

# Home Canning of Vegetables

Guide E-307

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Cooperative Extension Service • College of Agricultural, Consumer and Environmental Sciences

## Caution

This publication is intended for individuals with a basic understanding of canning procedures. For more detailed information, consult the *USDA Complete Guide to Home Canning* (2009), which is available online at [http://nchfp.uga.edu/publications/publications\\_usda.html](http://nchfp.uga.edu/publications/publications_usda.html) or through your local county Extension office (<http://aces.nmsu.edu/county/>).

Because vegetables are naturally low in acid, canning them requires special precautions that differ from those for canning high-acid foods. In particular, canning procedures must prevent the growth of microorganisms. Some bacteria cause food spoilage, while others produce toxins that cause illness or death. For example, *Clostridium botulinum* is a harmless bacterium in air. However, in the environment inside a canning jar with little or no acid (pH greater than 4.6), no oxygen, and temperatures between 40 and 120°F, this bacteria grows and produces a deadly toxin that can cause serious damage to the central nervous system or death when eaten in very small amounts (botulism).

Pressure processing is the only safe way to can vegetables without adding any acid. Boiling water produces steam. The temperature of steam under pressure is much higher than it normally would be without pressure. To prevent botulism, the internal temperature of canned vegetables and other non-acid foods must reach 240°F. This guide provides the correct processing times and canner pressures for canning vegetables safely in New Mexico.

To prevent the risk of botulism, low-acid and tomato foods not canned according to the USDA recommendations in this guide should be boiled even if no signs of spoilage are detected. Boil canned food for a full 10 minutes at elevations below 1,000 feet; add an ad-



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ditional minute of boiling time for each 1,000 of feet elevation (Table 1). Boiling destroys botulin toxin. If in doubt, always boil foods before tasting.

**Table 1. Boiling Times for Canned Food to Destroy Botulin Toxin**

At elevation (ft)	Boil foods (minutes)
2,000–2,999	12
3,000–3,999	13
4,000–4,999	14
5,000–5,999	15
6,000–6,999	16
7,000–7,999	17
8,000–8,999	18
9,000–9,999	19

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## Canning Equipment List

- Cutting board
- Knife
- Peeler/corer
- Mixing spoons
- Tongs
- Measuring cup and spoon sets
- Canning jars
- Canning lids and screw bands
- Re-sealable plastic bags for leftovers
- Pot holders × 2
- Paper towels
- Cloth towels × 2
- Dish soap and scrubber
- Cooking pots in 1-quart and 5-quart sizes
- Large strainer
- Mixing bowl set in 2-, 3-, and 5-quart sizes
- Canning set
  - Jar lifter
  - Magnetized lid lifter
  - Funnel
  - Plastic spatula (to release air bubbles in jars)
- Pressure canner with rack for proper elevation

## Selecting Vegetables

Select freshly harvested, tender vegetables that are free of bruises, blemishes, or signs of disease or decay. To avoid waste, prepare only enough vegetables that will fill the number of jars that can fit into the canner. See Table 2 for recommended quantities of food.

The following vegetables are not recommended for home canning: broccoli, Brussels sprouts, cabbage, cauliflower, kohlrabi, rutabaga, squash, wild mushrooms, mashed potatoes, pumpkin purée, sweet potatoes (chunk size only), and red chile.

## Salt

If desired, add 1/2 teaspoon of salt per pint or 1 teaspoon per quart. Salt may be omitted since it is used only for flavor. For best results, do not use salt substitutes for canning since heat causes some substitutes to become bitter or develop a metallic taste. Instead, add salt substitutes just before serving.

## General Canning Procedures

Use regular or wide-mouth Mason jars with self-sealing lids held in place by screw-on metal bands. The bands hold the lids in place during the processing and cooling periods, and can be removed and reused after cooling. Mason jars are made from tempered glass to resist high

