of Bigstock, Gulnara22, 362975518.

Trade names—To simplify information, trade names have been used. No endorsement of named products is intended, nor is criticism implied of similar products not mentioned.

Pacific Northwest Extension Publications

Pacific Northwest Extension publications are produced cooperatively by the three Pacific Northwest land-grant universities: Washington State University, Oregon State University, and the University of Idaho. Similar crops, climate, and topography create a natural geographic unit that crosses state lines. Since 1949, the PNW program has published more than 700 titles, preventing duplication of effort, broadening the availability of faculty specialists, and substantially reducing costs for the participating states.

Pacific Northwest Extension publications contain material written and produced for public distribution. You may reprint written material, provided you do not use it to endorse a commercial product. Please reference by title and credit Pacific Northwest Extension publications.

Order Information

University of Idaho Extension

<http://www.uidaho.edu/extension/publications> • 208-885-7982 • 208-885-4648 (fax) • calspubs@uidaho.edu

Washington State University Extension

<http://pubs.wsu.edu> • 800-723-1763 • 509-335-3006 (fax) • ext.pubs@wsu.edu

Oregon State University Extension Service

<https://catalog.extension.oregonstate.edu> • 800-561-6719 • 541-737-0817 (fax) • puborders@oregonstate.edu

Published and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914, by University of Idaho Extension, the Oregon State University Extension Service, Washington State University Extension, and the U.S. Department of Agriculture cooperating. The University of Idaho has a policy of nondiscrimination on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity/expression, age, disability or status as a Vietnam-era veteran.

PNW 421 | Published Aug. 1992, Revised Sept. 2008, July 2010, July 2022 | © 2022 by the University of Idaho

