Reduced Oxygen Packaging

Farm to School Food Safety Webinar Series

March 6, 2024

Farm to School Food Safety Webinar Series

March 6, 2-3:30pm - Reduced Oxygen Packaging

April 17, 2-3:30pm - Local Animal Proteins

May 1, 2-3:30pm - Wild Foods & More

MINNESOTA FARM TO SCHOOL LEADERSHIP TEAM

MISA

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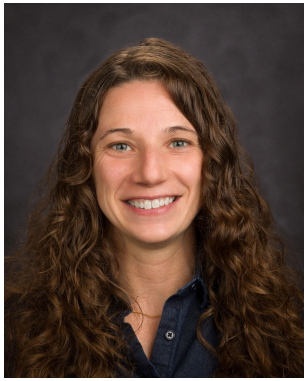
DEPARTMENT OF EDUCATION

DEPARTMENT OF AGRICULTURE

Introductions



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Agenda

- What is reduced oxygen packaging (ROP)?
- Food safety considerations in ROP.
- Minnesota Food Code requirements.
- HACCP plan overview.
- Resources.
- Questions.

Learning objectives

- Understand what reduced oxygen packaging (ROP) methods can be safely used in a foodservice operation.

- Apply this information to planning meetings and conversations in your department or school district.

- Know what resources are available and who to contact for assistance in planning for ROP in your foodservice operation.

Poll

Are you familiar with reduced oxygen packaging?

- Yes, I am a ROP pro in the kitchen.
- Yes, it rings a bell but I have never used it.
- No, ROP what?

What is reduced oxygen packaging (ROP)?

Process of placing food into a package, removing all or the majority of oxygen from inside the package, and hermetically (airtight) sealing the package.

Why?

Extend the quality and shelf life of the food.

Types of ROP

Vacuum packaging

- Food place into appropriate packaging.
- Package placed into chamber.
- Air is removed from inside the package.
- Package is hermetically sealed.

The University of Minnesota Extension, nor the instructor of this webinar, endorse these specific brands. These are only included here as examples of this type of product.

Types of ROP

Cook-chill

- Food is thoroughly cooked to minimum internal temperature.
- Appropriate packaging is filled with the cooked food at a temperature of 135°F or higher.
- Steam forces air out of the package.
- Package is hermetically sealed.
- Food is rapidly cooled.

Types of ROP

Sous vide

- Food is placed into appropriate packaging, air is removed, and hermetically sealed.
- Packaged food placed in water bath to be cooked.
- “Finished” on a hot cooking surface or rapidly cooled.

The University of Minnesota Extension, nor the instructor of this webinar, endorse these specific brands. These are only included here as examples of this type of product.

FYI - other types of ROP

Modified atmosphere packaging (MAP)

- Oxygen is reduced or removed by adding nitrogen and/or carbon dioxide
- Packaging is permeable
- Atmosphere inside package changes with time

Controlled atmosphere packaging (CAP)

- Oxygen is reduced or removed by adding other gases
- Package is impermeable
- Use oxygen scavenging products to capture what is produced

Equipment

Vacuum packaging	Cook-chill	Sous vide
Appropriate bags	Cooking equipment	Appropriate bags
Vacuum chamber/sealer	Pumps or funnels	Vacuum chamber/sealer
	Appropriate bags	Cooking equipment
	Heat bar or vacuum chamber/sealer	
	Rapid cooling equipment	

Equipment

Equipment - Hutchinson School District

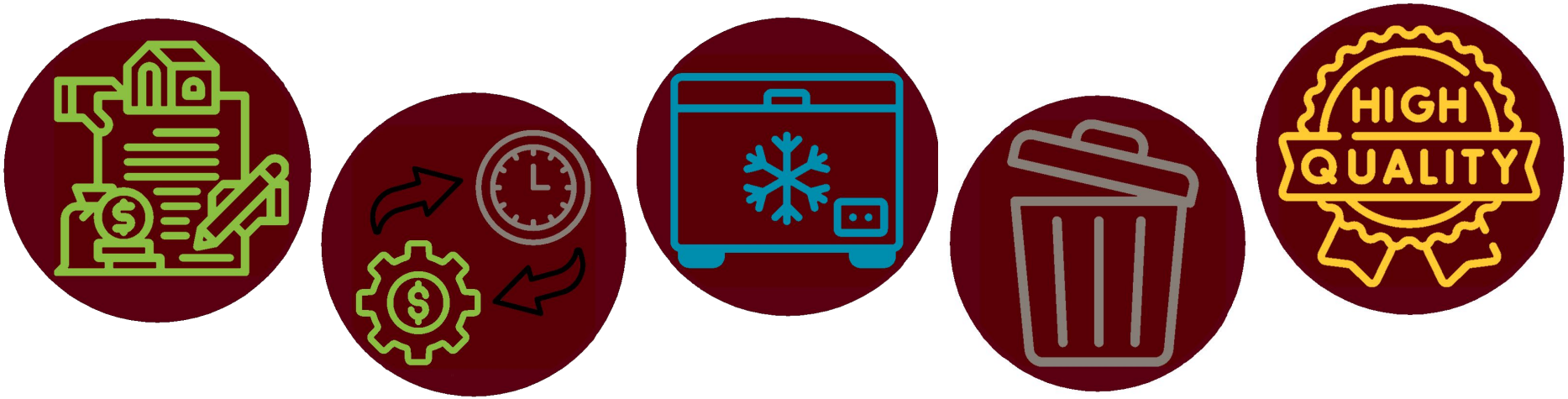
Henkelman POLAR 80

- 15-40 seconds per cycle
- Sealer bar
- Stops vacuum process once liquid detected
- Programmable settings

Equipment - grant opportunities

- Farm to School and Early Care Equipment Grant
- NSLP Equipment Grant (administered by the MDE)
- Statewide Health Improvement Partnership (SHIP) Funds

Benefits of ROP



Benefits - Hutchinson School District

- Provide fresh veggies and meats all year round.
- Prepare and store homemade sauces, soups and gravies that can be made during slow periods and served all year round.
- Improve shelf life.
- Long term financial savings.

Harmful microorganisms

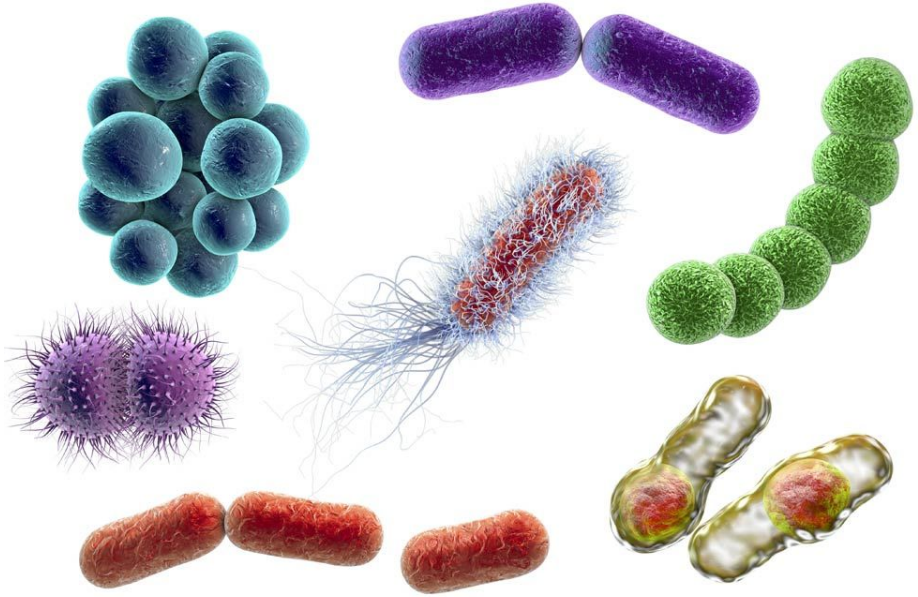
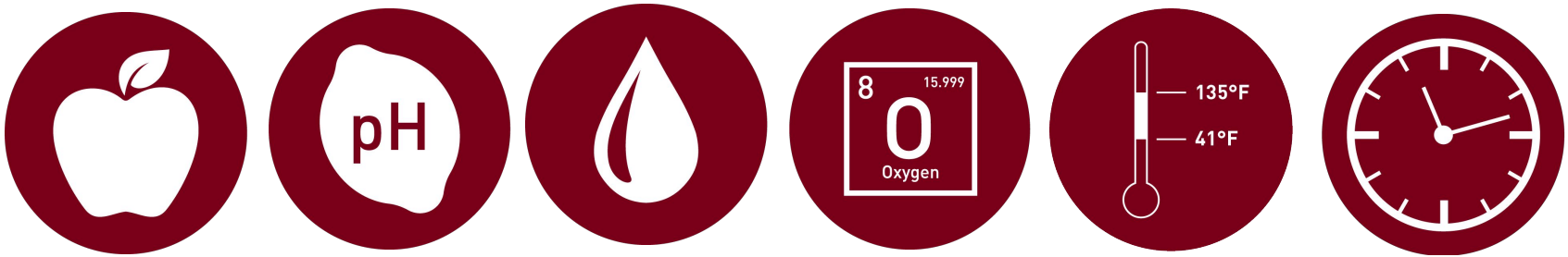


