

**Overview**

This standard is about the skills and knowledge needed for you to control mashing and conversion in brewing.

This standard details the skills and understanding needed when manufacturing part or finished products from a raw material. It details the skills required to start up, run and shut down equipment, as well as being able to take the appropriate action should operating problems occur. It is also about working to product specifications and production schedules. Complying with and understanding health and safety, food safety and organisational requirements are essential features of this standard.

It details the skills needed to monitor and control the water sourcing process in brewing. It also covers the different types of water and water sources used in brewing and the impact they have on legal, organisational, health and safety and environmental regulations.

An understanding of the principles of sourcing water, water treatment and effluent in brewing is required. It covers the regulatory requirements, water sources and quality, water characteristics and treatment, and effluent control.

This standard also covers understanding the principles of mashing and conversion in brewing. It covers the conversion of starch into simple sugars in the mash, the role and function of enzymes, the significance of time and temperature in mashing and conversion and the significance of mineral salts in mashing.

This standard is for you if you work in brewing and are involved in mashing and conversion in brewing.

## Performance criteria

*You must be able to:*

### **Carry out water sourcing in brewing**

1. carry out water sourcing in accordance with the legal or regulatory requirements, the organisational health and safety, hygiene and environmental standards and instructions
2. identify the different types of water used in brewing
3. monitor the introduction of water into the brewing process
4. monitor the quality of a brewery water supply
5. identify the sources of water for a brewery and the characteristics of each in terms of mineral ion content, consistency and possible non-microbiological contaminants
6. monitor and control the health risks associated with legionella bacteria in cooling water and service water
7. monitor and control water chlorination, softening, deionization and de-aeration in a treatment plant
8. monitor and control effluent quality in terms of volume, Suspended Solids (SS), Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), pH and temperature
9. reduce effluent loading from the principal effluent sources

### **Prepare for mashing and conversion**

10. prepare for mashing and conversion in accordance with the legal or regulatory requirements, the organisational health and safety, hygiene and environmental standards and instructions
11. check product specifications at the right time
12. set up equipment according to specification
13. check that material for mashing and conversion is available and fit for use
14. check that services meet requirements
15. start up the plant and check that it is running to specification
16. take action in response to operating problems
17. maintain communication in accordance with organisational procedures

### **Carry out mashing and conversion**

18. carry out mashing and conversion in accordance with the legal or regulatory requirements, the organisational health and safety,

- hygiene and environmental standards and instructions
19. use equipment and check that it is supplied with materials and services
  20. achieve the required output to the correct specification
  21. check the product is transferred to the next stage in the manufacturing operation
  22. take action in response to operating problems within the limits of your responsibility
  23. maintain communication in accordance with organisational procedures

### **Finish mashing and conversion**

24. finish mashing and conversion in accordance with the legal or regulatory requirements, the organisational health and safety, hygiene and environmental standards and instructions
25. check the specifications to time shut down accurately
26. follow procedures to shut down equipment
27. deal with items that can be re-cycled or reworked
28. dispose of waste in line with organisational requirements
29. make equipment ready for future use after completion of the process
30. maintain communication in accordance with organisational procedures
31. complete all necessary documentation in line with organisational requirements

## Control mashing and conversion in brewing

---

### Knowledge and understanding

*You need to know and understand:*

1. the organisational health and safety, hygiene, environmental and quality standards and instructions
2. the personal protective equipment required
3. the work area tools and equipment needed
4. why it is important to check the cleanliness of work area, tools and equipment
5. what the typical usage volumes of water are as a ratio
6. what the water content of beer is
7. the essential uses of large volumes of water in a brewery
8. what the differences are, and typical uses of, product water, process water and service water are
9. at what points water is introduced into the process and the special water quality needed at these points
10. what the characteristics and quality of an ideal brewery water supply are
11. what the sources of water for a brewery are
12. what the characteristics of different sources of water are in terms of mineral ions content, consistency and possible non-microbiological contaminants
13. the significance of legionella bacteria in cooling water and service water and the health risks associated with the organism
14. the basic principles of treatment plants for water chlorination, softening, deionization and de-aeration
15. what the nature and characteristics of effluent are from each principal brewing operation
16. what the principle components of effluent quality are in terms of volume, suspended Solids (SS), Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), pH and temperature
17. how to reduce effluent loading from the principal effluent sources
18. what the sequence of events are from raw material intake to completion of the mashing and conversion process
19. the operating principles of mashing/mash conversion systems, including the cereal- cooking vessel
20. what the operational differences are between isothermal (mash-tun) conversion and stepped temperature rise conversion vessels
21. what the typical times, temperatures and grist ratios used in the conversion vessel are

22. the qualitative assessment of starch conversion
23. the operating principles of wort separation devices
24. why a particular wort separation device is used and the relevant advantages and disadvantages of different devices
25. what the significance of cycle times are for brewhouse capacity
26. what the methods for the assessment of wort clarity/solids content are
27. how spent grains are used as a co-product
28. how to deal with waste materials in accordance with organisational requirements
29. the need for records to be completed within agreed timescales and to an agreed standard
30. what should be communicated, to whom and why it should be done
31. the limits of your authority and the consequences of exceeding them

## Control mashing and conversion in brewing

<b>Developed by</b>	NSAFD
<b>Version Number</b>	2
<b>Date Approved</b>	January 2019
<b>Indicative Review Date</b>	January 2024
<b>Validity</b>	Current
<b>Status</b>	Original
<b>Originating Organisation</b>	Improve
<b>Original URN</b>	IMPPO212 (skill), IMPBW102K
<b>Relevant Occupations</b>	Plant and Machine Operatives; Process Operatives; Process, Plant and Machine Operatives; Manufacturing technologies; Food Preparation Trades
<b>Suite</b>	Brewing
<b>Keywords</b>	Food; drink; manufacturing; brewing; conversion; mashing; starch; grist