**Table 2. Estimated Amounts (in pounds) of Vegetables Necessary for a Pressure Canner Load**

Vegetable	Canner load	
	9 pints	7 quarts (14 pints)
	Pounds of vegetables	
Asparagus	16	24 1/2
Beans or peas (shelled or dried)	3 1/4	5
Beans (green)	9	14
Beets (without tops)	13 1/2	21
Carrots	11	17 1/2
Corn (cream style)	20	*
Corn (whole kernel)	20	31 1/2
Lima beans (fresh)	18	28
Mushrooms	7 1/2 <sup>a</sup>	14 1/2 <sup>b</sup>
Okra	7	11
Peas (green, English, or shelled)	20	31 1/2
Peppers (hot or sweet)	9	*
Potatoes	22 1/2	35
Pumpkin (1-inch chunks)	10	16
Spinach and other greens	18	28
Sweet potatoes	11	17 1/2
<sup>a</sup> Makes 9 half-pints		
<sup>b</sup> Makes 9 pints		
* Not recommended		

temperatures. Jars are available in 1/2 pint, pint, 1 1/2 pint, and quart sizes. Larger jars are not recommended for home canning. Do not reuse glass jars or bottles from commercially processed products such as mayonnaise because these jars will not withstand the water bath or pressure canner heating process.

Inspect jars carefully for cracks or chips and discard faulty ones. Wash jars in hot, soapy water and rinse thoroughly or clean using a dishwasher. To sterilize jars, keep jars hot in the dishwasher, a sink of hot water, or in a warm 180°F oven until they are filled. Check metal screw bands for signs of rust or dents. Discard corroded or dented bands. Use only new lids and follow the manufacturer's directions for preparing lids for canning. Do not use lids that are missing any gasket compound, dented, deformed, or older than five years from date of manufacture.

Vegetables may be hot or cold when packed into jars. However, blanching for 3–5 minutes forces air from vegetables, resulting in better color and more space for

food in the jar. Pack food loosely and add hot liquid, usually water. Leave a 1-inch headspace. Slip a rubber or plastic spatula between the food and the jar to help release trapped air bubbles. Use a clean, damp cloth or paper towel to wipe the rim and threads of each jar. Put on a new lid with a screw-on metal band to hold it in place; tighten comfortably. See Figure 1 illustrating these steps for jar filling. Process using a pressure canner.

**“Follow these steps for successful pressure canning:**

1. Put 2 to 3 inches of hot water in the canner. [In areas with hard water, add 1 tablespoon of vinegar to reduce mineral deposits on jars.] Some specific products in this Guide require that you start with even more water in the canner. Always follow the directions with USDA processes for specific foods if they require more water added to the canner. Place filled jars on the rack, using a jar lifter. When using a jar lifter, make sure it is securely positioned below the neck of the jar (below the screw band of the lid). Keep the jar upright at all times. Tilting the jar could cause food to spill into the sealing area of the lid. Fasten canner lid securely.
2. Leave weight off vent port or open petcock. Heat at the highest setting until steam flows freely from the open petcock or vent port.
3. While maintaining the high heat setting, let the steam flow (exhaust) continuously for 10 minutes, and then place the weight on the vent port or close the petcock. The canner will pressurize during the next 3 to 5 minutes.
4. Start timing the process when the pressure reading on the dial gauge indicates that the recommended pressure has been reached, or when the weighted gauge begins to jiggle or rock as the canner manufacturer describes.
5. Regulate heat under the canner to maintain a steady pressure at or slightly above the correct gauge pressure. Quick and large pressure variations during processing may cause unnecessary liquid losses from jars. Follow the canner manufacturer’s directions for how a weighted gauge should indicate it is maintaining the desired pressure.

**IMPORTANT:** If at any time pressure goes below the recommended amount, bring the canner back to pressure and begin the timing of the process over, from the beginning (using the total original process time). This is important for the safety of the food.

6. When the timed process is completed, turn off the heat, remove the canner from heat if possible, and let the canner depressurize. Do not force-cool the canner. Forced cooling may result in unsafe food or food spoilage. Cooling the canner with cold running water or opening the vent port before the canner is fully depressurized will cause loss of liquid from jars and seal failures. Force-cooling may also warp the canner lid of older model canners, causing steam leaks. Depressurization of older models without dial gauges should be timed. Standard-size heavy-walled canners require about 30 minutes when loaded with pints and 45 minutes with quarts. Newer thin-walled canners cool more rapidly and are equipped with vent locks. These canners are depressurized when their vent lock piston drops to a normal position.
7. After the canner is depressurized, remove the weight from the vent port or open the petcock. Wait 10 minutes, unfasten the lid, and remove it carefully. Lift the lid away from you so that the steam does not burn your face.
8. Remove jars with a jar lifter, and place them on a towel, leaving at least 1-inch spaces between the jars during cooling. Let jars sit undisturbed to cool at room temperature for 12 to 24 hours.” (pp. I-21–22, USDA [2009])

Do not touch jars, lids, or rings until they are completely cooled.