Image credit: Shutterstock

Factors that influence growth

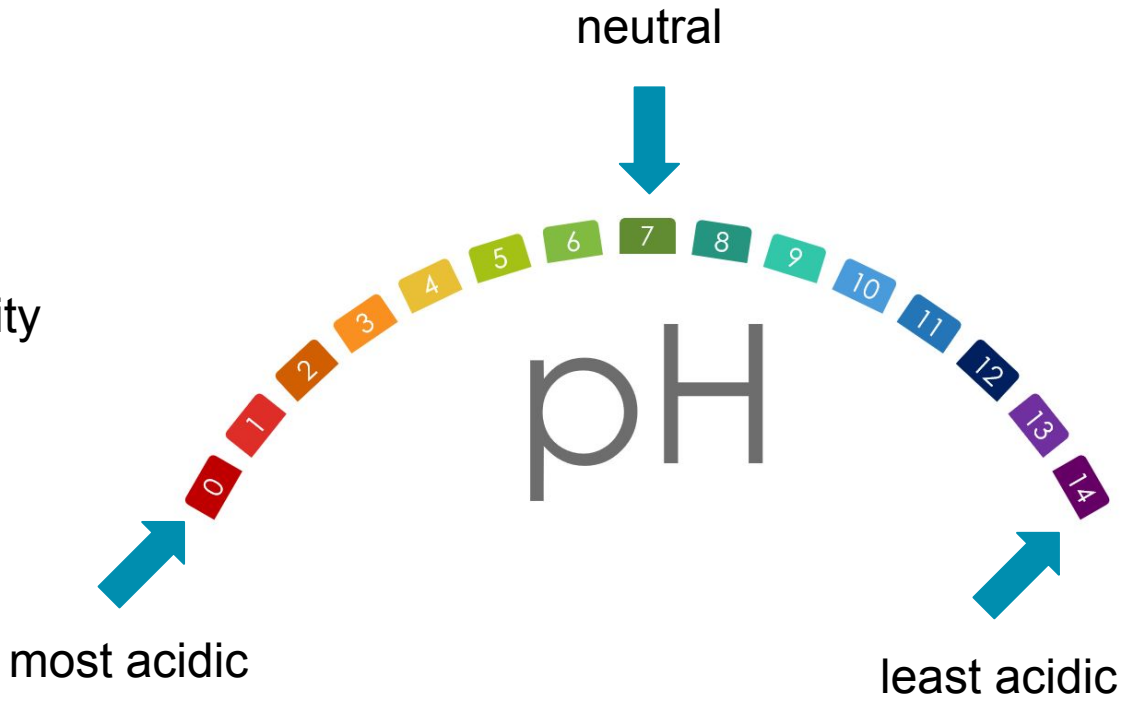


Food

- Bacteria need a food source to get energy to grow and multiply.
- Proteins and carbohydrates (sugars, starches).

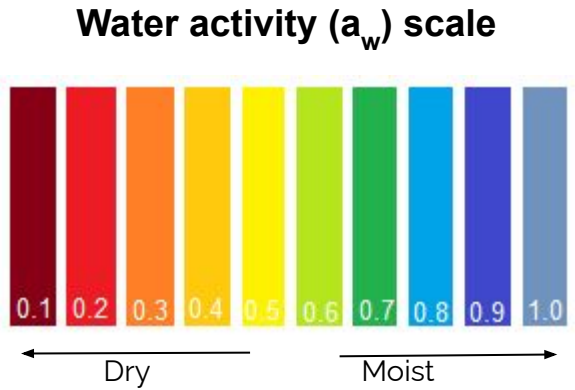
Acidity

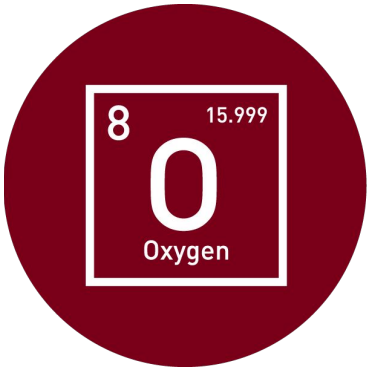
pH: measurement of acidity of a food



Moisture

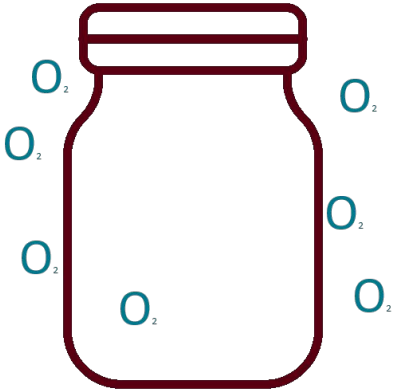
Water activity (a_w): the ability of free water molecules to bind with other molecules



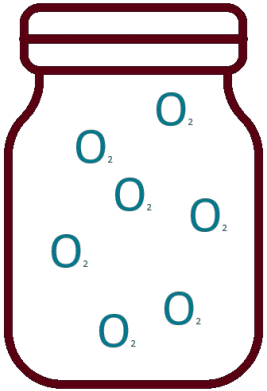


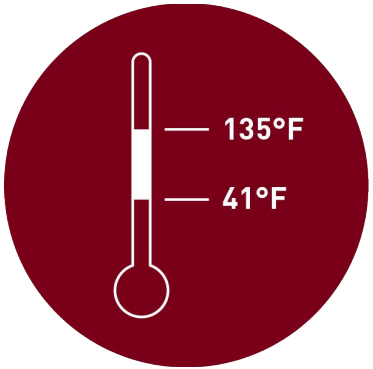
Oxygen

Anaerobic environment



Aerobic environment





Temperature

Temperature Danger Zone: temperature range between 41°F and 135°F that is ideal for pathogen growth

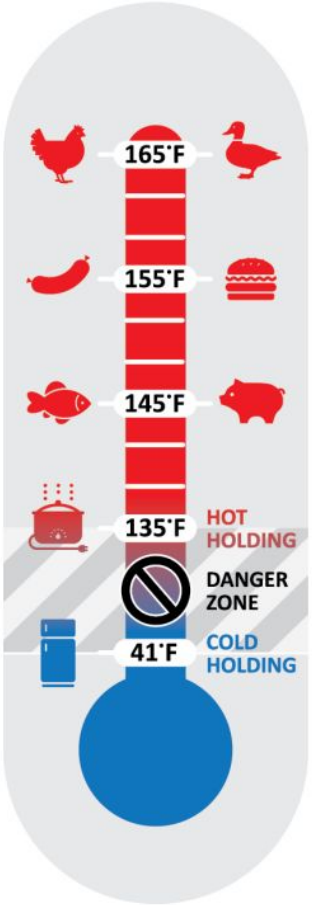
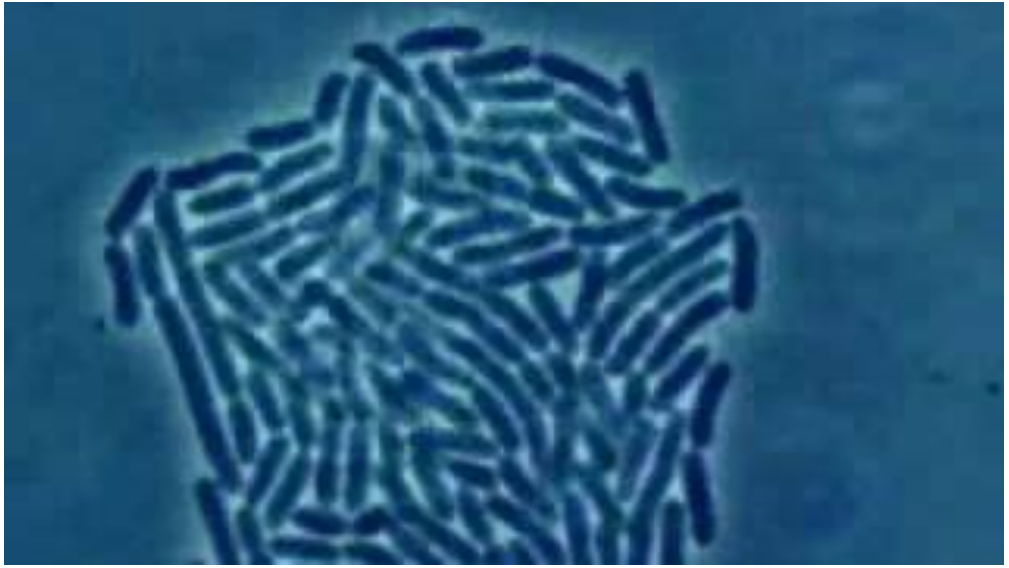


