SPECIFICATION #1: Frozen Meat Ingredients

Table 2.10.1.2 Frozen Meat Handling Process Control Points

Subsystem	PCP	Target (range)	Effect of Deviation
Truck receiving	Temperature	-20°C to -18°C Temperature must not exceed -15°C during unloading	• **Too Low**: Risk of damage to grinding equipment • **Too High**: Loss of ingredient shelf life
	Time	Meats must not exceed their shelf life prior to unloading	• ingredient spoilage • microbial food safety risk
• All animal protein slurries and frozen blocks should be visually inspected prior to unloading. - Meats must have no smell or aroma of spoilage. - Meats must have no visible appearance of red or green dies or kerosene. • For frozen meat quality specifications, reference ingredient specifications in Q&FS Ingredient Specification Database			
Frozen storage	Temperature	-20°C to -18°C	• **Too High:** Thawing Loss of ingredient shelf life
	Time	Est. < 12 months (non-fish / shrimp) Est. < 6 months (fish & shrimp) Reference ingredient specifications in Q&FS Database for specific shelf life information Reference Wet Global Quality Standard for specific on-site storage / handling requirements	• ingredient spoilage • microbial food safety risk
Refrigerated storage / Tempering	Temperature	**Target**: -10°C to -8°C (at 5cm inside of block)	• **Too Low**: Potential inclusion of ice crystals into mixer • **Too High**: Loss of ingredient shelf life Microbial food safety risk
Grinding	time on line (grind to retort)	**3 hours**: Evaluate **4 hours**: Scrap	• loss of ingredient shelf life • microbial food safety risk • incorrect product texture
	grinder plate	3/8"	
Transport	time on line	4 hours from grinding to retort	• loss of ingredient shelf life • microbial food safety risk
• In order to prevent ground meat from re-freezing into blocks, the depth of frozen meats on conveyor belts should not exceed 18"			

SPECIFICATION #2 – Fresh Meat Ingredients

Table 2.10.2.1 Fresh Meat Handling Overview

Subprocess	Inputs		Outputs		Description
	Raw Materials	From other unit ops	To other unit ops	By products	
Tank truck receiving	Pumpable meat	Offsite processing	Holding tanks	none	Pumpable meat is received in tank trucks
Holding tanks	Pumpable meat	Tank truck receiving	Fresh meat transport	none	Pumpable meat is held at refrigeration temperature in vertical holding tanks
Fresh meat transport	Pumpable meat	Holding tanks	Oven mixers	none	Pumpable meat is pumped to mixing

Table 2.10.2.2 Fresh Meat Handling Process Control Points

Subsystem	PCP	Target (range)	Effect of Deviation
Tank truck	Temperature	0 - 5°C	• loss of ingredient shelf life • microbial food safety risk
	Time	Shelf life of meat should not exceed 24 hours before delivery (at 4°C)	• loss of ingredient shelf life • microbial food safety risk
• Sample ports must be available at the pumpable meat unloading area - Meats must have no smell or aroma of spoilage. - Meats must contain no visible denaturants including charcoal or carbon black. - Meats must have no visible appearance of red or green dies or kerosene. • Unloading pipelines should be flushed & cleaned prior to unloading pumpable meat slurries to prevent cross contamination. • Safety algorithms or positive mechanical pressure relief devices must be in place to prevent the pressure in the pumpable meat slurry unloading lines from exceeding the limiting design pressure of the pump and the unloading lines. • For fresh meat quality specifications, see ingredient specifications in Q&FS Ingredient Specification Database			
Storage tanks	Temperature	0°C to 5°C	• loss of ingredient shelf life • microbial food safety risk
	Storage time	Storage time must not exceed 4 days after preparation at the	• ingredient spoilage
• Control systems must be in place to monitor storage time and control usage of the meats • Pumpable meat slurry tanks must be designed to allow adequate flow to the delivery pumps and to prevent stagnation points at the bottom of the tank. • Auger pumps must be used at the bottom of animal protein slurry storage and delivery tanks to allow flow of highly viscous animal protein slurries. If an auger pump is not used, alternate means of avoiding pump cavitation must be implemented. • There must be sampling ports immediately downstream of the pumpable meat slurry storage tanks or in the tanks themselves. The system must have the capability of removing unacceptable meat loads. • Pumpable meat slurry tanks must have a vent to equalize pressures during loading and unloading. The vent must have a grid with openings no larger than 5 mm in size. • Mass flow or first in/first out design should be incorporated where appropriate. The design should minimize the possibility of cross contamination between old and new animal protein slurry loads. • Pumpable meat slurry pumps should have enlarged inlet ports to facilitate the flow of the higher viscosity meat slurries.			
Fresh meat transport	Time on line	< 3 hours at 15-20°C < 2 hours at 20-25°C	• loss of ingredient shelf life
• Lengths of piping outside of refrigerated storage should be minimized and insulated.			

