

# Requirements and overview of cooking methods

Bacteria associated with less than thoroughly cooked burgers, requirements for managing the risk to consumers and overview of cooking methods.

The main source of bacteria in meat is from the intestines of the animal. When animals are slaughtered there is potential for harmful bacteria from the intestines and hide to contaminate the surface of meat. There is no way of knowing which animals in the slaughterhouse are carrying harmful bacteria as the bacteria cannot be seen without a microscope.

Certain harmful bacteria are associated with raw beef, such as Salmonella and Shiga-toxin producing Escherichia coli (STEC), including Escherichia coli (E. coli) O157. STEC is of particular concern because it can cause infection in very low doses which can lead to serious illness and death in some cases.

When meat is minced to produce burgers, harmful bacteria from the surface of the raw meat may be spread throughout the burger. Unless the burger is cooked right through, bacteria can remain on the inside.

Minced meat may be formed into a burger or into a patty. For the purpose of this guidance a burger consists of minced meat with added ingredients, while a patty consists of minced meat with less than 1% salt added. Different rules apply to minced meat (including patties) and to meat preparations (including burgers) at meat processors and during transport. In this guidance when the term burgers is used it also includes patties.

Cooking to a time/temperature combination of 70°C for two minutes will result in a six-log reduction in bacteria and this is generally considered to reduce the risk of food poisoning to an acceptable level. The methods of producing less than thoroughly cooked (LTTC) beef burgers, or beef burgers that appear to be less than thoroughly cooked, which are covered in this guidance can give similar levels of reductions in bacteria.

Reductions in bacteria are often expressed as log reductions to avoid using the massive numbers which are associated with micro-organisms. The table below shows how log reductions of bacteria can be expressed as percentages.

## Log reductions of bacteria expressed as percentages

Reduction	Percentage of bacteria eliminated
One-log	90%
Two-log	99%
Three-log	99.9%

Four-log	99.99%
Five-log	99.999%
Six-log	99.9999%

## Requirement to inform LA of intention to serve LTTC beef burgers

If a business plans to serve LTTC beef burgers, they are legally required to inform their LA beforehand because it constitutes a significant change to their business operation.

## Requirement for a Food Safety Management System

Businesses serving LTTC beef burgers must produce and implement an appropriate food safety management system (FSMS) which takes into account that beef burgers will be less than thoroughly cooked. The FSMS must be based on [Hazard Analysis and Critical Control Points \(HACCP\) principles](#). This guidance summarises the requirement, it is not exhaustive, all hazards must be considered.

### HACCP

HACCP is a way of managing food safety hazards and ensuring food safety which can be incorporated into the FSMS.

HACCP involves:

- looking closely at a food business, what could go wrong and food safety risks
- identifying the critical control points a business needs to focus on, to ensure risks are removed or reduced to safe levels
- deciding what action is needed if something goes wrong
- making sure procedures are being followed and are working
- keeping records to show procedures are working

### Pre-requisites

Pre-requisites are basic hygiene standards which must be in place before HACCP is considered. These provide the foundation of good hygiene practice. Some examples which are particularly relevant to LTTC beef burgers are:

- suitable staff training
- suitable cleaning and disinfection procedures
- temperature control
- personal hygiene of staff

### Legal requirements

The requirement to inform local authority of plans to serve less than thoroughly cooked burgers can be found in:

- Article 6(2) of [retained Regulation \(EC\) No 852/2004](#) for England and Wales
- Article 6(2) of [Regulation \(EC\) No 852/2004](#) for Northern Ireland

The requirement for a HACCP-based food safety management system is included in:

- Article 5 of [retained Regulation \(EC\) No 852/2004](#) for England and Wales
- Article 5 of [Regulation \(EC\) No 852/2004](#) for Northern Ireland