Image credit: Minnesota Department of Health

Time

The number of bacteria can **double** every 20 minutes!



Video credit: Izzo, D. *Bacteria Growth.*

Harmful microorganisms

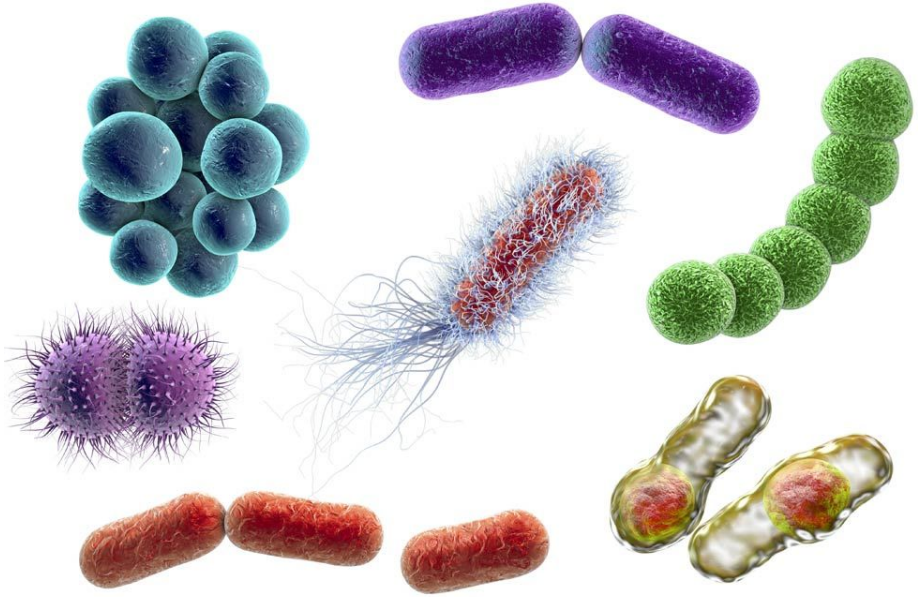
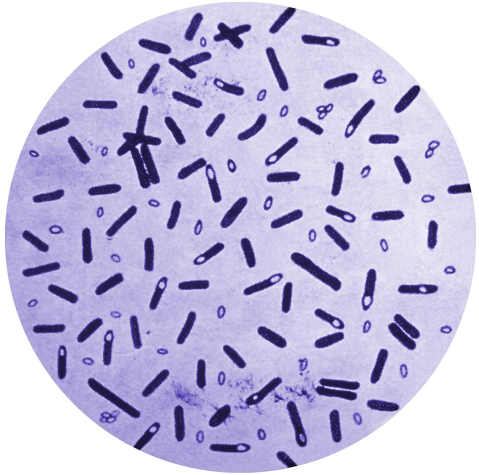


Image credit: Shutterstock

Clostridium botulinum



Illness symptoms:

- Vomiting
- Diarrhea
- Vision problems
- Difficulty swallowing
- Respiratory failure

Onset: 12 - 72 hours after eating food

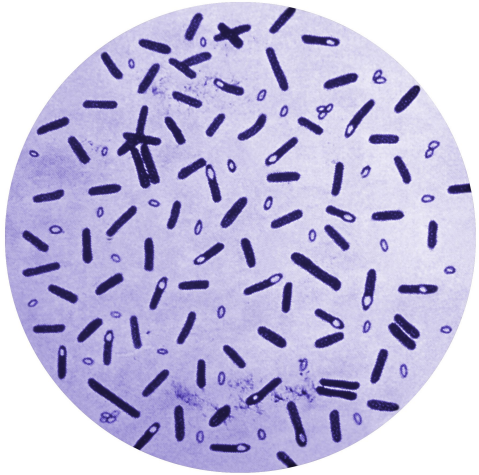
Duration: variable

Associated foods:

- Improperly canned or ROP foods
- Garlic in oil mixtures
- Honey (infants)

Image credit: CDC Public Health Image Library

Clostridium botulinum



Ideal conditions:

- Anaerobic environment
- High moisture
- Low acidity (high pH)
- Time

Control factors:

- Raw foods
- Acidic or low moisture prepared foods
- Refrigeration
- Time

Image credit: CDC Public Health Image Library

Listeria monocytogenes

Illness symptoms:

- Nausea
- Diarrhea
- Fever
- Muscle aches
- Nervous system

Onset: 9 - 48 hours after eating food, sometimes 2-6 weeks later

Duration: variable

Associated foods:

- Unpasteurized (raw) milk
  - Dairy products
  - Cheeses
- RTE foods
  - Deli meats
  - ROP foods

Image credit: CDC Public Health Image Library

Listeria monocytogenes

Ideal conditions:

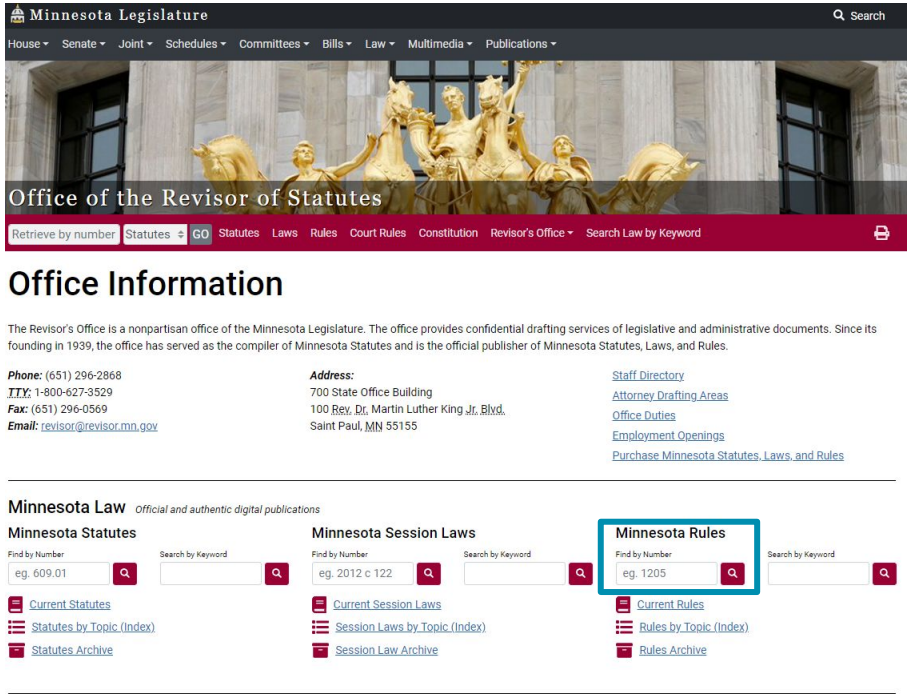
- Aerobic or Anaerobic environment
- High moisture
- Low acidity (high pH)
- Time

Control factors:

- Raw foods
- Acidic or low moisture prepared foods
- Refrigeration
- Time

Image credit: CDC Public Health Image Library

Accessing MN Food code



Website:
https://www.revisor.mn.gov

Search 4626 in the Minnesota Rules field.

Chapter 4626 is the Food Code.