SPECIFICATION #3 – Finished Product

Process	Sub-process	Description	Input		Output	Target Room Env.	PCP	Parameter	Effect of Deviation
			Raws/Material	Source	Destination				
Filling & Sealing (4)									
	Can Filler	Final meat mixture is inserted into empty can via gravity hopper, lid is attached via seamer after can is filled.	Chunks in Gravy Mixture	Mixed Meat transport	Can seamer		N/A	N/A	N/A
			Empty cans, lids Lid	Supplier	Final can		Product temperature	30-35 °C	(-) Initial temperature too low for thermal processing
							Headspace	8-10 mm, Target 9 mm	(-) Buckling (+) Paneling
							Can Weight	Large cans: 376 ± 6 g Jumbo cans: 626 ± 6 g	(-) Poor weight control (+) Pucking
							Empty can vacuum	8-13" Hg at high speed	Paneling or buckling of cans

5 – Filling (Continued)

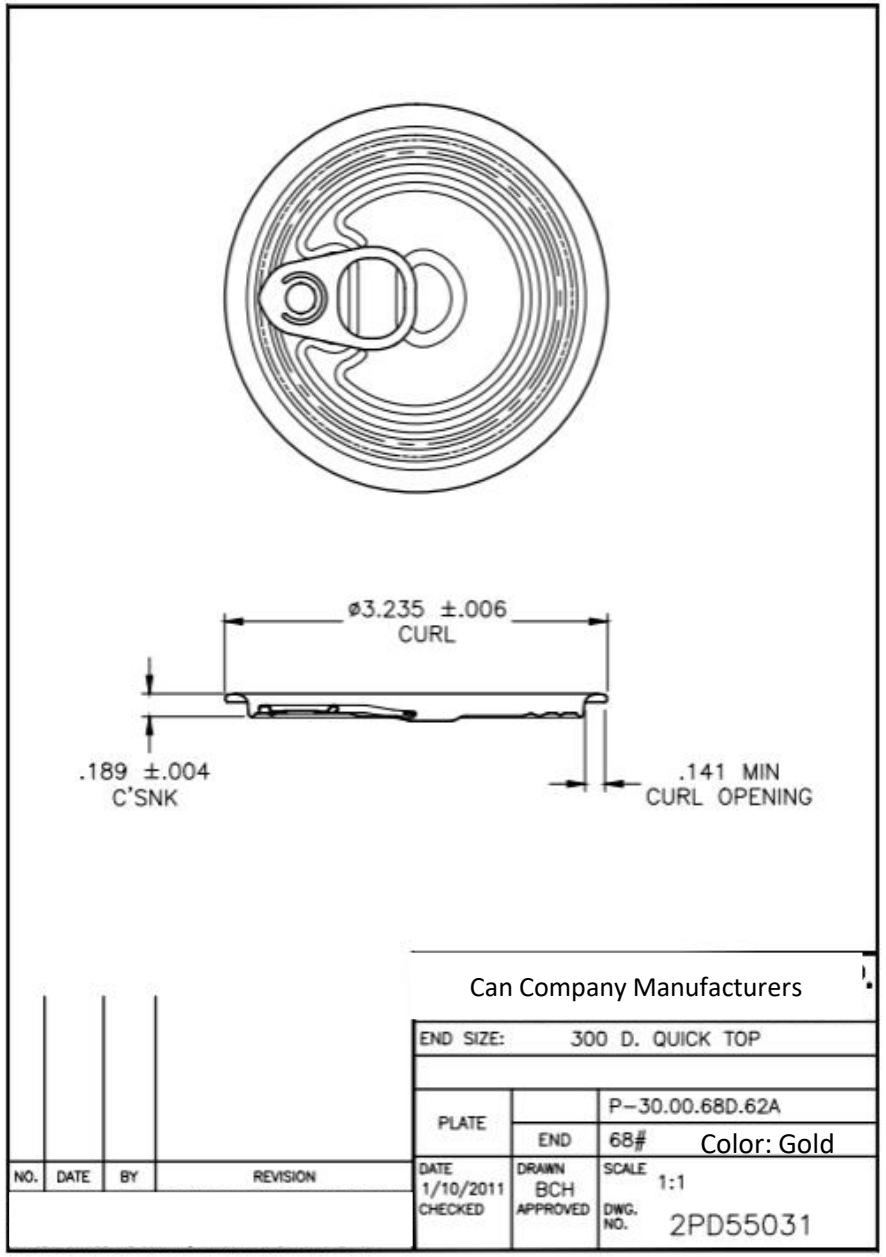
Typical machine run rate is ~900 cans per minute in a two chain hydrostat mode. Equipment efficiencies should be optimized without compromising product quality and system consistency / sustainability. Excessive speeds can cause product splashing.