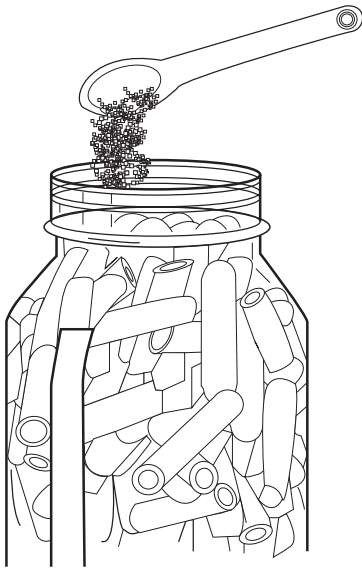
- **Dial gauges** on pressure canners should be checked annually to make sure they are accurate.
- **Weighted gauges** on pressure canners **are not accurate for elevations above 10,000 feet.** Follow manufacturer instructions for proper use.
- **Rubber gasket** must be pliable and in good condition to maintain seal of pressure canner.

See Figure 2 illustrating these steps for pressure canner procedures.

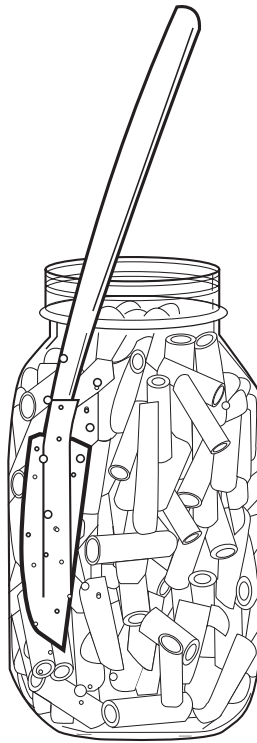
**“Testing jar seals**

After cooling jars for 12 to 24 hours, remove the screw bands and test seals with one of the following options:

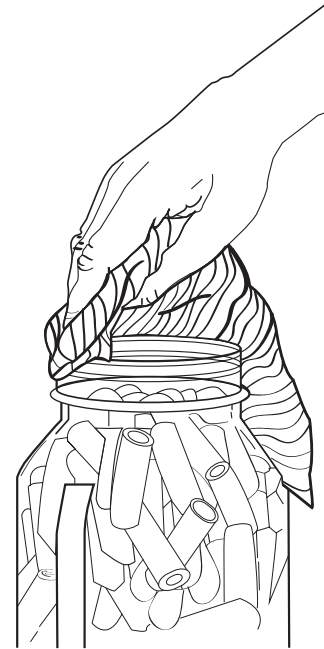
**Option 1.** Press the middle of the lid with a finger or thumb. If the lid springs up when you release your finger, the lid is unsealed.