MN Food Code requirements

4626.0415 Specialized processing variance requirements.

A food establishment must obtain a variance from the regulatory authority before:

Food Safety Plan vs. HACCP

Food safety plan
Prerequisite programs (preventative)
SSOPs
Food handling procedures
Illness reporting
Recall plans
Training plans

HACCP
Specific hazards identified for a specific process
Critical limits established for a specific pathogen and/or process
12 steps to developing a plan
7 Principles

MN Food Code requirements

4626.0415 Specialized processing variance requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

MN Food Code requirements

4626.0415 Specialized processing variance requirements

A food establishment must obtain a variance from the regulatory authority before:

D. packaging TCS foods using a reduced oxygen packaging method except where the growth of and toxin formation by *Clostridium botulinum* and the growth of *Listeria monocytogenes* are controlled as specified in part 4626.0420

Rule we will discuss next

MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

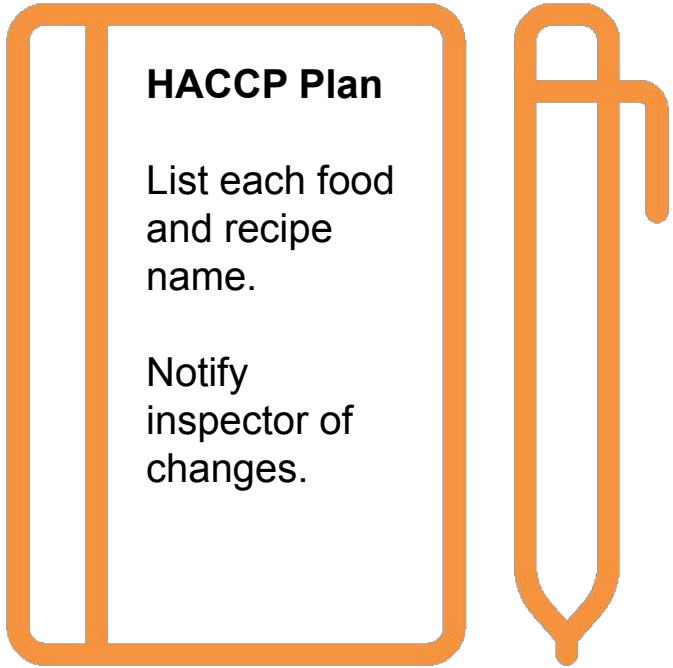
B. [...], a food establishment that packages TCS foods using a reduced oxygen packaging method must have a HACCP plan that contains the information in part 4626.1735 and that:

Contents of a HACCP plan

MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(1) Identifies the food to be packaged.



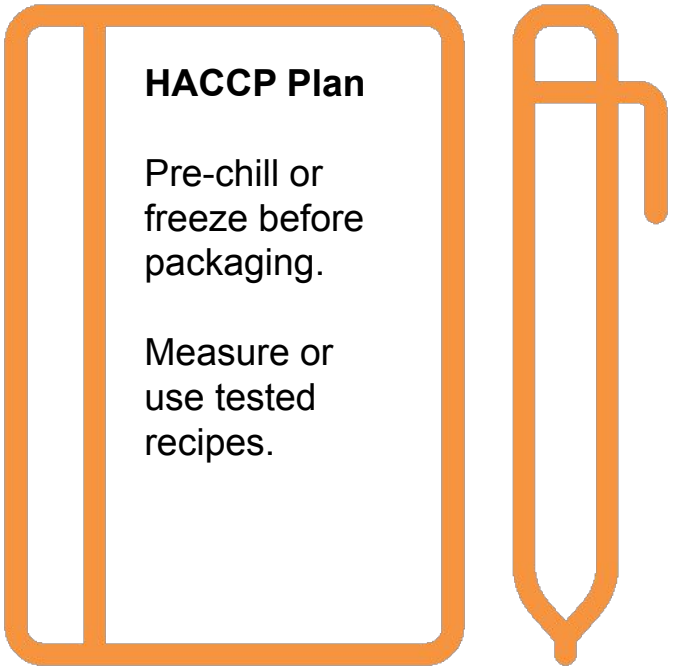
MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) the packaged food must be maintained at 41 degrees Fahrenheit or less and meet at least 1 of the following criteria:

(a) has an a_w of 0.91 or less;

(b) has a pH of 4.6 or less;

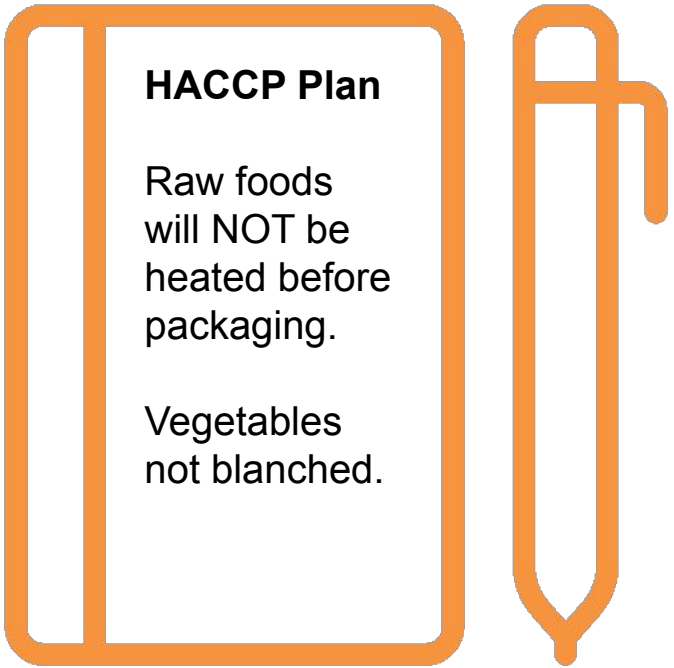


MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(c) is a meat or poultry product cured at a food processing plant regulated by the USDA using substanced specified in CFR [...];

(d) is a food with a high level of competing organisms such as raw meat, raw poultry, or raw vegetables.



MN Food Code requirements

Examples of foods that meet **4626.0420 Reduced oxygen packaging without a variance; criteria**

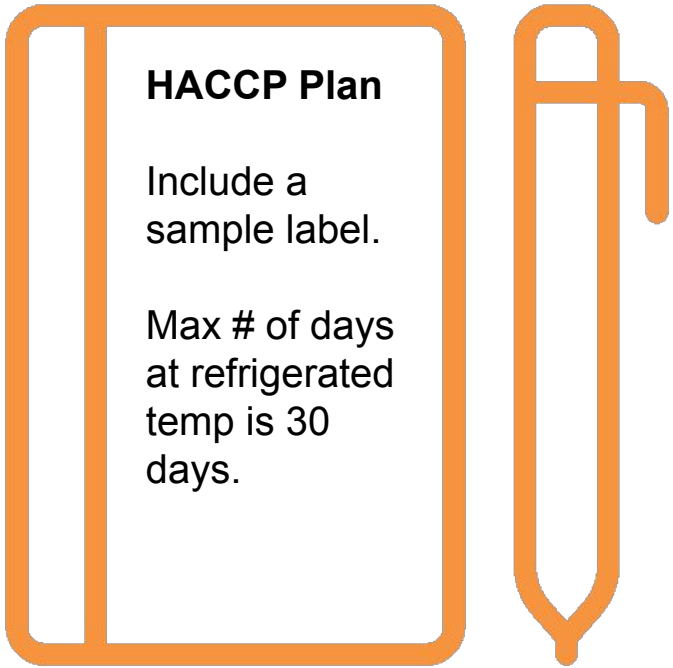
MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(3) Describes how the package must be prominently and conspicuously labeled on the principal display panel in bold type on contrasting background, with instructions to:

(a) Maintain the food at 41 degrees Fahrenheit or below; AND

(b) Discard the food if within 30 calendar days of its packaging it is not served for on-premises consumption [...].



