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E. coli O157 Control of Cross-contamination

Guidance for food business operators and local authorities

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Summary

Intended audience:	This guidance is for all types of businesses that handle both raw foods (that can be a source of *E. coli* O157) and ready-to-eat foods. For example: • Manufacturers and processors • Retailers, caterers and carers (including movable and/or temporary premises and premises used primarily as a private house)
Which UK nations does this cover?	This guidance applies across the UK.
Purpose and how to use this guidance:	The purpose of this document is to provide guidance on the steps for food businesses to take in order to control cross-contamination between raw foods that are a potential source of *E. coli* O157 and ready-to-eat foods. Following this guidance will also help control cross-contamination from other foodborne bacteria such as Campylobacter, Salmonella and other *E. coli* strains. The measures required to control cross-contamination will vary between different businesses and should be proportionate to the risk posed in accordance with the specific activities carried out, such that: **A food business operator** should undertake a risk assessment on site to decide the controls necessary to minimise the risk of cross-contamination and ensure food safety. This guidance provides options on the steps that a food business can follow depending on what is achievable and appropriate in their particular business. The controls that are considered necessary should be discussed with the local authority, and where relevant primary authority, who can advise on their suitability. **A local authority** should undertake a risk assessment of the business on site to assess the suitability of the controls considered appropriate by the business to minimise the risk of cross-contamination and ensure food safety. This assessment should have full regard to the circumstances of each particular business. If a food business has a primary authority the local authority should liaise with that authority to ensure that an informed and consistent approach is taken. Local authorities will have due regard to the Regulator's Code when determining the control measures in place.
Structure of the guidance and legal status:	This guidance is formatted in three columns: • Column 1 lays down the legal requirements contained in Regulation (EC) No 852/2004 with which food businesses must comply. • Column 2 sets out recommended means by which food businesses may comply with the regulations in order to control cross-contamination with *E. coli* O157. Where possible, it provides different options for compliance, the suitability of which will be dependent on the activities and particular circumstances relating to each business. It is for the business to determine the controls that are appropriate given their activities and for the relevant local authority to verify the suitability of the controls. Whilst businesses are advised to follow this guide to compliance, it is open to a business to demonstrate to their local authority that it can achieve the objectives of the regulations in other ways. • Column 3 provides guidance on good practice within food businesses.
Key words	• Contaminants and food contact materials • Food law, monitoring and controls • Hygiene and food safety
Review date	September 2015

Revision History

This guidance follows the Government **Code of Practice on Guidance**. If you believe this guidance breaches the Code for any reason, please let us know by emailing **betterregulation@foodstandards.gsi.gov.uk**. If you have any comments on the guidance itself, please call us using the contact number on page 2 or complete our ongoing **Guidance survey**

Revision No.	Revision date	Purpose of revision and paragraph number	Revised by

Acknowledgments

This guidance has been reviewed in consultation with representatives of the following groups:

- All Wales Food Safety Technical Panel
- British Hospitality Association (BHA)
- British Retail Consortium (BRC)
- Federation of Small Businesses (FSB)
- National Farmers' Retail & Markets Association (FARMA)
- National Farmers Union (NFU)
- National Food Hygiene Focus Group representing local authorities in UK
- Northern Ireland Food Liaison Group (NIFLG)
- Royal Environmental Health Institute of Scotland (REHIS)
- Scottish Food Enforcement Liaison Committee (SFELC)
- The Chartered Institute of Environmental Health (CIEH)

We would like to acknowledge the helpful contributions provided by all.

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Section 1: Introduction

The Food Standards Agency (FSA) has produced this guidance document to help food businesses comply with food hygiene legislation contained in Regulation (EC) No. 852/2004 to control cross-contamination with *E. coli* O157.

Escherichia coli O157 (commonly abbreviated *E. coli* O157) is a harmful bacterium that is particularly dangerous because it has the ability to survive during refrigeration and freezing and has been shown to be tolerant of acid, salt and dry conditions. If consumed, even at very low doses, it can lead to death or serious untreatable illness. Even after recovery from infection, some cases are left with permanent kidney or brain damage. Special attention should always be regarded to vulnerable groups, such as young children or the elderly.