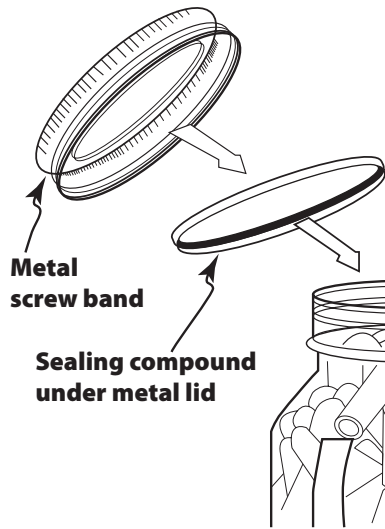
**1. Add salt, if desired.**



**2. Remove air bubbles with plastic utensil.**



**3. Wipe upper rim of jar completely for a good seal.**



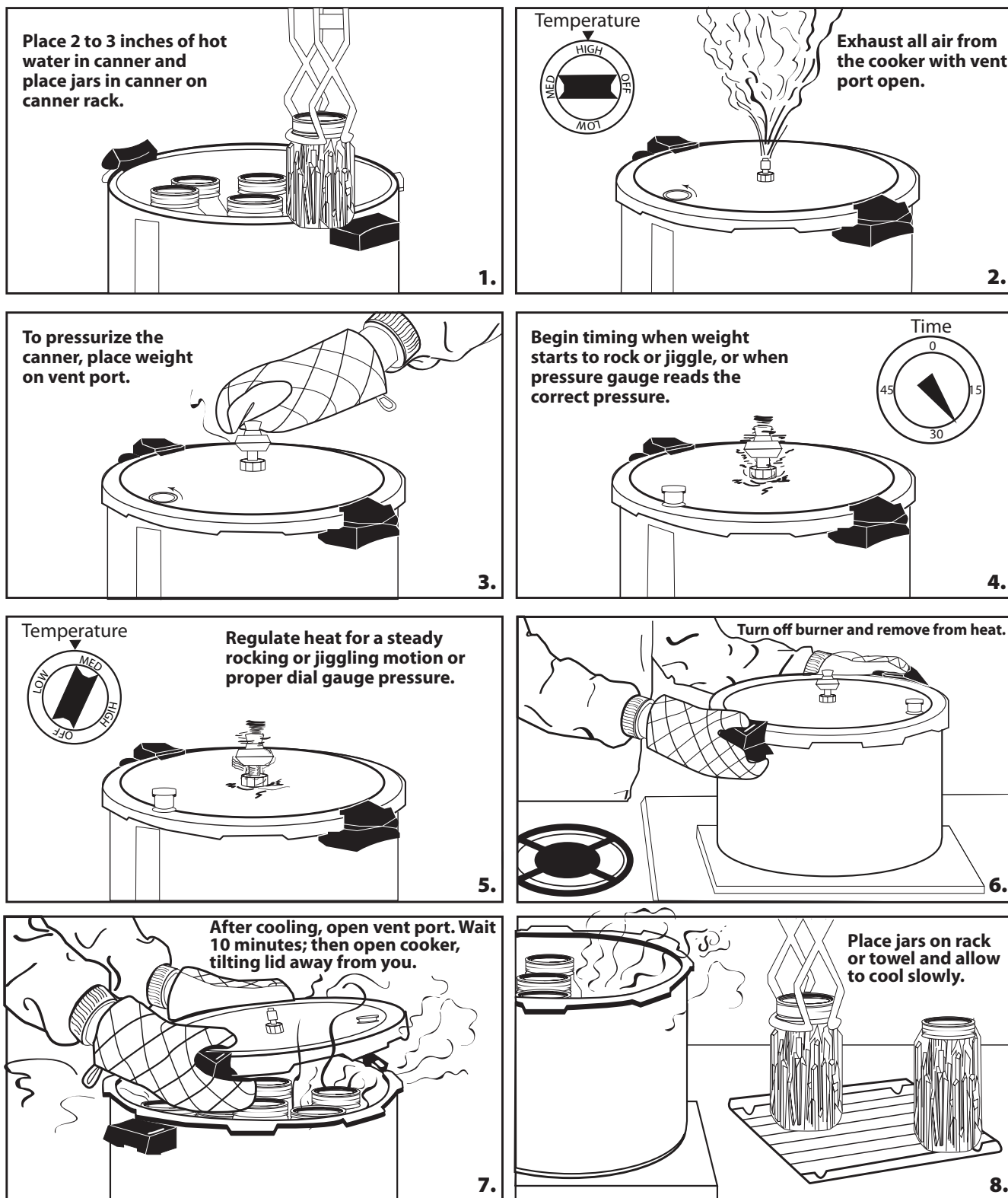
**4. Assemble lid and screw band finger tight.**



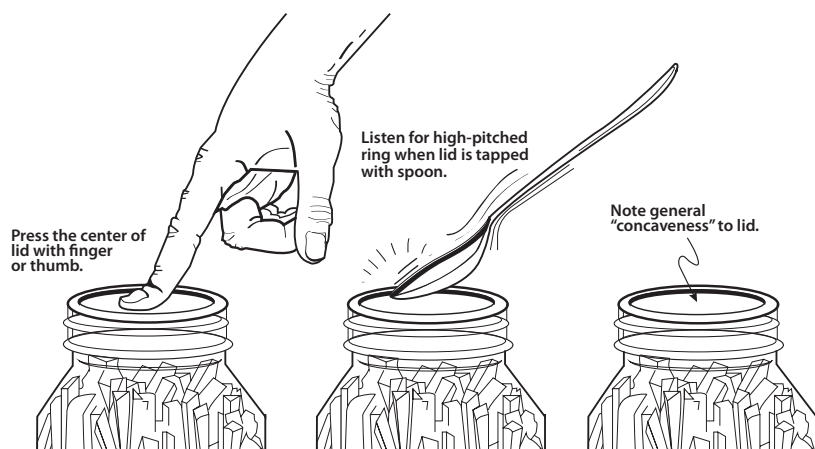
**5. Remove screw band for reuse after processing and jar has cooled.**

*Figure 1.* Procedure for filling canning jars before processing (illustration adapted from USDA, 2009, for New Mexico State University by Susan B. Portillo).