ROP food name:

Date packaged: Initials:

Date frozen: Initials:

Date refrigerated/thaw: Initials:

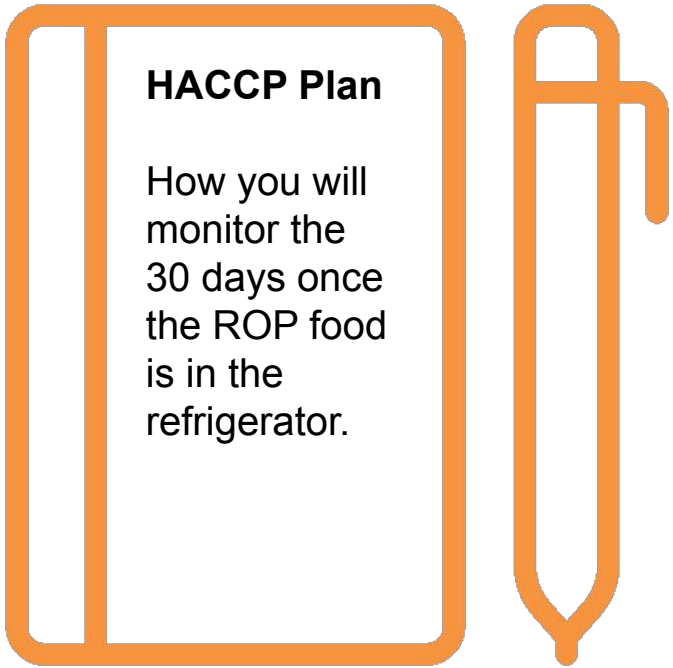
Refrigated use-by date:

Instructions: Immediately after packaging, store food in freezer at ambient temperature 0 to -10F.
Once food is moved to refrigerator, use within 30 days.
Day 1 is date the food is removed from freezer.

MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(4) Limits the refrigerated shelf life to no more than 30 calendar days from packaging to consumption, except the time the product is maintained frozen [...].



MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(5) Includes operational procedures that:

(a) Prohibit contacting ready-to-eat food with bare hands;

Rule 4626.0225

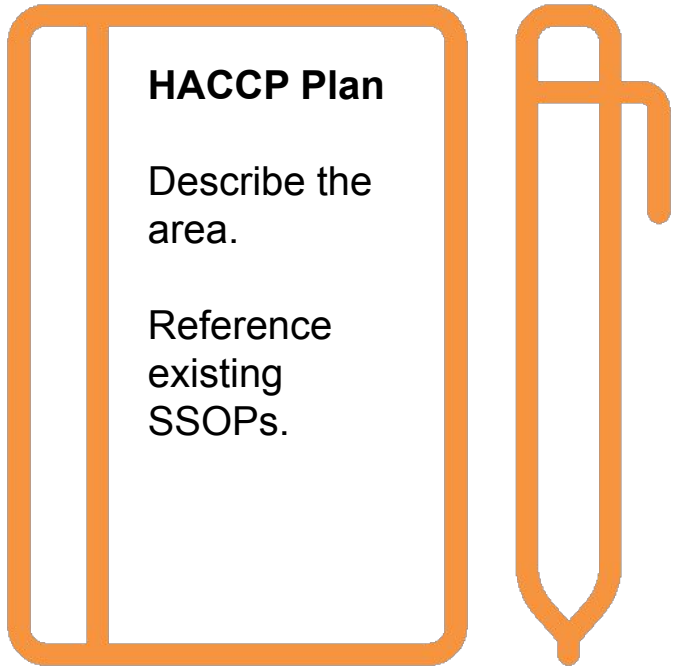
MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(5) Includes operational procedures that:

(b) Identify a designated work area and method by which:

(i) Physical barriers or methods of separation of raw foods and ready-to-eat foods minimize cross-contamination; AND



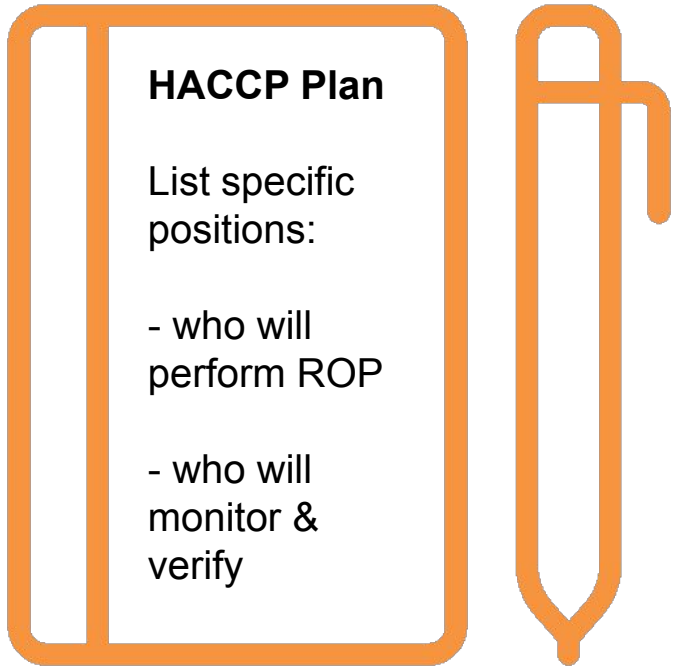
MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(5) Includes operational procedures that:

(b) Identify a designated work area and method by which:

(ii) Access to processing equipment is limited to responsible trained personnel familiar with the potential hazards of the operation;



MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(5) Includes operational procedures that:

(c) Delineate cleaning and sanitizing procedures for food contact surfaces.

MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

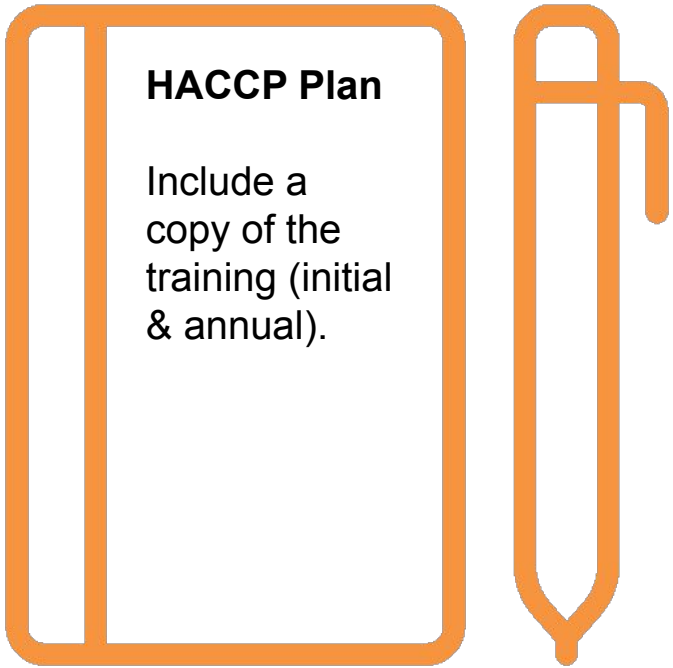
(6) Describes the training program that ensures that the individual responsible for the reduced oxygen packaging operation understands the:

(a) concepts required for a safe operation;

(b) equipment and facilities; AND

(c) procedures in subitem (5) and part 4626.1735

Contents of a HACCP plan



MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

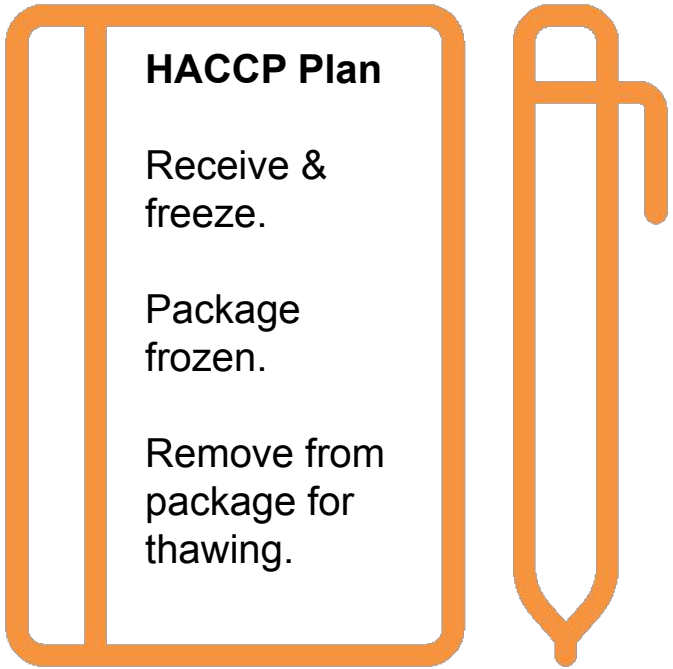
(7) Is provided to the regulatory authority prior to implementation as required by 4626.1730.