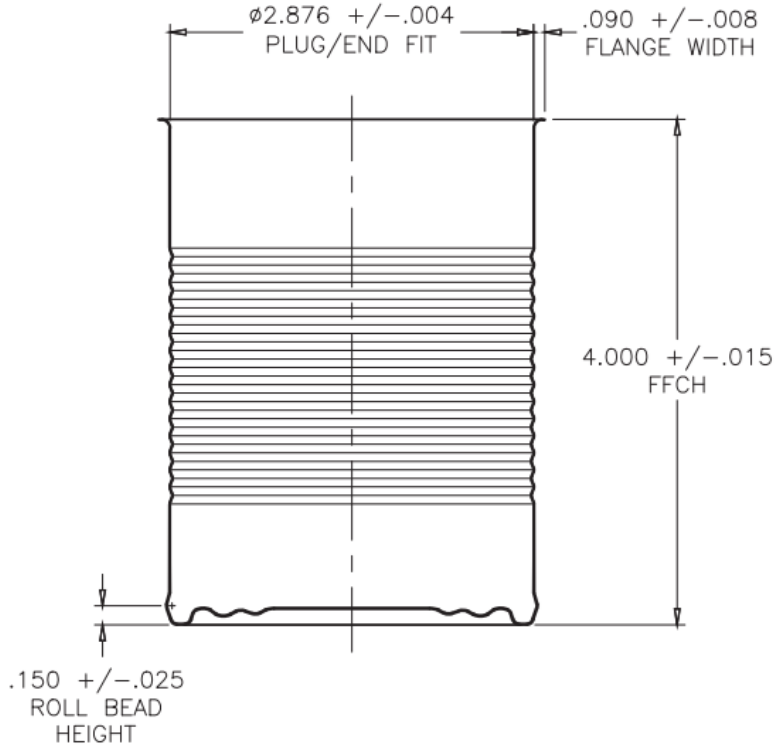
- Check for clean ends on cans. Flange washer can be installed between filler & seamer to clean lip edge prior to seaming.
- Maximum capacity of can filler must not be exceeded (machine specific)
- Maximum capacity of can seamer must not be exceeded (machine specific)
- Can weights should be monitored and maintained at each filler valve
- Can seam integrity should be monitored and maintained at each seamer position
- DSTM (Double Seam Tightness Monitor) is recommended to identify & reject cans with seam issues in process

DATA SET #1

Shift	Product	Time	Sample Number	Weight
1	Meat Chunks & Gravy Large Can	8:30 AM	77	376
1	Meat Chunks & Gravy Large Can	10:30 AM	78	387
1	Meat Chunks & Gravy Large Can	12:30 PM	79	375
2	Meat Chunks & Gravy Jumbo Can	2:30 PM	80	630
2	Meat Chunks & Gravy Jumbo Can	4:30 PM	81	637
2	Meat Chunks & Gravy Jumbo Can	6:30 PM	82	634
3	Meat Chunks & Gravy Jumbo Can	8: 30 PM	83	629