The primary objective of this guidance is to ensure the food produced and sold in the UK is safe to eat and consumers are protected. The risk of cross-contamination with *E. coli* O157 must be considered and controlled in any food business where both raw and ready-to-eat (RTE) foods are handled.

E. coli O157 is a hazard that needs to be controlled through the business' food safety management system. To help businesses comply with this requirement the guidance clarifies:

- the circumstances in which *E. coli* O157 cross-contamination hazards should be considered,
- the control measures that can be applied to control cross-contamination with *E. coli* O157, and
- that if such controls fail, there is an imminent risk to consumers with potentially severe consequences.

By following the steps provided in this guidance a food business will help control cross-contamination from other foodborne bacteria such as *Campylobacter*, *Salmonella* and other *E. coli* strains.

The control measures required will vary between different businesses and should be proportionate to the risk posed in accordance with the specific activities of the business.

Local Authorities (LA)[1] will be able to advise on the control measures required in a specific business.

This guidance lays down the legal requirements and the FSA's interpretation of how to comply with these requirements followed by good practice. Businesses are advised to follow this guide to compliance, but it is open to a business to demonstrate to their local authority that it can achieve the objectives of the regulations in other ways.

There is a risk of cross-contamination if the same piece of complex equipment is used to process raw and RTE foods. The risk may be adequately controlled by an effective cleaning and disinfection process, but requires that all surfaces that could potentially be contaminated either directly or indirectly, are subjected to the required chemical or heat disinfection. Due to the complexity of certain types of machinery, including vacuum packers, slicers and mincers, it is considered that it would be too difficult to effectively clean such equipment between uses during the normal operation of a business.

Page 12 discusses the different approaches in more detail on all types of equipment.

1 Businesses with a Primary Authority or equivalent scheme may wish to contact them as required

1.1 Who is this guidance for?

This guidance is for all types of businesses that handle both raw foods (that can be a source of *E. coli* O157) and RTE foods.

It will also help LAs during their inspections of food premises to ensure that the risk of cross-contamination with *E. coli* O157 is under control.

The guidance **does not apply** to the following types of food businesses:

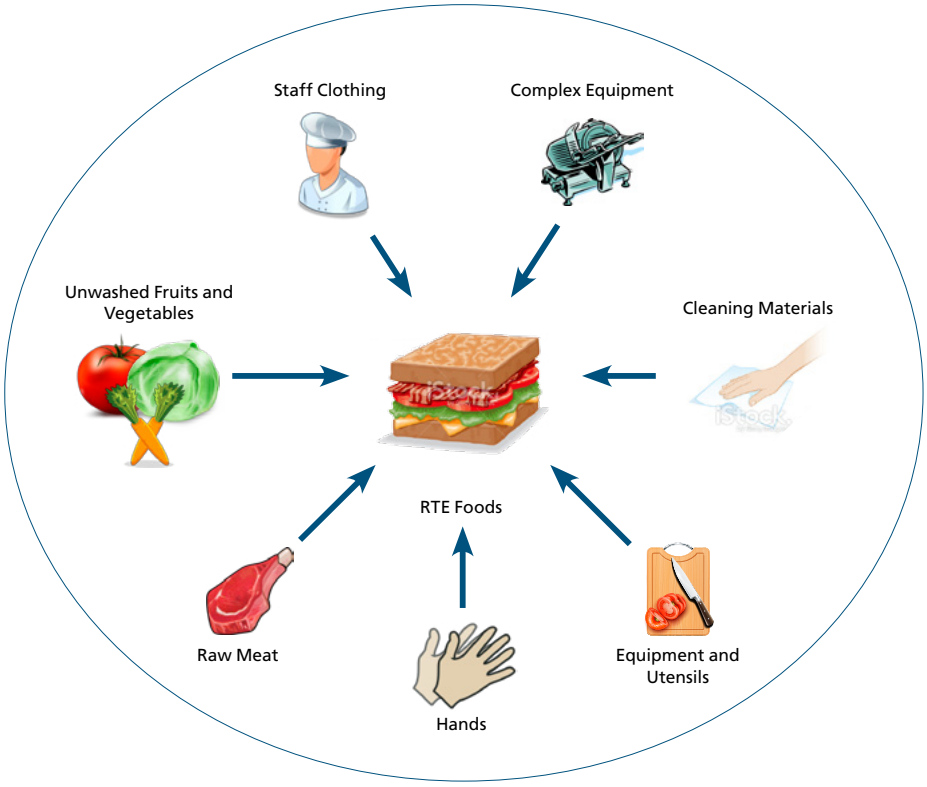
- primary producers and growers (for example farmers);
- food businesses that handle only pre- wrapped/ pre-packaged food in a way that prevents cross-contamination such as distributors, warehouses and some retailers where open food is not handled or packed on site; and
- approved manufacturing processors such as cheese manufacturers or raw milk processors (such as those pasteurising milk), which already have their own established systems to control cross-contamination.