HACCP plan requirements

MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

(C) Except for fish that is frozen before, during and after packaging, a food establishment must not package fish using a reduced oxygen packaging method. Reduced oxygen packaged fish must be held frozen until used or removed from reduced oxygen packaging prior to the thawing process.



MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(D) [...] a food establishment that packages TCS food using cook-chill or sous-vide process must:

(1) Provide the regulatory authority prior to implementation a HACCP plan that contains the information in part 4626.1735;

Contents of a HACCP plan

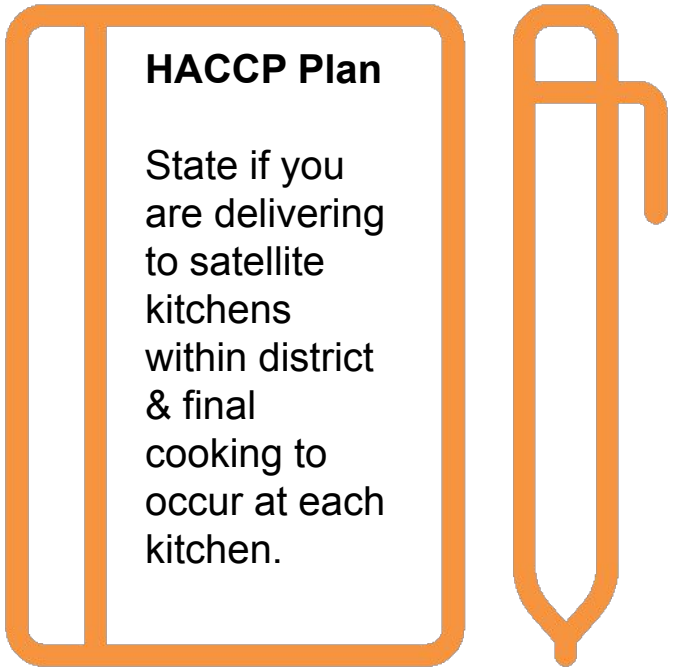
MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(a) prepared and consumed on the premises, or prepared and consumed off the premises but within the same business entity with no distribution or sale of the packaged product to another business entity or the consumer;



MN Food Code requirements

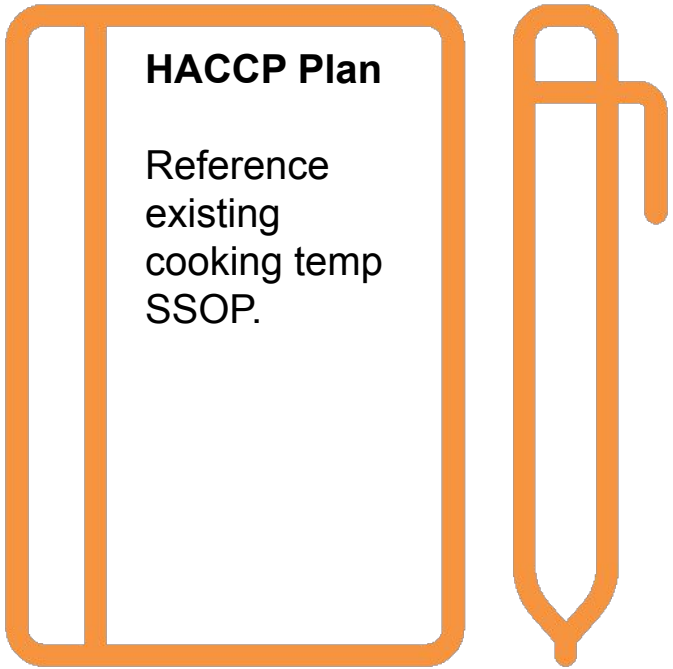
(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(b) Cooked to heat all parts of the food to a temperature and for a time as specified in part 4626.0340;

Cooking raw animal foods



MN Food Code requirements

(specific for cook-chill and sous vide)

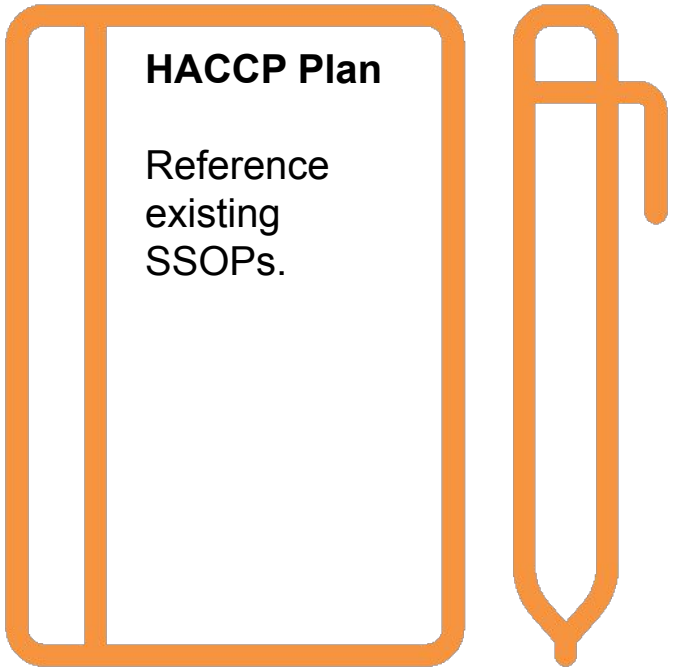
4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(c) Protected from contamination before and after cooking as specific in parts 4626.0225 to 4626.0337 and 4626.0340 to 4626.0367;

rules on Protection from Contamination

rules on Destroying Organisms



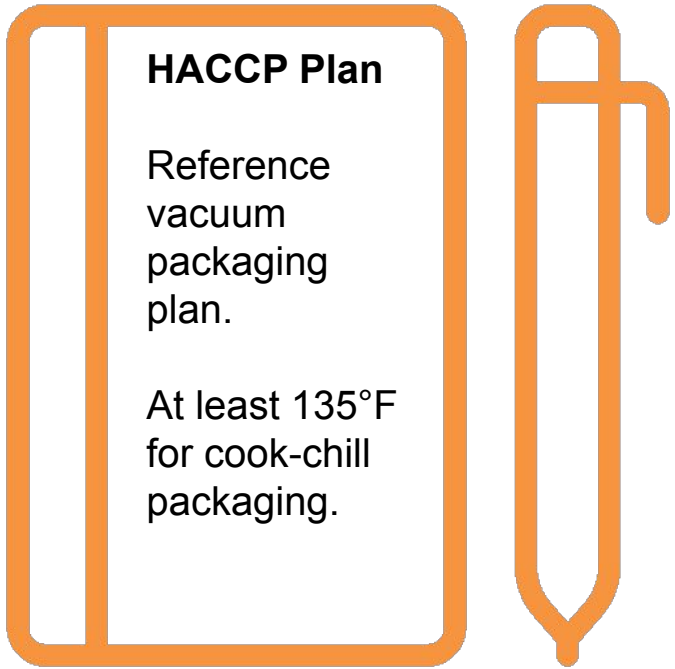
MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(d) Placed in a package with an oxygen barrier and sealed before cooking (sous vide), or placed in a package and sealed immediately after cooking and before reaching a temperature below 135 degrees Fahrenheit (cook-chill);



MN Food Code requirements

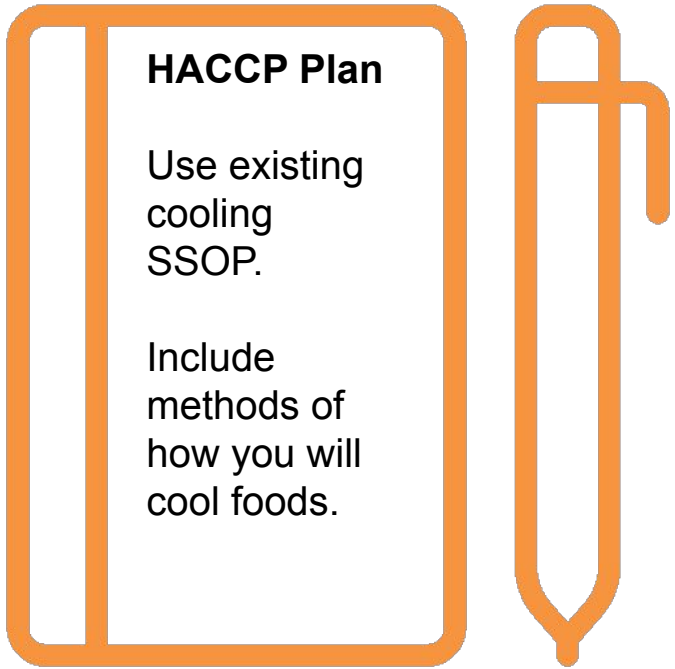
(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(e) Cooled to 41 degrees Fahrenheit in the sealed package or bag as specific in part 4626.0385 and subsequently:

Cooling Requirements



MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

- (i) cooled to 34 degrees Fahrenheit within 48 hours of reaching 41 degrees Fahrenheit and held at that temperature until consumed or discarded within 30 days after the date of packaging;
- (ii) held at 41 degrees Fahrenheit or less for no more than 7 days, at which time the food must be consumed or discarded;
- (iii) held frozen with no shelf life restrictions while frozen until consumed or used.

