



Australian Government

Department of Education, Employment and Workplace Relations

FDFST4008A Preserve food in cans or sealed containers

Release: 2

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Modification History

April 2012: Minor typographical corrections.

Unit Descriptor

This unit covers the skills and knowledge required to process low acid foods and preserve food in hermitically sealed containers or hermetically sealed packaging.

Application of the Unit

This unit applies to quality assurance and other technical staff who have responsibility for maintaining product safety, quality and the production environment in processing and sealing food into airtight containers. The unit applies to two and three piece cans used in food and beverage production and other sealed containers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Oversight the preparation of the packaging materials for thermal processing	1.1 Suitable containers for canning are identified 1.2 Container's properties, function, and integrity is assessed 1.3 The parts of a can and end (top) are identified 1.4 A can closing machine (seamer) is set up and trial operation undertaken 1.5 The characteristics of the seamed cans are measured and calculated
2. Oversight food preparation and filling of cans	2.1 The quality requirements of raw materials for processing are identified 2.2 The correct procedures for dicing and slicing are performed 2.3 The blanching process is correctly implemented using either steam, water, microwaves or hot gas 2.4 The correct filling procedures for syrups and brines are applied to produce the specified head space 2.5 Cans are weighed with headspaces, drained and net weights recorded 2.6 Exhausting is carried out to remove all gases from the headspace and oxygen from the can 2.7 Closing of the can is monitored
3. Ensure hermetic sealing of processed food product	3.1 The quality requirements of raw materials for processing are accessed and applied 3.2 Raw materials are cooked and prepared in an aseptic environment 3.3 Materials are placed into containers and hermetically sealed
4. Eliminate harmful micro-organisms in the hermetic sealing or canning of low acid foods	4.1 Micro-organisms relevant to the canning of low acid foods are identified 4.2 The D Value of micro-organisms is interpreted 4.3 The types of microbial spoilage important in food canning are assessed 4.4 The process for eliminating the risk of microbial spoilage in a food product is documented
5. Assess the impact of acidification in relation to hermetic sealing or canning of low acid foods	5.1 The acidity of a range of foods is measured 5.2 The relationship between acidity and growth of micro-organisms is identified 5.3 Critical Control Points (CCPs) are established for acidified foods
6. Monitor retort operation	6.1 Containers are loaded onto baskets 6.2 The retort is sealed

ELEMENT	PERFORMANCE CRITERIA
7. Review a canning operation	6.3 Air trapped inside the retort is removed prior to processing
	6.4 Pressure is built up in the retort and sterilisation temperature is maintained
	6.5 The can is cooled using chlorinated water
	7.1 Critical Control Points (CCPs) for a canning operation are reviewed
	7.2 Data is reviewed to ensure adherence within critical limits for each CCP
	7.3 Operating procedures are reviewed to ensure a quality and safe canned product

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills include:

Ability to:

- define commercial sterility
- identify who can establish a thermal process
- identify the components in establishing a thermal process
- establish heat treatment procedures
- assess the factors affecting heat treatment
- identify the role of chlorination in canning low acid foods
- acidify food as part of processing
- establish and assess the requirements for canning low acid food
- establish and assess the requirements for canning high acid foods
- set up and operate a retort to specification for a scheduled process
- calculate the lethality value for a product
- calculate the Fo Value from available data by using the:
 - graphical integration method
 - Gillespie method
- calculate the Sterilising Value of process by using the:
 - trapezoidal method
 - micro-organism population method
- calculate the Fh value for different container sizes
- calculate the time it would take to reach a given temperature at the slowest heating point in a can
- identify factors that impact the thermal process
- construct confidence intervals for mean and standard deviation
- compute 't-test'
- read and interpret 't-table'
- determine significance of results using 't-test'
- calculate X^2
- test X^2 significance at 95 and 99 percent
- recognise a process deviation.

Required knowledge includes:

Knowledge of:

- types of thermal processing systems
- the principles and purposes for blanching
- the function and use of each system
- the parts of a retort/cooker

- relevant legislation and regulations that apply to the canning process of low acid foods
- roles and responsibilities of authorities responsible for administering legislation
- the chemical properties and application of chlorine in canning
- principles of thermal processing, including use of a retort
- aseptic techniques for packaging food under aseptic conditions
- characteristics of two piece and three piece (seamed) cans
- dicing, slicing, blanching and brining processes
- the types micro-organisms relevant to the canning of low acid foods, including their basic structure and growth patterns
- d value of micro-organisms
- low acid foods, acidification and their relationship to the growth of organisms
- critical control points
- chemical properties of chlorine, and how it effects micro-organisms
- methodology for the measurement of Chlorine in cooling water
- D,Z,J, Fo and Fh Values
- Thermal Death Rate, Lethality Value and Sterilisation Value
- Confidence intervals and tests of significance
- Approximation
- Principles of variability
- Principles of variance.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to preserve food products in hermetically sealed containers, and review a commercial canning operation based on test data and documented procedures.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Critical aspects of assessment must include evidence of the following: - oversighting the food preparation for food canning or other hermetically sealed packaging - supervising the set up and operation of hermetically sealed packaging or canning equipment including the production of trial canning - establishing the CCPs and critical limits for a canning process or other hermetically sealed packaging - calculating pressures, temperatures and cooking times to eliminate the risk of microbial spoilage for a canning or hermetic sealing operation.
Context of and specific resources for assessment	Assessment of performance requirements in this unit should be undertaken within the context of food technology. Competency is demonstrated by performance of all stated criteria, including the critical aspects and knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statements applicable to the workplace environment. - Assessment must occur in a real or simulated workplace where the assessee has access to: - production process and related equipment, manufacturers' advice and operating procedures - equipment and facilities for carrying out canning processes and testing of canned products.
Method of assessment	The following assessment methods are suggested: - written and/or oral questioning to assess knowledge and understanding - observation of candidate conducting a range of canning or hermetic sealing operations - a report on review of a canning or hermetic sealing operation.

Guidance information for assessment	Evidence should be gathered over a period of time in a range of actual or simulated environments.
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Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Occupational health and safety requirements	- Codes of practice - Material Safety Data Sheet - Enterprise specific.
Regulations	- Australian and international standards including: - professional association regulations - industry guidelines and codes of practice - industry regulations - Food Standards Code - ISO Standards - codex alimentarius - State food regulations
Cans	Cans may be two or three piece and steel or aluminium. Closures may be ring pull or require an opener.
Sealed containers	Sealed containers are vacuum-sealed and may include cryovac, bottling or any other airtight container for food products.
Types of canning equipment	Canning may be carried out using still and agitating retorts that may operate as a batch or continuous process. Continuous agitating types include hydrostatic retorts.
Exhausting systems for retort	These may include heat exhaust, steam injection or mechanical exhaust
Food irradiation methods	Methods to deliver ionising radiation to disrupt RNA including radurization, radicidation and radappertization.
Alternative food preservation methods	These may include the range of chemical preservatives, modified atmosphere packaging, lactic fermentation, sugar or ethanol preservation, emulsification, pressure inactivation, water activity through dehydration or

	adding solutes, and pulsed electric field processing.
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Unit Sector(s)

Technical.