However, the above mentioned businesses are still required to comply with food hygiene regulations and are recommended to follow specific guidance on good hygiene practices[2].

1.2 What is cross-contamination?

Cross-contamination is one of the most common causes of food poisoning. It happens when harmful bacteria are spread onto food from either other food sources (known as direct cross-contamination) or from surfaces, hands or equipment that have been contaminated (known as indirect cross-contamination).

Figure 1: Examples of cross-contamination



2 Some examples could include: Food Industry Guides to Good Hygiene Practice for Wholesale Distributors and Retail http://www.food.gov.uk/about-us/publications/industrypublications/industry-guides/ , Code of Hygienic Practice for Fresh Fruit and Vegetables http://www.codexalimentarius.org/roster/detail/en//c/80352/ or the Code of good practice for specialist cheese makers http://www.specialistcheesemakers.co.uk/best_practice/

1.3 Steps to control cross-contamination

The key control measures outlined in this guidance to control cross-contamination with *E. coli* O157 are:

- Separation between raw and RTE foods.
- Effective cleaning and disinfection procedures.
- Personal hygiene, particularly hand washing, and handling practices.
- Effective management controls and training.

1.4 Sources of *E. coli* O157 in food

E. coli O157 can be found in the following sources, and all these products are required to be handled as if *E. coli* O157 is present:

- **Raw meat** – *E. coli* O157 is most commonly associated with beef, lamb, goat and deer but it has also been found in pork, poultry and the offal of all the mentioned species.

  Raw bacon must be handled as raw meat because the salting/curing process will not guarantee the removal of harmful bacteria.

- **Fresh Produce** – Fruits and vegetables that are not supplied as RTE must be treated as a potential source of *E. coli* O157 and to make them safe to eat they will need to undergo an adequate washing[3] and/or processing treatment (for example peeling or cooking).

  Soil where fresh produce grows can become contaminated with bacteria such as *E. coli* O157 which can transfer to fruits and vegetables. Root crops and leafy vegetables sold loose are likely to have the most soil on the outside.

  Fresh produce that is not supplied as RTE is to be handled, stored and displayed in such a way that it does not contaminate RTE foods. Special attention is required when storing soiled vegetables to ensure that they do not contaminate other produce that may not be supplied as RTE but are likely to be consumed raw (for example fruits such as strawberries or raspberries).

  Fruits and vegetables that have been supplied as RTE should already have been subjected to controlled procedures to ensure that they do not present a risk to health. It is not necessary to re-wash them and re-washing is not recommended as it could introduce an additional cross-contamination risk.

- **Raw milk** – Raw milk and raw milk products supplied to a food business should always be treated as a potential source of contamination unless supplied as RTE. Cheese manufactured from unpasteurised milk and supplied as a RTE product should be treated as RTE. The processing of raw milk in the manufacture of RTE products is beyond the scope of this guidance.