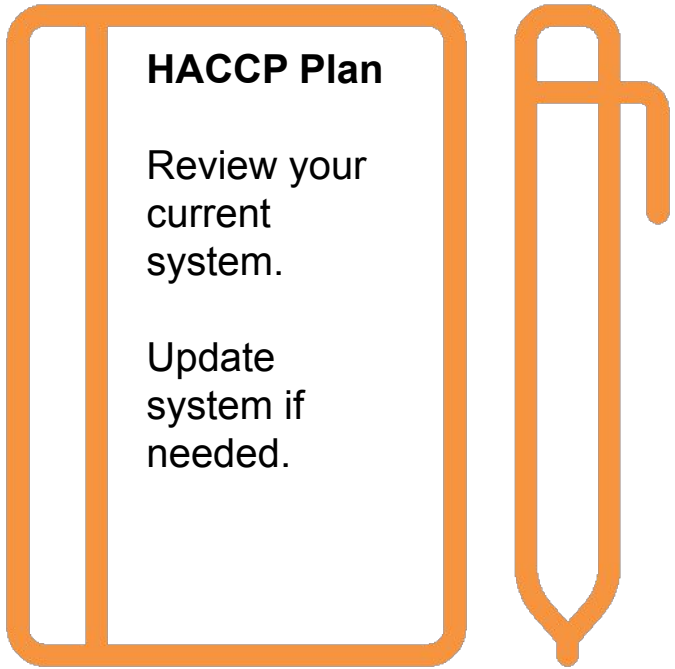
MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(f) held in a refrigeration until that is equipped with an electronic system that continuously monitors time and temperature and is visually examined for proper operation twice daily;



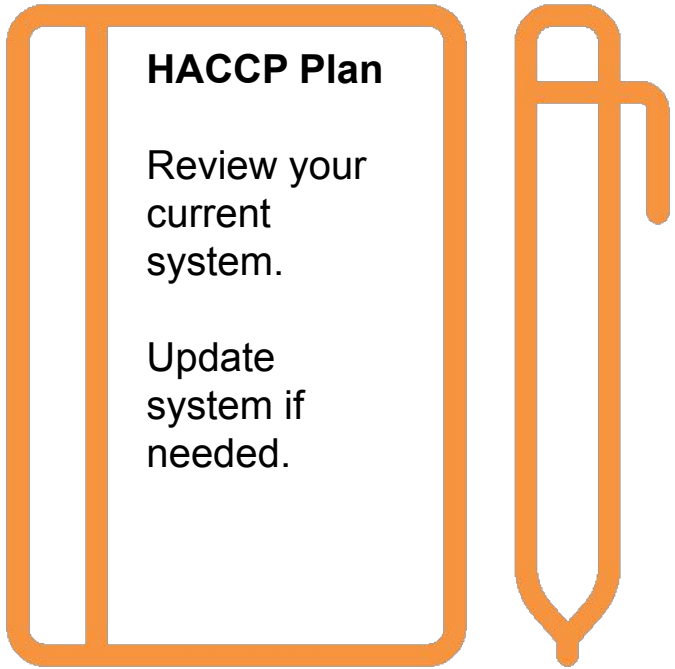
MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(g) if transported off-site to a satellite location of the same business entity, equipped with verifiable electronic monitoring devices to ensure that times and temperatures are monitored during transportation; AND



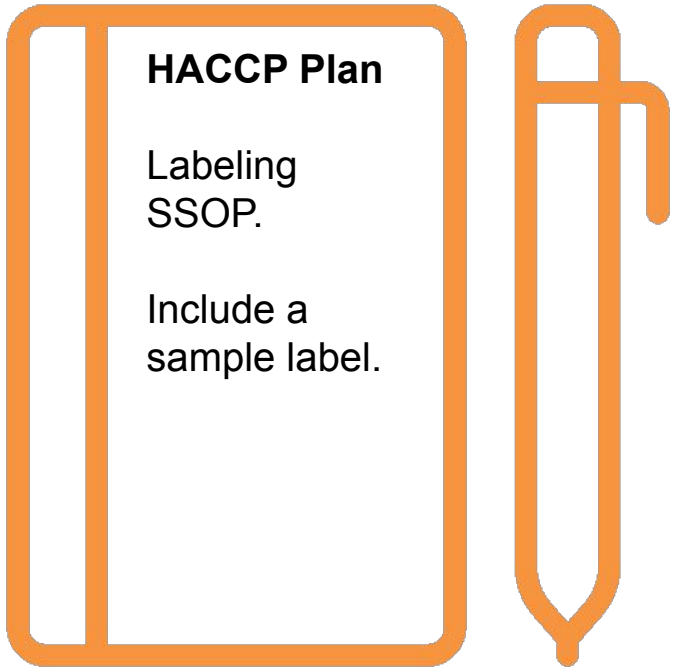
MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(2) Ensure the food is:

(h) labeled with the product name and the date packaged.



MN Food Code requirements

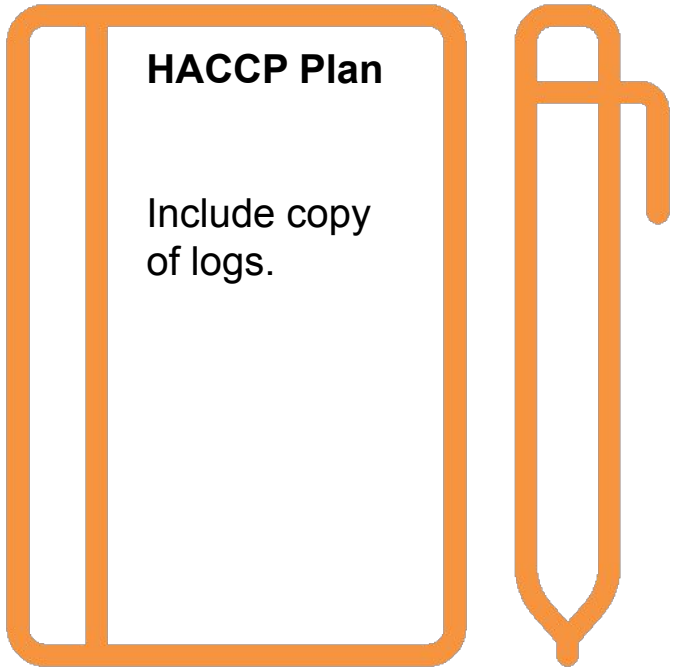
(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(3) Maintain the records required to confirm that cooling and cold holding refrigeration time/temperature parameters are required as part of the HACCP plan and:

(a) Make records available to the regulatory authority upon request; AND

(b) Hold records for at least 6 months.

