DEPARTMENT OF HEALTH AND HUMAN SERVICES Food and Drug Administration	Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d)
	Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d); Food Process Filing for Acidified Method (Form Method (Form FDA 2541f); and Food Process Filing for Low-Acid Aseptic Systems (Form FDA 2541g).
USE FDA INSTRUCTIONS ENTITLED "Instructions for Paper Submi	ssion of Form FDA 2541d (Food Process Filing for Low-Acid Retorted Method)"
FDA USE ONLY Date Received by FDA:// (MM/D	 D/YYYY)
Food Canning Establishment (FCE) Number <i>(Enter number assigned l</i>	by FDA) Submission Identifier (SID) (YYYY-MM-DD/SSS)
A. Product Information	A.1 (Food Product Group) (Continued)
Note: Section A.1 (Food Product Group) requests optional inform	nation.
1. (Optional) Select one Food Product Group. If there is no single bes Group that applies, select Other.	
Aquaculture Seafood (e.g., farming of aquatic organisms including fish crustaceans, etc.)	<ul> <li>mollusks,</li> <li>Gravies/Sauces (spaghetti sauce, mushroom gravy)</li> <li>Imitation Dairy (includes soy-based products)</li> </ul>
<ul> <li>Baby Food (infant/junior foods including infant formula)</li> <li>Bakery Products (canned brown bread, bakery glazes)</li> </ul>	Imitation/Pit/Mixed/Subtropical Fruit         Imitation/Pit/Mixed/Subtropical Fruit
Beans, Corn, or Peas	Imitation/Pit/Mixed/Subtropical Fruit as a Jam, Jelly, Preserve, Drink, Syrup, Topping
Berry/Citrus/Core Fruit Berry/Citrus/Core Fruit Berry/Citrus/Core Fruit Berry/Citrus/Core Fruit as a Jam, Jelly, Preserve, Drink, Syrup, Top	Leafy/Stem Vegetables         Leafy/Stem Vegetable         Leafy/Stem Vegetable as a Juice or Drink (e.g., spinach juice, etc.)
Beverage Base Breakfast Foods (liquid form – ready-to-eat, su	Meal Replacement/Medical Foods (e.g., supplemental liquid nutrition, etc.)
<ul> <li>Cheese (does not include soy cheese or imitation dairy)</li> <li>Cocoa</li> <li>Coffee/Teas (excluding herbal and botanical teas)</li> <li>Crustacean (e.g., crab, shrimp, lobster, etc.)</li> <li>Dairy (milk-based</li> <li>Dietary Supplement and/or herbal and botanical teas</li> </ul>	Mixed Vegetables         I)       Mixed Vegetables (e.g., carrots and peas, etc.)         I)       Mixed Vegetables as a Juice or Drink (e.g., carrot and green bean juice, etc.)
Dressings/Condiments (e.g., salad dressing, chutney, salsa, pepper sa	auce, etc.)       Multiple Food (one container with a separate compartment for each product item (e.g., lasagna dinner, chop suey dinner, etc.)         Noodle/Pasta       Nut Spread and Nut Topping       Other Vegetables         Pet Food (e.g., dog/cat food, etc.)
<ul> <li>Fruit as a Vegetable</li> <li>Fruit as a Vegetable (e.g., eggplant, pumpkin, etc.)</li> <li>Fruit as a Vegetable Juice or Drink (e.g., eggplant juice, pumpkin juice)</li> </ul>	Rice, Wheat, Oat or Grain (liquid form – ready-to-eat such as grits)

Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d)	
A.1 (Food Product Group) (Continued) Root and Tuber Vegetables Root/Tuber Vegetables (e.g., carrots, leeks, potatoes, etc.) Root/Tuber Vegetables as a Juice or Drink (e.g., carrot juice, etc.)	C. Container Type (Select one) Note: If the product is not packaged in one of the container types identified below, select Other.
	<ol> <li>Aluminum/Tinplate/Steel Can</li> <li>What is the shape of the container? (Select one)</li> </ol>
Shelled Egg Shellfish (e.g., clams, mussels, oysters, etc.) Soup	Cylindrical Oval Rectangular
Sweet Goods/Dessert (liquid form – ready-to-eat, such as pudding)	□ Irregular (Attach a picture or schematic. Provide name or a brief description of
Vegetable Protein Products (e.g., imitation meat analog)	attachment below.)
Vine/Other Fruit	
Vine/Other Fruit	Other (Attach a picture or schematic. Provide name or a brief description of
Vine/Other Fruit as a Jam, Jelly, Preserve, Drink, Syrup, Topping	attachment below.)
Wine Cooler	
Other (Specify below)	<ul> <li>b) How many pieces are used to construct the container? (Select one or more choices, as applicable)</li> </ul>
	i. 2-pieces – Do you use perforated divider plates? Yes No
2. Enter Product Name (e.g., beans, green; mushrooms (button); tuna (light); sardines (sild))	ii. 3-pieces – Do you use perforated divider plates? Yes No
	How is the side seam sealed? (Select one)
	Cemented Velded
	c) Is the container a low-profile container?
3. What is the form of the product? (Select all that are applicable)	Yes (If yes, answer either question c.i or c.ii.) No (If no, continue to Section D.)
Chunks (e.g., chunks, nuggets, etc.) Cut Diced Filet French cut	i. Heat penetration test was conducted with nested containers. (Attach study and
Liquid (i.e., all liquid no solids) On the Cob Paste/Puree Pieces	picture or diagram. Provide name or a brief description of attachment below.)
Round/Spheres     Shredded/Julienne     Sliced (e.g., slices, quarters, strips, etc.)     Speare/Stalka	
Spears/Stalks Whole Other (Enter product form)	ii.  Nesting of containers prevented by: (Select one)
	Brick Stacked Lid to Lid/Bottom to Bottom Perforated Divider Plates
	Racks Spiral
4. What is the packing medium? (Select all that are applicable)	2. Ceramic/Glass
Brine Cream/Sauce/Gravy Oil Solid (no packing medium)	a) What is the shape of the container? (Select one)
Syrup Water None	Cylindrical Rectangular
Other (Enter packing medium)	Irregular (Attach a picture or schematic. Provide name or a brief description of attachment below.)
Continue to Section B.	
B. Governing Regulation (Refer to the precursor questions in the instructions)	Other (Attach a picture or schematic. Provide name or a brief description of attachment below.)
X Low-acid (21 CFR 108.35 and 21 CFR Part 113)	b) Do you use perforated divider plates?  Yes No
Continue to Section C.	(Continue next page – Glass/Ceramic)

Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d)	
C. Container Type: 2. Ceramic/Glass (Continued)	C. Container Type: 4. Retortable Paperboard Carton (Continued)
<ul> <li>c) Is overpressure used during the processing of the product to maintain container integrity?</li> <li>Yes (Continue to c.i) No (Continue to c.ii-c.iv)</li> <li>i. What is the total overpressure used during processing? (enter in pounds per square inch gauge (psig)) (Continue to Section D)</li> <li>ii. What is the percent (%) headspace?</li> <li>iii. What is the minimum initial temperature? (enter in Fahrenheit)</li> <li>iv. What is the vacuum? (enter in inches of mercury (Hg))</li> </ul>	<ul> <li>b) Is the container physically restricted during the processing of the product to control container thickness?</li> <li>Yes (Continue to b.i) No (Continue to c)</li> <li>i. Racks</li> <li>Other (Attach a picture. Provide name or a brief description of attachment below.)</li> </ul>
3. Flexible Pouch	c) Is overpressure used during the processing of the product to control container thickness?
a) What is the shape of the container? <b>(Select one)</b>	Yes (Continue to c.i) No (Continue to d)
<ul> <li>Flat pouch Gable top Gable top/side gusseted Gusseted</li> <li>Irregular (Attach a picture or schematic. Provide name or a brief description of attachment below)</li> </ul>	<ul> <li>What is the total overpressure used during processing? (enter in pounds per square inch gauge (psig))</li> </ul>
attachment below.)	d) What is the maximum thickness during retort processing? (enter in inches)
Other (Attach a picture or schematic. Provide name or a brief description of attachment below.)	e) What is the maximum residual air? (enter in cubic centimeters)
<ul> <li>b) Is the container physically restricted during the processing of the product to control container thickness?</li> <li>Yes (Continue to b.i)</li> <li>No (Continue to c)</li> <li>Racks</li> <li>Other (Attach a picture. Provide name or a brief description of attachment below.)</li> </ul>	<ul> <li>a) What is the shape of the container? (Select one)</li> <li>Bowl Cylindrical Oval Rectangular Tray</li> <li>Irregular (Attach a picture or schematic. Provide name or a brief description of attachment below.)</li> </ul>
c) Is overpressure used during the processing of the product to control container thickness?	Other (Attach a picture or schematic. Provide name or a brief description of attachment below.)
Yes (Continue to c.i) No (Continue to d)	b) Is this a compartmentalized container? ( <b>Select one)</b>
<ul> <li>What is the total overpressure used during processing? (enter in pounds per square inch gauge (psig))</li> </ul>	Yes How many compartments? _ No
d) What is the maximum thickness during retort processing? (enter in inches)	c) What is the predominant material used to make the body of the container? (Select one)
e) What is the maximum residual air? (enter in cubic centimeters) 🗌 Not Applicable	<ul> <li>HDPE (high-density polyethylene)</li> <li>HDPP (high-density polypropylene)</li> <li>Paperboard</li> <li>PET (polyethylene teraphthalate)</li> </ul>
4. 🗌 Retortable Paperboard Carton	Other (Enter material)
a) What is the shape of the container? <b>(Select one)</b> Rectangular	
Other (Attach a picture or schematic. Provide name or a brief description of attachment below.)	(Continue next page – Semi Rigid)

Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d)	
C. Container Type: 5. Semi Rigid (Continued)	C. Container Type: 6. Other (Continued)
d) What is the predominant material used to make the lid of the container? (Select one)	b) Specify the material that, based on weight, is the predominant material used to make the
Aluminum/Steel HDPE (high-density polyethylene)	container stock. This is the material that constitutes the highest weight value of the container stock.
HDPP (high-density polypropylene)	
PET (polyethylene teraphthalate)	c) Specify the material that, based on weight, is the predominant material used to make the
Not Applicable	lid stock. This is the material that constitutes the highest weight value of the lid stock. If the container does not have a lid, specify Not Applicable.
Other (Enter material)	
	<ul> <li>d) Specify the method used to seal the lid to the body of the container. If the container does not have a lid, specify Not Applicable.</li> </ul>
e) How is the lid sealed to the body of the container? (Select one)	
Double Seam Heat Seal Induction Weld Press Twist	Continue to Section D.
Snap On Threaded Closure Ultrasonic Seal	Continue to Section D.
Not Applicable	D. Container Size
Other (Enter seal type)	<i>Note:</i> Section D.1 (dimensions) is required information. However, section D.2 (net weight) is optional information.
f) Is the container physically restricted during the processing of the product to control	1. Dimensions:
container thickness?	a) Diameter Height (Use for cylindrical shapes) (see accompanying
Yes (Continue to f.i) No (Continue to g)	instructions for proper coding)
i. 🔲 Racks	b) Length Width Height/Thickness (Use for container shapes other than cylindrical) (see accompanying instructions for proper coding)
Other (Attach a picture. Provide name or a brief description of attachment below.)	2. Net Weight (Optional): (enter in ounces)
	Continue to Section E.
g) Is overpressure used during the processing of the product to control container thickness?	C. Duccessing Methods The mails Duccessed New Acceptic System
Yes (Continue to g.i) No (Continue to h)	E. Processing Method: Thermally Processed Non-Aseptic System
<ul> <li>What is the total overpressure used during processing? (enter in pounds per square inch gauge (psig))</li> </ul>	1. What is the finished equilibrium pH of the product after processing?      2. Heating Medium ( <i>Select one</i> )
h) What is the maximum thickness during retort processing? (enter in inches)	a) High pressure assisted Microwave Ohmic (electrodes) Steam
i) What is the maximum residual air? (enter in cubic centimeters) 🗌 Not Applicable	Steam-air (Attach a heat distribution study. Provide name or a brief description of attachment below.)
6. Other (Enter container type)	
	Water cascade Water immersion Water spray
a) Attach schematic or picture of container. ( <i>Provide name or a brief description of attachment below.</i> )	☐ Other (Enter heating medium)

Continue to Section F.

Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d)						
F. Process Mode	G. Process System Critical Factors (Continued)					
1. Mode (Select One). Only 1 Process Mode, either Agitating or Still, should be selected.	3. Is the product vacuum packed?  Ves No					
a) Agitating <b>(Select one)</b> i.	<ol> <li>What is the container position in retort? (Select one) (Under Section F.1 when Agitating is selected, skip this question.)</li> </ol>					
Batch Continuous	Brick Stacked Horizontal Jumbled/Random					
ii.   End over End (Only batch)	Lid Down Lid Up Vertical					
iii. Oscillation (Only batch) <b>(Select one)</b>	When heating medium of high pressure assisted, microwave, ohmic, or steam is selected in Section E, skip G.5 and G.6.					
b) Still <i>(Select one)</i> i.  Horizontal	5. Minimum Come-Up-Time: (enter in minutes) ( <i>Attach a temperature distribution study. Provide name or a brief description of attachment below.</i> )					
ii. 🗌 Vertical	When heating medium of steam-air is selected in Section E, skip G.6					
<ul> <li>2. Cooker: What type of cooker do you use? (Select one)</li> <li>a) Crateless: Bottom Surface (Select one)</li> </ul>	6. Minimum Water Flow Rate: (enter using gallons per minute (gpm))					
<ul> <li>Solid Perforated</li> <li>Hydrolock</li> </ul>	Not Applicable (Attach an explanation. Provide name or a brief description of attachment below.)					
<ul> <li>c) Hydrostatic</li> <li>d) Retort</li> </ul>	Continue to Section H.					
e)  Rotomatic/Rotary f)  Sterilmatic	H. Product Critical Factors: (Complete all product critical factor questions as delineated by process authority to assure commercial sterility.)					
g) Other (Enter cooker type)	1. Does the product contain particulates? Yes ( <i>Continue to a</i> ) No ( <i>Continue to H.2</i> )					
(For Other cooker type choice, attach documentation. Provide name or a brief description of attachment below.)	<ul> <li>a) Is controlling the particulate size a critical factor?</li> <li>Yes (Continue to b-d)</li> <li>No (Continue to H.2)</li> </ul>					
	b) What is the shape and dimension of the particulate size to be controlled? If more than one, list all that apply.					
Continue to Section G.						
G. Process System Critical Factors	c) Does your product contain fines? Yes (Continue to c.i) No (Continue to d)					
1. What is the filling method(s) used to fill the product into the container? (Select all that apply)	i. What is the maximum percent?					
🗌 Hand filling 🔄 Piston filling 🔄 Pocket filler	d) Is full rehydration of the particulate a critical factor?					
Vibrating/Tumble filling Volumetric filling	2. Does the product contain any dry ingredients?					
2. How many phases are used to fill the container with the product? (Select one)	$\square$ Yes (Continue to a) $\square$ No (Continue to H.3)					
Single Phase Two Phase Three Phase (Continue to a)	a) What is the minimum % moisture of the hydrated dry ingredients before					
a) Enter the number of ounces added in each Phase. Phase 1: Phase 2: Phase 3:	processing?					

Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d)	
H. Product Critical Factors (Continued)	H. Product Critical Factors (Continued)
<ul> <li>3. How are pieces arranged in the container? (Select one)</li> <li>Head to Tail Heads/Tips Down Heads/Tips Up Horizontal</li> <li>Layered Vertical</li> <li>Not Applicable</li> <li>Other (Enter arrangement of pieces)</li> </ul>	<ul> <li>8. Are other binders added?  Yes (Continue to a-b)  No (Continue to H.9)</li> <li>a) What is the maximum % binder added?</li> <li>b) What is the type of binder added?</li> <li>9. Does syrup strength affect the heat penetration during processing of the product?</li> </ul>
For Other arrangement of pieces choice, attach documentation. Provide name or a brief description of attachment below.)	<ul> <li>Yes (Continue to a) No (Continue to Section I)</li> <li>a) What is the brix measurement?</li> </ul>
4. Does the % total solids affect the heating of the product during processing?	Continue to Section I.
<ul> <li>Yes (Continue to a)</li> <li>No (Continue to H.5)</li> <li>a) What is the % total solids?</li> </ul>	I. Process Source (Complete the questions below) *Note: If you selected "Still" as the mode in Section F.1, and "Steam" as the heating medium in Section E.1, you may select "Unknown" or "Locally Made" for sterilizer if applicable
<ul> <li>5. Is the finished equilibrium pH of the product after processing (identified in Section E) critical to the process?</li> <li>Yes No</li> </ul>	sterilizer if applicable.         1. Process Source         a) What is the Process Source?
6. Does consistency/viscosity affect the heating of the product?	
<ul> <li>Yes (Continue to a-c) No (Continue to H.7)</li> <li>a) What instrument is used to measure the consistency/viscosity?</li> </ul>	(Attach support documentation. Provide name or a brief description of attachment below.)
b) What is the temperature when you measure the consistency/viscosity? (enter in Fahrenheit)	b) What is the date of the Process Source Document (mm/dd/yyyy)? _ / _ / /
c) What is the consistency/viscosity?	2. What is the Manufacturer's Name and the Sterilizer Model?
What is the unit of measure? <i>(Select one)</i> <ul> <li>Centipoise</li> <li>Other <i>(Enter units of measure)</i></li> </ul>	*Unknown/Locally Made (Attach pictures and documentation. Provide name or a brief description of attachment below.)
7. Is starch added to maintain consistency/viscosity of the product?	Continue to Section J.
Yes (Continue to a-b) No (Continue to H.8)	
<ul> <li>a) What is the maximum % starch added?</li> <li>b) What type of starch is added?</li> </ul>	

## J. Scheduled Process: (Do not write in shaded areas -- Check appropriate box under column heading, when applicable, and enter numerical values on dashed lines.)

In the section below, please do NOT enter decimal points. They are already on the form. No blank spaces are allowed, therefore, enter leading zeros, where necessary.

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9					Col. 10	Col. 11	Col. 12	Col. 13	
Process No	Step	Minimum Initial Temp.	Process Time	Process Temp.	Fo (F18/250)	Thruput (Containers per Minute)	Headspace	a. Reel Speed	b. Reel Diameter	c. Steps per Turn of Reel	d. Chain/ Conveyer Speed	e. Cooker Capacity	f. Frequency Strokes per Minute	Maximum Fill Weight	Minimum Free Liq. at Closing	Minimum Container Closing Machine Gauge Vacuum	Other
							☐ Net ☐ Gross ☐ NA				Feet Carriers Flights (per minute)			□ NA		Temp. (+/- 3° F) 	
Number	Number	°Fahrenheit	Minutes	°Fahrenheit	Minutes	Number	Inches	RPM	Inches	Number	Number	Number	Number	Ounces	Ounces	In. Hg.	
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Food Process Filing for Low-Acid Retorted Method (Form FDA 2541d)									
K. Additional Information (Optional)									
Heat Penetration Data (optional) :									
Enter applicable values: 1. j value 2. fh value 3. f2 value 4. jc value 5. fc v	/alue 6. x (X <sub>bh</sub> ) value								
Heat Penetration Study (Attach document. Provide name or a brief description of attachment below.)									
Temperature Distribution Study (Attach document. Provide name or a brief description of attachment below.)									
Other (Attach document. Provide name or a brief description of attachment below.)									

Comments:

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Full Name (Please Type or Print)			Signature				
Establishment Name	State or Province		Country (other than U.S.)	Date	Telephone No.		

## LACF Contact Information

For more information, contact the LACF Registration Coordinator by e-mail at LACF@FDA.HHS.GOV or phone: 240-402-2411.

For paper submissions, send completed forms to:

Food and Drug Administration LACF Registration Coordinator (HFS-303) Center for Food Safety and Applied Nutrition 5001 Campus Drive College Park, MD 20740-3835

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