- **Untreated water supplies** – Water can be an important source of microbiological hazards because harmful bacteria may survive in water for months. Water supplied to food businesses, including private supplies, must meet potable water standards.

3 Washing will help to remove bacteria including *E. coli* from the surface of fruit and vegetables. Most of the bacteria will be in the soil attached to the produce. Washing to remove any soil is, therefore, particularly important. When washing vegetables, do not just hold them under the running tap, rub them under water, for example in a bowl of fresh water starting with the least soiled items first and then give each of them a final rinse. Washing loose produce is particularly important as it tends to have more soil attached to it than pre-packaged fruit and vegetables – *NHS choices - How to wash fruits and vegetables: http://www.nhs.uk/Livewell/homehygiene/Pages/How-to-wash-fruit-and-vegetables.aspx*

Section 2: Separation

The design of any food premises should permit good food hygiene practices, including protection against contamination with *E. coli* O157 and other harmful bacteria.

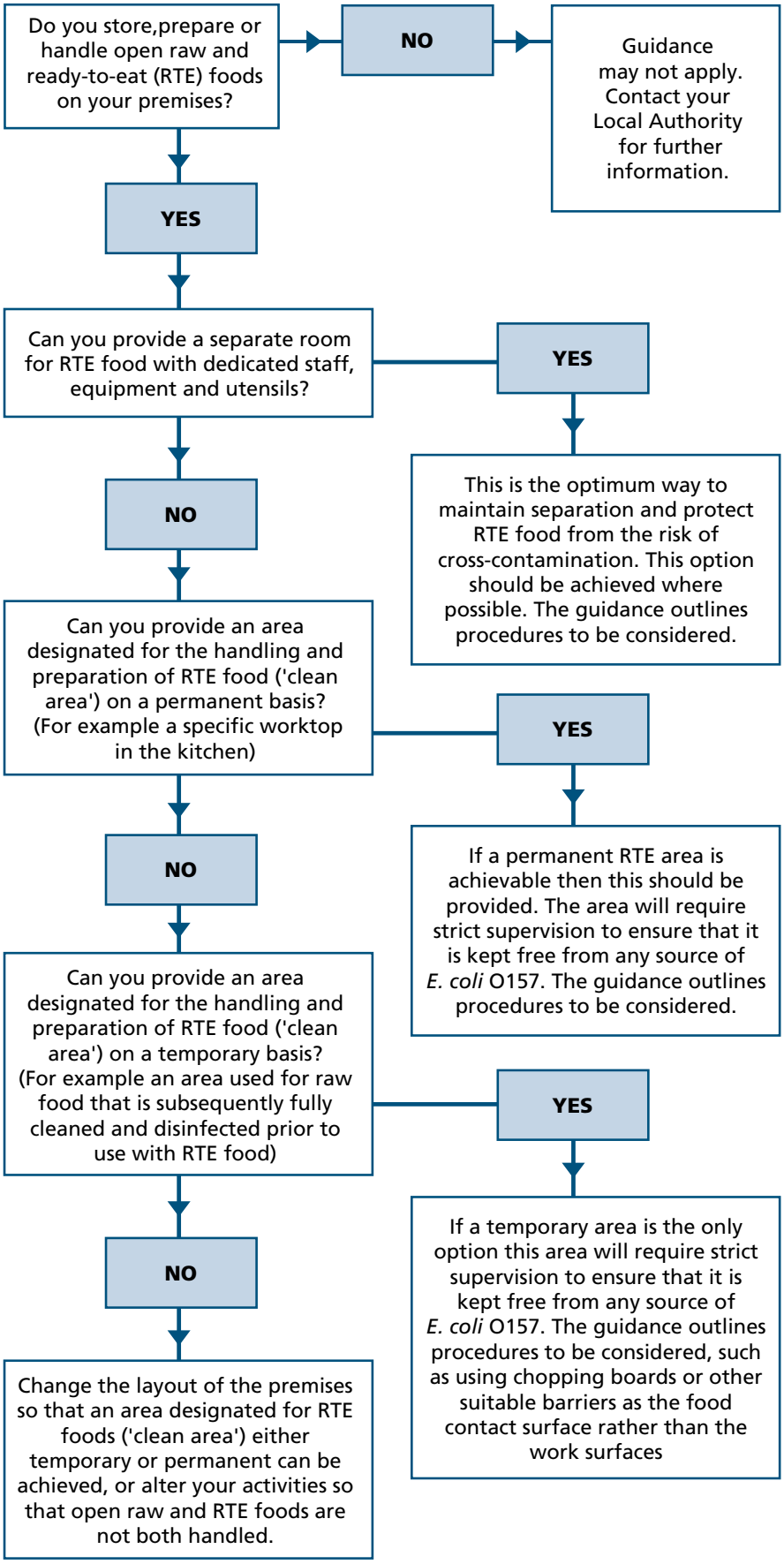
Raw food contaminated with *E. coli* O157 may transfer bacteria to RTE foods either by