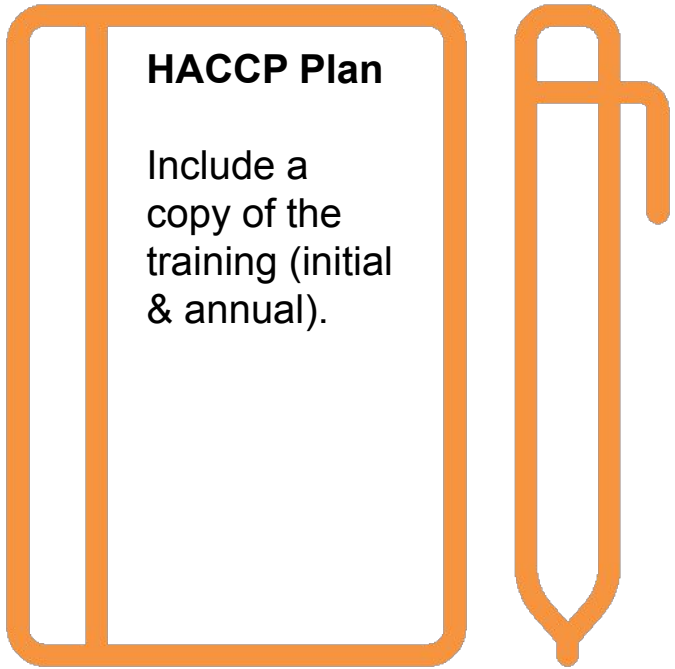


MN Food Code requirements

(specific for cook-chill and sous vide)

4626.0420 Reduced oxygen packaging without a variance; criteria

(4) Implement written operational procedures and a training program



MN Food Code requirements

(specific for cook-chill and sous vide)

Examples of foods that meet **4626.0420 Reduced oxygen packaging without a variance; criteria**

MN Food Code requirements

4626.0420 Reduced oxygen packaging without a variance; criteria

- Guidance for cheese (HACCP plan required)
- No HACCP plan required if reduced oxygen packaging TCS food that is:
  - Labeled with production time and date;
  - Held at 41 degrees Fahrenheit or less; AND
  - Removed from the ROP within 48 hours after packaging.

Food Safety Plan vs. HACCP

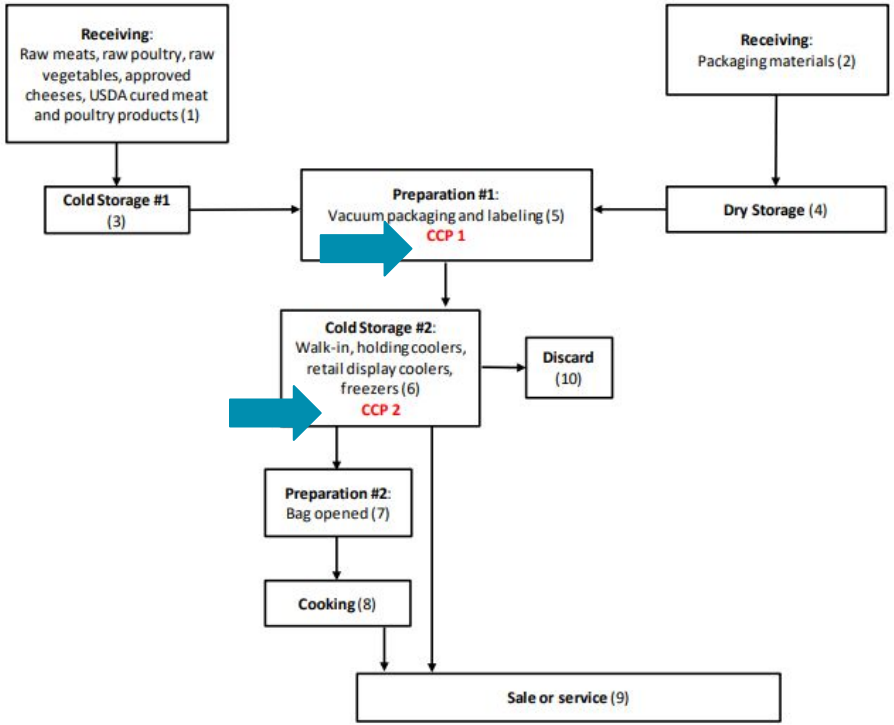
Food safety plan
Prerequisite programs (preventative)
SSOPs
Food handling procedures
Illness reporting
Recall plans
Training plans

HACCP
Specific hazards identified for a specific process
Critical limits established for a specific pathogen and/or process
12 steps to developing a plan
7 Principles

HACCP Plan

1. Assemble your HACCP team.
2. Describe your product.
3. Identify the intended use and consumer.
4. Construct a process flow diagram.
5. Verify the process flow.
6. **Conduct a hazard analysis.**
7. **Identify Critical Control Points (CCPs).**
8. **Establish critical limits.**
9. **Establish monitoring procedures.**
10. **Establish corrective action procedures for deviations.**
11. **Establish verification procedures.**
12. **Establish record-keeping procedures.**

Sample flow diagram



Prerequisite programs:

- Receiving
- Storage
- Handling
- Cooking
- Holding for service

Source: Minnesota Department of Health

Principle 1: conduct a hazard analysis

Operational step	Potential hazard(s)	Preventative measures	Is this a CCP?
Receiving			
Storage			
Preparation - washing, trimming, etc			
Preparation - ROP	Anaerobic environment - Clostridium botulinum and Listeria monocytogenes	Time & temperature controls	Yes
Cold Storage			
Preparation - thawing			
Cooking			
Service			

Principle 2: identify CCPs

What is the action(s) that can be taken to minimize the risk of the hazard?

- Hold at cold temperature
- Limit the amount of time the food is stored

Principle 3: establish critical limits

What is the desired outcome or parameter to be monitored?

- Hold at cold temperature: 41 degrees Fahrenheit or below
- Limit the amount of time the food is stored: no more than 30 days at refrigerated temperature

Principle 4: monitoring procedures

What will be monitored?	The specific action in the CCP and critical limits
How will it be monitored?	Visual inspection, logs
How frequently will it be monitored?	Daily, twice a shift, at time of packaging
Who is responsible for monitoring?	Supervisor, chef, designated employee

Principle 5: corrective action procedures

What actions must be taken if the critical limit (the outcome or the parameter) have a deviation?

Discard the product!

Principle 6: verification procedures

Who is going to check that the procedures and monitoring actions are happening? How will this be done?

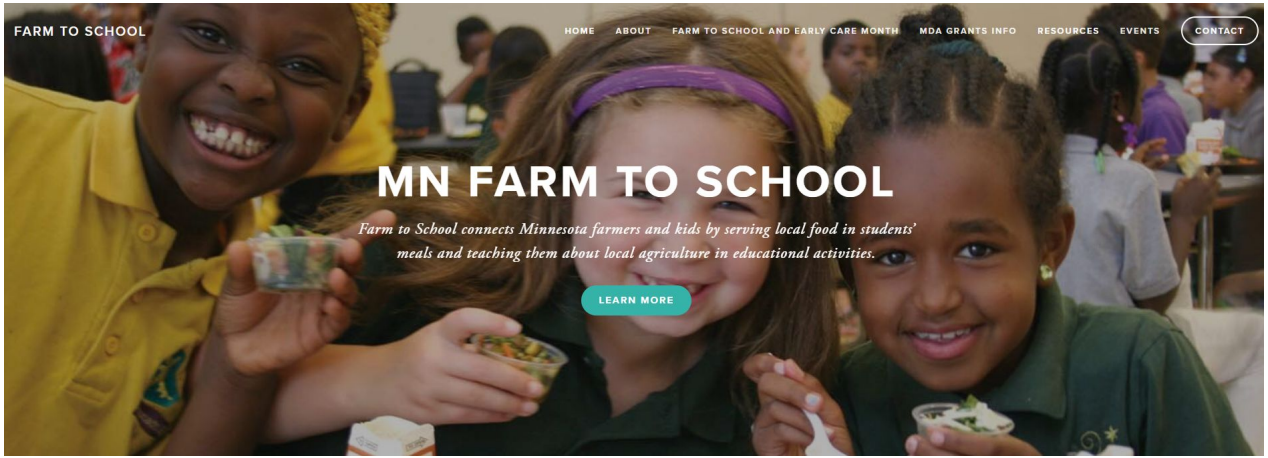
Principle 7: record keeping

What documentation are you going to keep and for how long?

Hutchinson School District

- Ask for help.
- Ask questions.
- Be persistent.
- Be creative.
- Plan for long term investment in your school meals.

Resources



https://www.farmtoschoolmn.org/

Questions

Evaluation survey

Receive a certificate for 1 hour of continuing education credits that can be applied to the renewal of your CFPM certificate.

Complete the survey by Sunday, March 17th.

https://z.umn.edu/F2Swebinar_ROP

Farm to Food Safety Webinar Series

March 6, 2-3:30pm - Reduced Oxygen Packaging

April 17, 2-3:30pm - Local Animal Proteins

May 1, 2-3:30pm - Wildish Foods

MINNESOTA FARM TO SCHOOL LEADERSHIP TEAM

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