



Australian Government

FDFST5003A Construct a process control chart for a food processing operation

Release: 2

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Modification History

April 2012: Minor typographical corrections.

Unit Descriptor

This unit describes the skills and knowledge to construct a process control chart based on a sound knowledge of statistics and the ability to determine Process Capability for equipment.

Application of the Unit

This unit applies to food processing staff who have roles in product design, or quality and production management. The unit typically applies to staff who have responsibility for establishing and maintaining product safety, quality and efficiency in food processing. The unit can apply to all sectors of food production including general food production, meat and seafood industries. The unit does not cover applying statistics to analyse mechanical, electrical, electronic or fluid power systems. However it includes applying statistics to food processing equipment to determine process capability and to construct a process control chart for the food processing operation. Depending on the workplace application, liaison may be required with engineering and maintenance specialists.

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. Apply tools and techniques to collect and present data	1.1 The key characteristics and uses of attribute and variable data are identified 1.2 The concepts of frequency and distribution are described 1.3 The frequency and distribution of supplied data for various measurement levels are determined 1.4 Data collection tools including check sheets, surveys and logs are described and used 1.5 Appropriate charts and graphs using available data are constructed
2. Interpret charting tools and techniques in process control	2.1 The concept of process capability and its implications are discussed 2.2 Probability distributions in analysing process capability are used 2.3 Control Charts used to monitor processes are interpreted 2.4 The application of charting methods to establishing process capability, evaluating process changes and interpreting simple experiments is identified
3. Determine the Process Capability of a piece of equipment on a production line	3.1 The scope and purpose of the process are identified 3.2 A representative data sample is determined 3.3 Data collection techniques are selected 3.4 Data is collected to meet sampling requirements 3.5 Appropriate statistical analysis techniques are selected and applied 3.6 All relevant parameters for the determination of Process Capability are calculated statistically 3.7 The Process Capability value for each piece of equipment is incorporated into process control for the whole operation
4. Construct a process flow chart	4.1 Scope and purpose of Average & Range charts in the food industry are identified 4.2 All relevant parameters for use in preparing both Average and Range charts are statistically calculated 4.3 Average and Range charts, showing all pre-calculated parameters, are prepared 4.4 Trends and cyclic patterns of Average and Range charts are interpreted 4.5 An action plan based on the results of Average and Range is designed

Required Skills and Knowledge

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

Required skills include:

Ability to:

- identify the types of causes of variation
- identify probability principles
- apply Poisson and binomial distributions to supplied attribute data
- identify the characteristics of the Normal distribution
- calculate and interpret indices of variability
- identify skewed distributions
- calculate and interpret indices of significance and variance
- calculate and interpret indices of probability
- identify and explain the role of Statistical Quality Control (SQC)
- discuss the concepts of process capability, acceptance levels and process improvement
- apply the uses of Average & Range charts in the food industry
- calculate statistically all relevant parameters for use in preparing both Average and Range chart
- prepare Average and Range charts showing all pre-calculated parameters
- interpret trends and cyclic patterns of Average and range charts
- prepare an action plan based on the results of Average and Range
- describe and calculate measure of central tendency
- identify the principles of process capability
- calculate all relevant parameters for the determination of process capability statistically
- interpret process capability value in relation to the overall process
- represent data in graphs, tables, averages and percentages
- prepare a report with recommendations regarding the outcomes of the process capability.

Required knowledge includes:

Knowledge of:

- the terms statistic and parameter
- the concept of statistical inference
- principles of variability and variance
- the relationship between probability and statistical inference
- the concept of variation within processes and recognition of its implications for process design and management
- the scope and purpose of Average & Range charts in the food industry
- all relevant parameters for use in preparing both Average and Range chart
- pre-calculations of parameters of Average and Range charts
- trends and cyclic patterns of Average and range charts
- the preparation of an action plan based on the results of Average and Range

- the definition of process capability
- process capability values.

Evidence Guide

<p>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.</p>	
<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to construct and interpret a process control chart based on the ability to determine Process Capability for equipment.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Critical aspects of assessment must include evidence of the ability to:</p> <ul style="list-style-type: none"> • apply tools and techniques for analysing in specification or out of specification production processes • identify and explain patterns of variation exhibited by distributions • construct a process flow chart • interpret Control Charts • determine process capability for a food processing operation.
<p>Context of and specific resources for assessment</p>	<p>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.</p> <p>Assessment must occur in a real or simulated workplace where the assessee has access to:</p> <ul style="list-style-type: none"> • Production process and related equipment, manufacturers' advice and operating procedures • Methods and related software systems as required for collecting data and calculating yields, efficiencies and material variances appropriate to production environment • Tests used to report relevant product/process information and recorded results.
<p>Method of assessment</p>	<p>The following assessment methods are suggested:</p> <ul style="list-style-type: none"> • Field Reports • Written and/or oral questioning to assess knowledge and understanding

	<ul style="list-style-type: none"> • Completing workplace documentation • Third party reports from experienced practitioner • Case studies • Observation of candidate conducting a range of tests and procedures.
Guidance information for assessment	Evidence should be gathered over a period of time in a range of actual or simulated environments.

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	<ul style="list-style-type: none"> • Codes of practice, regulations, material safety data sheets (MSDSs) • Enterprise and process specific occupational health and safety requirements.
Policies and procedures	<ul style="list-style-type: none"> • Codes of practice, regulations, MSDSs • Enterprise specific requirements • Relevant state/territory/commonwealth occupational health and safety acts, regulations, national standards, codes of practice and guidance notes which may apply in jurisdiction • Australian and international standards • Food safety legislation • Relevant equipment and software for data analysis.

Unit Sector(s)

Technical.