SPECIFICATION #4: Packaging Materials





APPROVED:

SGS_STL 6523848-1

REVISIONS	
1	8/31/21 AS
2	
3	
4	
5	
6	

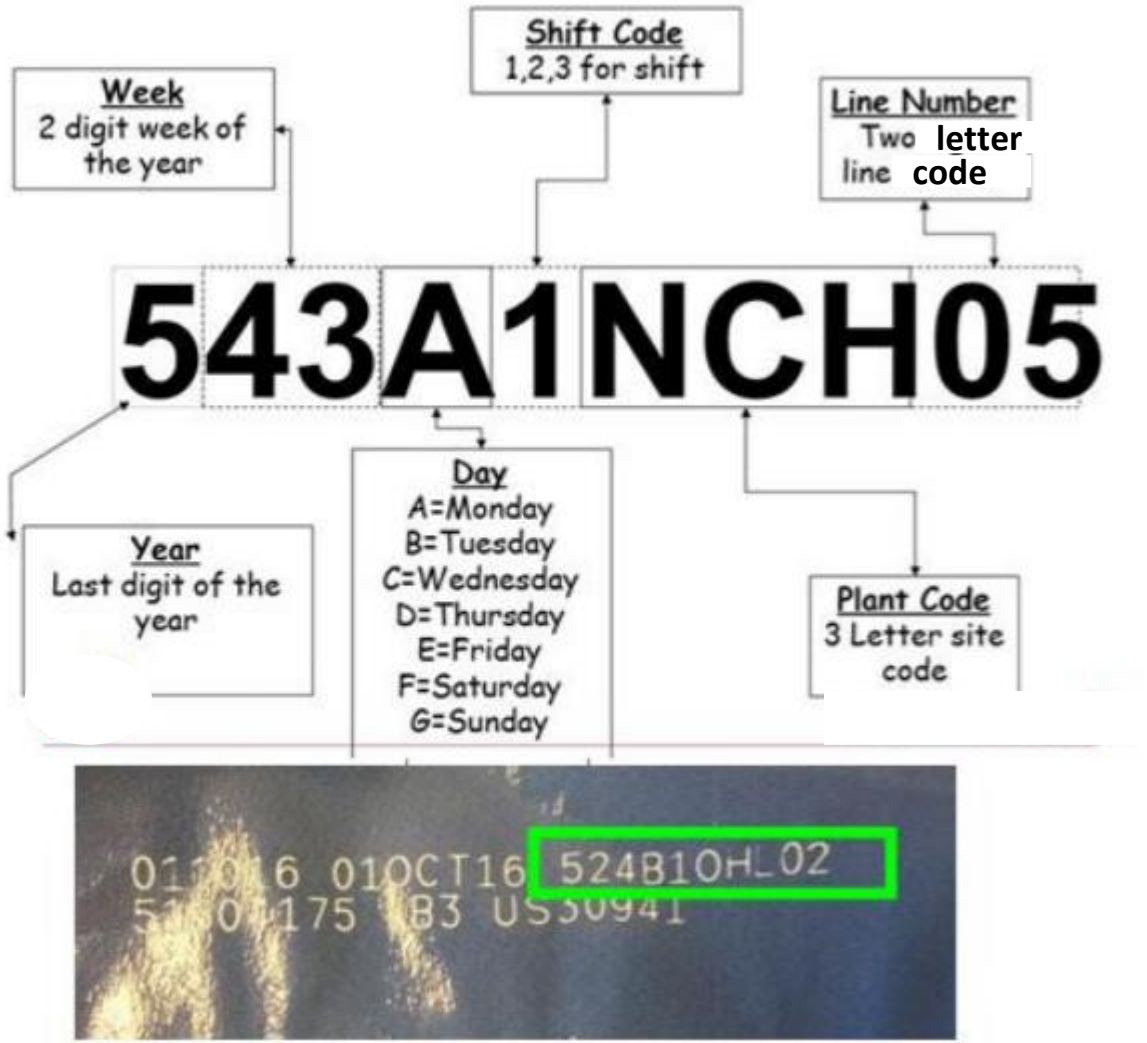
CAD DWG.
NO MANUAL
REVISIONS ALLOWED

SIGNATURES	DATE
DRAWN	
CHECKED	
APPROVED	

TITLE
Can - 300 x 400 Steel 2pc silver

SCALE 1 / 1
SUPERCEDES
DWG. SIZE 100%
DWG./PART No. 101231164206TJ

SPECIFICATION #5 – Date Code Marking



BACKGROUND

In your role as the Process Engineer on the Innovation Launch team for the Shelf to Table Dinner Company, it is your job to ensure that the processing conditions at start-up match the validation conditions from your testing protocol to ensure food safety and product quality.

For this product new product development, you have a combination of both fresh and frozen meat ingredients into your recipe. Based on the provided handling specifications **(SPECIFICATION #1 AND SPECIFICATION #2)** for both types of meat, please answer the following questions.

QUESTION #1

At the start of your shift, you check the production records and discover that a combination of fresh and frozen meat have been left out on the manufacturing line between the grinding operation and the retort operation while the line was not running from 8:00 AM CST to 11:30 AM CST due to mechanical issues on your case packer at the end of the line.

Based on this information, you expect your finished product to have the following implications:

a) Loss of product ingredient shelf life

b) Microbial Food Safety Risk, Incorrect finished product color

c) Incorrect product texture, product refreezing

d) Loss of product ingredient shelf life, microbial food safety risk and incorrect product texture

e) Incorrect finished product color

After discovering the mix of fresh & frozen meat had been left on the line from 8:00 AM to 11:30 AM CST, you begin an investigation as to the cause of your down time and critical actions taken to remedy the situation. Your investigation takes 37 minutes to complete, making the time 12:07 PM CST. The team is ready to start the line again and is looking for direction from you on what to do with the product that has been left out on the line.

Continue to refer to SPECIFICATION #1 AND SPECIFICATION #2

QUESTION #2.

What do you advise the team to action based on the fresh and frozen meat handling instructions in your process specification?

A) Evaluate the product for microbial food safety risk

B) Scrap the materials left on the line

C) Refreeze the materials left on the line to use another day

D) Continue with the products on the line into production without further intervention.

