Understanding HACCP

Hazard Analysis and Critical Control Points

HACCP - **Hazard Analysis and Critical Control Points** - is a systematic, preventative approach to food safety.

Rather than relying primarily on testing the finished product, HACCP looks at each stage of a food process, identifies significant food-safety hazards that may occur, and establishes appropriate controls to prevent, eliminate or reduce those hazards to an acceptable level.

HACCP principles are used internationally throughout food production, processing, packaging, storage and distribution.

In Australia, HACCP concepts underpin food safety programs established under the Australia New Zealand Food Standards Code. Requirements for individual businesses may depend on the type of food operation and applicable state or territory legislation.

The Seven Principles of HACCP

1. Conduct a Hazard Analysis

The food production process is examined to identify potential biological, chemical and physical hazards that may reasonably occur.

Examples may include:

- pathogenic microorganisms
- allergens or chemical contamination
- foreign materials
- inappropriate temperature control
- contamination during processing or packaging
- loss of packaging integrity
- incorrect modified atmosphere gas composition
- excessive residual oxygen or insufficient carbon dioxide in MAP products
- failure of the package to retain the intended modified atmosphere

Where modified atmosphere packaging (MAP) is used, the hazard analysis should consider whether the selected gas mixture, achieved headspace composition and package integrity could affect food safety or the effectiveness of an established preservation strategy.

The likelihood and potential severity of each hazard are then considered and appropriate control measures identified.

2. Determine Critical Control Points

A **Critical Control Point (CCP)** is a step at which control is essential to prevent or eliminate a significant food-safety hazard, or reduce it to an acceptable level.

Not every measurement or process control is necessarily a CCP. Whether a particular stage is considered a CCP is determined by the food business through its hazard analysis and HACCP plan.

3. Establish Critical Limits

A measurable or observable limit is established for each CCP.

Depending on the process, this could include parameters such as:

- temperature
- time
- pH
- water activity
- gas concentration (O_2/CO_2)
- pressure or vacuum
- package and/or seal integrity
- other validated process limits

Critical limits establish the boundary between an acceptable and unacceptable process condition.

For MAP products, critical or process limits may include a defined acceptable range for residual O_2, CO_2 concentration or overall gas composition, where these parameters have been identified through the hazard analysis as necessary to control a significant food safety hazard.

Critical limits should be scientifically or technically validated.

4. Establish Monitoring Procedures

Monitoring provides evidence that a CCP or other control measure remains within its established limits.

Depending on the application, monitoring may include:

- measurement or analysis
- observation
- sampling
- testing
- equipment readings
- automated process records

Monitoring methods should be appropriate for the process and capable of identifying loss of control in sufficient time for action to be taken.

5. Establish Corrective Actions

The HACCP plan should define what happens when monitoring identifies that an established limit has not been met.

Corrective action may include:

- stopping or adjusting the process
- isolating affected product
- investigating the cause
- retesting or assessing product
- correcting equipment or process settings
- documenting the event and actions taken

The objective is both to manage potentially affected product and prevent the issue from recurring.

6. Establish Verification Procedures

Verification confirms that the HACCP system and its control measures are functioning as intended.

Examples can include:

- reviewing monitoring records
- equipment calibration
- independent testing
- internal audits
- reviewing corrective actions
- checking the effectiveness of control measures
- reviewing the HACCP plan when processes, products or equipment change

7. Establish Documentation and Records

Appropriate records provide evidence that controls have been implemented and monitored.

Records may include:

- HACCP plans and hazard assessments
- monitoring results
- corrective actions
- calibration records
- verification results
- maintenance records
- training records
- product and process specifications

Good record keeping also assists with traceability, investigation, auditing and continuous improvement.

HACCP and Modified Atmosphere Packaging

Modified atmosphere packaging - **MAP** - replaces or modifies the atmosphere surrounding a food product using gases such as carbon dioxide, nitrogen and oxygen.

MAP can assist with shelf life, product quality and management of deterioration mechanisms, but **MAP itself is not an aseptic process and does not make a product sterile**.

The role of MAP within a HACCP system depends on the product, process and hazards identified by the food business.

For some processes, gas composition or package integrity may form part of a significant food-safety control. In others, these parameters may primarily be process, quality or verification controls rather than critical control points.

The appropriate classification must be determined through the manufacturer's own food safety and hazard assessment.

Monitoring MAP Processes

Where package atmosphere forms part of the process specification, monitoring may include:

Headspace gas analysis
Measurement of residual oxygen and/or carbon dioxide can confirm that the atmosphere achieved inside the package is consistent with the established process specification.

Package leak testing
Leak detection can assist in confirming that the package is capable of maintaining its intended atmosphere and protecting the product from unintended exchange with the surrounding environment.

Gas mixing and supply control
Gas mixing equipment can provide a controlled and repeatable gas composition to the packaging process.

Calibration and verification
Measuring equipment should be appropriately maintained and calibrated so that results used for process control or verification can be relied upon.

Where SGTA Fits

Specialised Gas Technologies Australia (SGTA) provides equipment and technical support for the control, measurement and verification of gases used within food production and packaging processes.

Our solutions include:

- modified atmosphere gas analysers
- oxygen and carbon dioxide measurement
- gas mixing systems
- package leak detection
- gas quality and moisture measurement
- equipment servicing and calibration

These technologies can provide measurable process information and records that may support a manufacturer's quality, verification or HACCP activities.

SGTA does not determine a customer's critical control coints, establish food-safety limits or provide HACCP certification. These decisions should be made by the food manufacturer and its appropriately qualified food-safety personnel based on the product, process, applicable legislation and validated food-safety requirements.

Further Information

For authoritative Australian food-safety requirements and guidance, refer to:

Food Standards Australia New Zealand (FSANZ)
Australia New Zealand Food Standards Code
Standard 3.2.1 – Food Safety Programs

Codex Alimentarius Commission
General Principles of Food Hygiene – CXC 1-1969
Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application

Businesses should also consider applicable requirements of their relevant Australian state or territory food-safety authority.

IMPORTANT NOTE
This document provides general information only and should not be relied upon as food-safety, regulatory or HACCP certification advice. Food businesses remain responsible for determining and validating their own food-safety controls and complying with applicable regulatory requirements.