*Figure 2.* Procedure for processing canning jars using a pressure canner (illustration adapted from USDA, 2009, for New Mexico State University by Susan B. Portillo).



**Figure 3. Procedure for testing jar seals after processing (illustration adapted from USDA, 2009, for New Mexico State University by Susan B. Portillo).**

**Option 2.** Tap the lid with the bottom of a teaspoon. If it makes a dull sound, the lid is not sealed. If food is in contact with the underside of the lid, it will also cause a dull sound. If the jar is sealed correctly, it will make a ringing, high-pitched sound.

**Option 3.** Hold the jar at eye level and look across the lid. The lid should be concave (curved down slightly in the center). If center of the lid is either flat or bulging, it may not be sealed.” (p. I-25, USDA [2009]) See Figure 3 illustrating these steps for testing jar seals.

### Reprocessing Unsealed Jars

Remove lids from unsealed jars and discard. Check the sealing surface of the jar for tiny nicks or cracks. If a jar has defects, discard it and replace it with another jar. If not, add a new lid and process for the same amount of time within 24 hours. Unsealed jars can be kept in the refrigerator and the food can be used within 3 to 4 days, or remove about an inch of the contents and freeze.

### Storing Canned Food

Clean the outside of sealed, cooled jars with a damp towel dipped in a vinegar and water solution. Replace screw bands once they are completely dry, otherwise the bands will rust onto the lid and damage the lid and seal. Label with date and contents, including ingredients, and store in a cool (50–70°F), dark, dry place away from sun, light, or dampness. Tomato products are best if eaten within one year.

### Accidental Freezing

Freezing may cause food in jars to spoil if the seal is broken. Freezing and thawing can cause food to soften and lose eating quality. Protect jars from freezing by wrapping them with layers of newspapers.

### If Canned Food Spoils

Examine jars carefully before consuming. Check lids for a vacuum seal. **NEVER** taste food from an unsealed jar. Signs of food spoilage are streaks and dried food at the top of the jar, swollen lids, broken jar seals, rising air bubbles, and any unnatural color. Other indicators include bad or unnatural odor; spurting liquid; white, blue, green, or black mold; or foaming.

Dispose of any food you suspect of being spoiled. For safety, spoiled canned

food and containers may need to be detoxified before disposal. Contact your county Extension office (<http://aces.nmsu.edu/county>) for detoxification instructions.

### Elevation Adjustments

All communities in New Mexico are above sea level, varying from 3,000 to 10,000 feet in elevation, with differences even within a county.

Use Table 3 to determine the elevation of your community, and then select safe processing times for canning your vegetables. The boiling temperature of liquids is lower at higher elevations, and therefore food must be processed longer or at a higher pressure at high elevations. See Table 4 for pressure adjustments for different elevations.

### Reference

U.S. Department of Agriculture. 2009. *Complete guide to home canning* [Online]. Available at [http://nchfp.uga.edu/publications/publications\\_usda.html](http://nchfp.uga.edu/publications/publications_usda.html)