## Overview of methods used to cook beef burgers

### Best practice

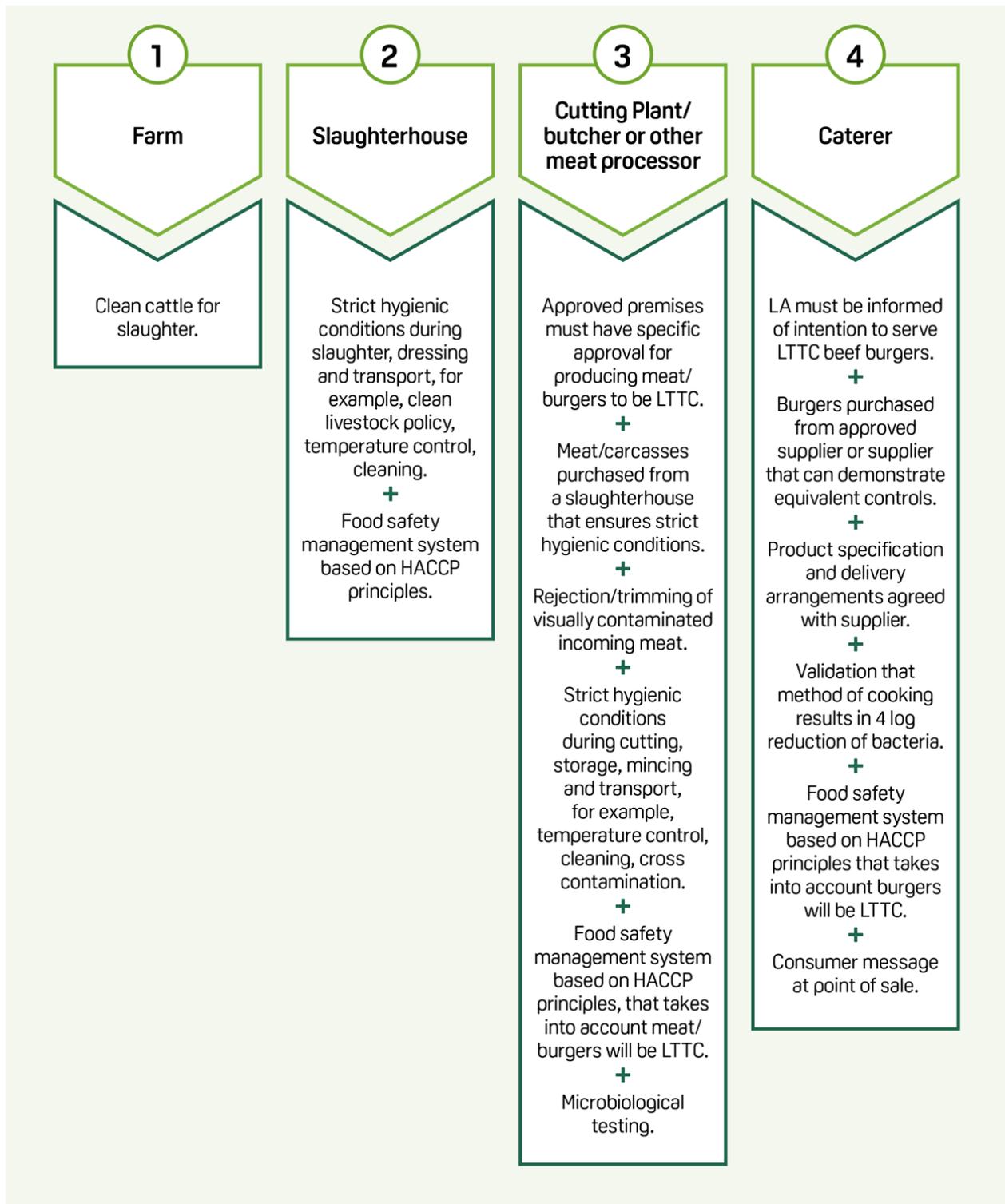
It is best practice to thoroughly cook burgers all the way through to 70°C for two minutes or equivalent, to achieve a six-log (99.9999%) reduction in bacteria.

[Sous-vide cooking](#) – burgers are vacuum packed and cooked in a water bath for a longer period and at a lower temperature than conventional cooking. A time/ temperature combination equivalent to 70°C for two minutes is achieved. This can result in beef burgers remaining pink in the middle while achieving a six-log reduction in bacteria.

[Sear and shave](#) - the outer surfaces of a piece of meat are cooked to a high enough temperature to achieve at least a six-log reduction in bacteria. The outer surfaces are then shaved off and the remaining meat is used to make burgers which are lightly cooked. This method of cooking can achieve a six-log reduction in bacteria while the beef burgers remain pink in the middle.

[Source control method](#) – beef, minced beef or beef burgers are bought from suppliers with strict controls in place, which research has shown can reduce bacteria by two-logs. The beef burgers are then lightly cooked to achieve at least a four-log reduction in bacteria. The infographic (Figure 1) gives an overview of the controls to be taken at each stage of the food chain when using this method. You can also download the [Source control method infographic as a PDF](#).

**Figure 1. Source control method - controls at each stage of the food chain**



We are consulting on this draft guidance. Take part in our [burgers guidance consultation](#).