E) Check the finished product color for verification

You are now focused on the filling unit operation and its adherence to the process specification (**SPECIFICATION #3).** Based on the quality check data noted in **DATA SET #1**, please answer the following question.

QUESTION #3:

Based on the data collected on fill weight, which of the following statements is true:

a) 1 sample from every shift was measured as over the specified fill weight limit

b) All samples from Shift 1 were within the fill weight specification

c) All samples from Shift 2 were within the fill weight specification

d) No samples were within the weight tolerance specified

e) Shift 1 and Shift 2 had defects versus the specification but the sample on Shift 3 was within the tolerance for weight.

You are supporting the Packaging R&D function this week for the Shelf to Table Dinner Company. In this function, it is your responsibility to ensure that the packaging materials for this launch are aligned with those specified during your qualification process and visually match the concept your marketing team aligned with the customer.

QUESTION #4:

You have two cans on the table in front of you (**Can A and Can B**). These two samples were provided to you by the operations lead to align which packaging raw materials should be used at start-up. Based on **the Specification #4** in the provided specification set, please choose which response to provide to the Operations Lead.

a) Can A and Can B are identical and the operations team is able to use any of these materials.
b) Can A matches the specifications and those are the materials that should be used for start-up.
c) Can B matches the specifications and those are the materials that should be used for start-up.
d) Neither of these are the correct start-up materials.
e) There is not sufficient information provided to conclude which set of materials should be used in production.

With this new launch, it will be critical for your team to track consumer complaints to understand if there are reoccurring issues that can be attributed to certain production times or production lines. An element to tracking this data is the production information that you've designed to be printed on each can at the end of the line.

QUESTION #5:

Based on **SPECIFICATION #5** and **CAN A** at your stations, which statement not true:

a) This product was produced in 2023.
b) The product was produced on the 15th week of the year
c) This can was produced in the plant that utilizes the site code KKC and production line FC.
d) This product was produced on a Monday.
e) None of these statements are true.