Table 3. Elevations of Cities and Towns in New Mexico			
City/Town	Elevation (ft)	City/Town	Elevation (ft)
Alamogordo	4,350	Las Vegas	6,450
Albuquerque	5,000	Logan	3,830
Artesia	3,350	Lordsburg	4,250
Aztec	5,650	Los Alamos	7,400
Bayard	5,800	Los Ranchos de Albuquerque	4,950
Belen	4,800	Lovington	3,900
Bernalillo	5,050	Magdalena	6,556
Bosque Farms	4,864	Melrose	4,599
Carlsbad	3,100	Mora	7,200
Carrizozo	5,450	Mosquero	5,550
Chama	7,900	Mountainair	6,500
Cimarron	6,450	Portales	4,010
Clayton	5,050	Raton	6,650
Cloudcroft	8,650	Reserve	5,749
Clovis	4,300	Rio Rancho	5,290
Columbus	4,020	Roswell	3,600
Corona	6,664	Roy	5,900
Corrales	5,005	Ruidoso	7,000
Cuba	7,000	San Jon	4,200
Deming	4,300	Santa Fe	7,000
Dexter	3,500	Santa Rita	6,300
Eagle Nest	8,250	Santa Rosa	4,600
Elida	4,345	Silver City	5,900
Española	5,600	Socorro	4,600
Estancia	6,100	Springer	5,800
Farmington	5,400	Taos	7,000
Fort Sumner	4,050	Texico	4,150
Gallup	6,500	Tierra Amarilla	7,460
Grants	6,450	Truth or Consequences	4,250
Hobbs	3,650	Tucumcari	4,100
Hurley	5,700	Tularosa	4,500
Jemez Springs	6,200	Vaughn	5,950
Las Cruces	3,900	Wagon Mound	6,200

Table 4. Elevation Adjustments for Pressure Canning	
Elevation	Pounds of Pressure
2,001–4,000 ft	12
4,001–6,000 ft	13
6,001–8,000 ft	14
8,001–10,000 ft	15

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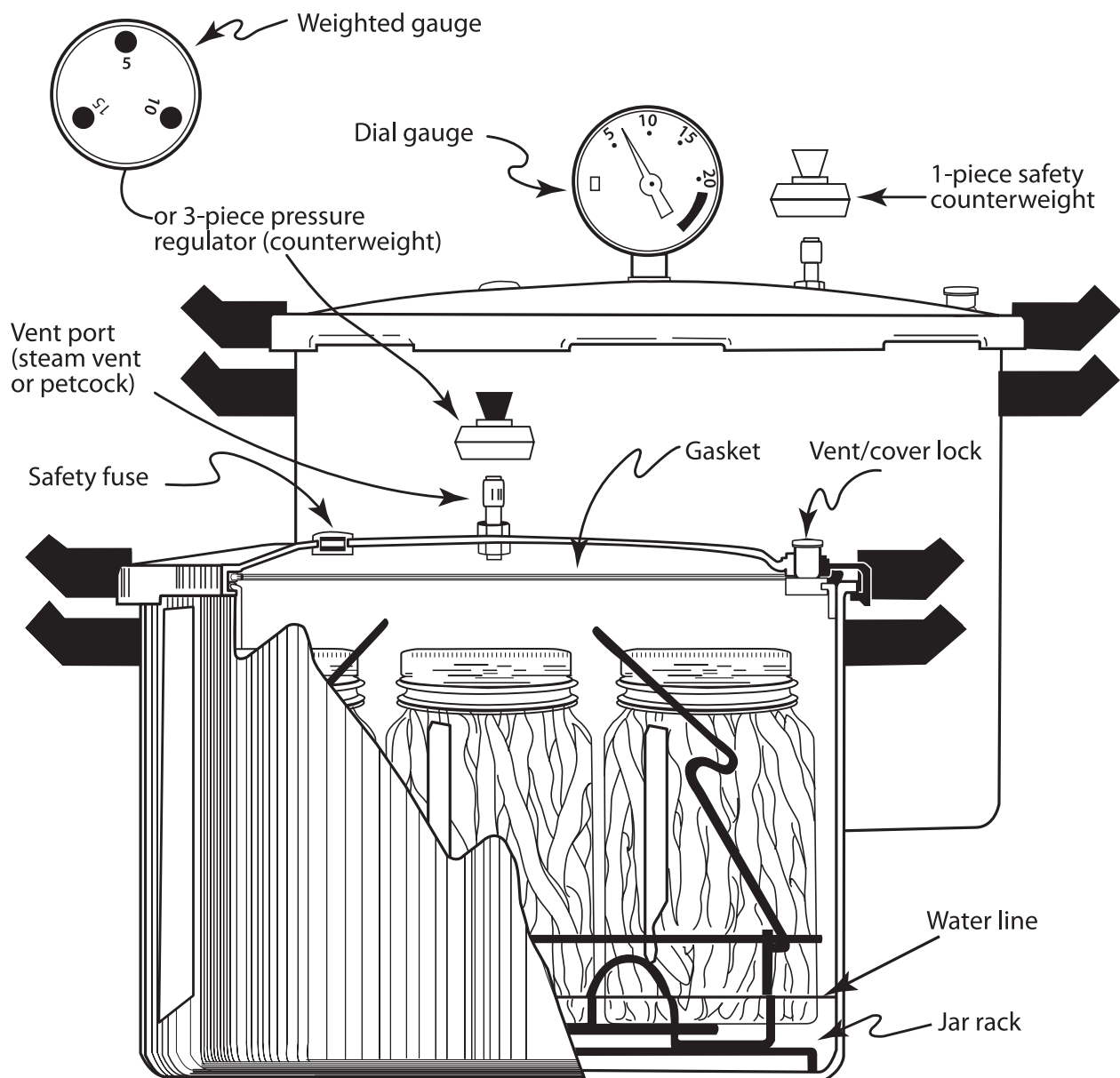
## Home Canning of Vegetables

**Note:** The following instructions are for dial-gauge pressure canners. See Table 5 for general canning procedures for different vegetables. When using a pressure canner with a weighted gauge, use the 15-pound weight and the time periods given. See Figure 4 illustrating parts of a pressure canner.

Table 5. General Canning Procedures for Different Vegetables				
Vegetable	Pack	Directions	Jar size	Processing time (minutes)
Asparagus	Hot	Wash, trim off scales, snap off tough stems then wash again. Leave whole or cut into 1-inch pieces.  Cover asparagus with boiling water. Boil 2 to 3 minutes. Fill jar loosely with hot asparagus, leaving a 1-inch headspace. Add boiling water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	30
			Quart	40
	Raw	Fill jar with raw asparagus. Pack tightly without crushing. Add boiling water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Same	
Beans or peas (dry)	Hot	Sort dried beans or peas. Wash, place in a large pot, and cover with water. Boil 2 minutes, remove from heat, and allow to soak for 1 hour. Drain. Cover soaked beans with fresh water and boil 30 minutes. Fill jars with beans or peas. Add cooking water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	75
			Quart	90
Beans (fresh green, Italian, snap, or wax)	Hot	Wash beans and trim ends. Leave whole or cut into 1-inch pieces. Cover with boiling water. Boil 5 minutes. Fill jars loosely with beans. Add cooking water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	20
			Quart	25
	Raw	Fill jars tightly with raw beans, leaving a 1-inch headspace. Add boiling water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Same	
Beets (whole, cubed, or sliced)	Hot	Trim off tops, leaving 1 inch of stems and roots to reduce bleeding. Scrub well. Cover with boiling water and boil until skins slip off (15 to 25 minutes, depending on size). Cool. Remove skins and trim off stems and roots. Leave baby beets whole. Cut medium or large beets into 1/2-inch cubes or slices. Fill jars with hot beets and fresh hot water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	30
			Quart	35
Carrots (sliced or diced)	Hot	Wash, peel, and rewash carrots. Slice or dice. Cover with boiling water. Bring to boil and simmer 5 minutes. Fill jars with carrots, leaving a 1-inch headspace. Add boiling water or cooking liquid, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	25
			Quart	30
	Raw	Fill jars tightly with raw carrots, leaving a 1-inch headspace. Add hot water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Same	
Corn (cream style)	Hot	Select slightly immature ears of corn. Shuck, remove silk, and wash ears. Blanch ears for 4 minutes in boiling water. Cut corn from cob at about the center of kernel. Scrape ears with knife and add scrapings to kernels. Add 2 cups of water for each 4 cups of corn scrapings and heat to boiling. Fill only pints jars. Leave a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	55
Corn (whole kernel)	Hot	Select slightly immature ears of sweet corn. Too immature corn tends to become brown. Shuck, remove silk, and wash ears. Blanch ears for 3 minutes in boiling water. Cut corn from cob at about three-fourths of kernel depth. Add 1 cup of water for each 4 cups of kernels and heat to boiling. Simmer 5 minutes. Fill jars with corn and cooking liquid, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Quart	85
Lima beans (fresh)	Hot	Shell beans and wash thoroughly. Cover beans with boiling water and return to boil. Fill jars loosely. Add boiling water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	40
			Quart	50
	Raw	Fill jars loosely with raw beans and add boiling water to cover. Do not press or shake down. Leave 1-inch headspace for pints and 1 1/2-inch for quarts. Add salt if desired. Adjust lids and process.	Same	



Table 5. General Canning Procedures for Different Vegetables				
Vegetable	Pack	Directions	Jar size	Processing time (minutes)
Mushrooms	Hot	Select domestic small- to medium-sized mushrooms with bright color, short stems, and unopened caps. Trim stems. Soak in cold water 10 minutes to remove dirt, then wash in clean water. Leave small mushrooms whole, but cut large ones. Cover with water in a saucepan and boil 5 minutes. Fill jars with hot mushrooms and add fresh hot water, leaving a 1-inch headspace. Add 1/8 teaspoon ascorbic acid powder for better color. Adjust lids and process. <b>CAUTION:</b> Do not can wild mushrooms.	1/2 pint*	45
			Pint*	45
Okra	Hot	Select young, tender pods. Discard any pods with rust spots. Wash and trim pods. Cut into 1-inch pieces or leave whole. Cover with hot water, boil 2 minutes, and drain. Fill jars loosely with hot okra and cooking liquid, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	25
			Quart	40
Peas (shelled, green, English)	Hot	Select pods filled with young, tender, sweet seeds. Shell and wash peas. Cover with boiling water. Bring to boil and boil 2 minutes. Fill jars loosely with hot peas. Add cooking liquid, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process. <b>NOTE:</b> Snow, sugar, and snap peas are not recommended because they can poorly.	Pint	40
			Quart	40
	Raw	Fill jars loosely with raw peas and add boiling water, leaving a 1-inch headspace. Do not pack, shake, or press down. Add salt if desired. Adjust lids and process.	Same	
Peppers (hot or sweet, including green chiles)	Hot	Select firm peppers. Wash, dry, and pierce each pepper. Peppers must be blanched in boiling water or blistered in an oven or broiler. Allow peppers to cool. Peel. Remove stems, cores, and seeds. Quarter large peppers. Small peppers can be flattened and left whole. Fill jars loosely with peppers. Add boiling water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process. <b>CAUTION:</b> Hot peppers may irritate hands. Use plastic gloves or avoid flesh of peppers. Keep hands away from eyes, face, and small children.	1/2 pint*	35
			Pint*	35
Potatoes (white)	Hot	Select potatoes. (May become discolored if stored below 45°F.) Wash, peel, and cut into 1- to 2-inch cubes. Place in ascorbic acid solution. Drain. Boil 2 minutes if cubed, 10 minutes if whole. Discard water. Fill jars with hot potatoes and fresh water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	35
			Quart	40
Pumpkin or winter squash	Hot	Select hard-rind pumpkins or squash. Stringless and small are better. Wash, remove seeds, peel, and cut into 1-inch cubes. Cover with water and boil 2 minutes. Fill jars with cubes and cooking liquid, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process. <b>CAUTION:</b> Do not purée or mash.	Pint	55
			Quart	90
Spinach or other greens	Hot	Can only freshly harvested, tender, evenly colored greens that are free of disease or insect damage. Cut away tough stems and midribs and wash small amounts at a time. Lift from water and repeat until water is clear and free of grit. Steam about 1 pound of spinach at a time in a blancher basket or cheesecloth bag for 3–5 minutes or until wilted. Loosely fill jars with hot spinach and cover with fresh boiling water, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	70
			Quart	90
Sweet potatoes (cubed)	Hot	Select small- or medium-sized sweet potatoes that are mature but not fibrous. Can them within 2 months of harvest. Wash potatoes, then boil 15–20 minutes. Remove skins. Cut into 1- to 2-inch chunks. Fill jars loosely with potatoes. Add boiling water, leaving a 1-inch headspace. Adjust lids and process. <b>CAUTION:</b> Do not dry pack, mash, or purée.	Pint	65
			Quart	90
Vegetables (mixed)	Hot	Combine 6 cups each of sliced carrots, whole kernel corn, cut green beans, and shelled lima beans, and 4 cups each of chopped tomatoes and cubed or sliced zucchini. Wash and prepare vegetables as described elsewhere in this publication. Combine all vegetables in a large pot. Add water to cover and boil 5 minutes. Fill jars with hot vegetables and liquid, leaving a 1-inch headspace. Add salt if desired. Adjust lids and process.	Pint	75
			Quart	90
*Fill only pint jars, not quarts.				



**Figure 4.** Parts of a pressure canner (illustration adapted from USDA, 2009, for New Mexico State University by Susan B. Portillo).



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