- direct contact through unsafe handling and storage, or by
- indirect contact through staff movement and poor personal hygiene or unsafe use of equipment, utensils and food contact surfaces.

Identifying separate work and storage areas, food contact surfaces, equipment and utensils for raw and for RTE foods is the most effective way to prevent cross-contamination.

If physical separation is not possible the adequate cleaning and disinfection of the areas used to prepare food will be the main control.

2.1 Separation of Areas Decision Tree – What is achievable?



Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Annex II Chapters I, II and III	**2.2 Food preparation rooms / areas**	**2.2 Food preparation rooms / areas**
Chapter I (2) the layout, design, construction, siting and size of food premises are to: (a) permit adequate maintenance, cleaning and/or disinfection, avoid or minimise air-borne contamination, and provide adequate working space to allow for the hygienic performance of all operations; (c) permit good food hygiene practices, including protection against contamination and, in particular, pest control. **Chapter II** (1) In rooms where food is prepared, treated or processed (excluding dining areas and those premises specified in Chapter III, but including rooms contained in means of transport) the design and layout are to permit good food hygiene practices, including protection against contamination between and during operations. In particular: (f) surfaces (including surfaces of equipment) in areas where foods are handled and in particular those in contact with food are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect. This will require the use of smooth, washable corrosion-resistant and non-toxic materials, unless food business operators can satisfy the competent authority that other materials used are appropriate. **Chapter III** Requirements for movable and/or temporary premises (such as marquees, market stalls, mobile sales vehicles), premises used primarily as a private dwelling-house but where foods are regularly prepared for placing on the market and vending machines (1) Premises are, so far as it is reasonably practicable, to be so sited, designed, constructed and kept clean and maintained in good repair and condition as to avoid the risk of contamination... (2) In particular, where necessary: (b) surfaces in contact with food are to be in sound condition and be easy to clean and, where necessary, to disinfect. This will require the use of smooth, washable, corrosion-resistant and non-toxic materials, unless food business operators can satisfy the competent authority that other materials used are appropriate; (h) foodstuffs are to be placed as to avoid the risk of contamination so far as is reasonably practicable.	When both raw and RTE foods are handled and prepared from the same premises, there must be effective procedures in place to prevent cross-contamination. How to ensure this will depend on the activities undertaken by the business, as well as what is achievable for the business. Refer to the separation of areas decision tree (page 9) to determine what is appropriate. The options for a food establishment are either: 1. using a permanent separate room for RTE food only. This separate room should have dedicated storage facilities, staff, equipment, utensils and sinks for the handling and preparation of RTE food only. or 2. using an area designated for the handling and preparation of RTE food (also referred to as 'clean area') on a permanent basis. The area must be of sufficient size for the operations carried out, and suitably constructed and installed in such a way as to ensure that RTE foods can be effectively protected from any potential contamination (for example located sufficiently away from areas where splashing may contaminate RTE foods). or 3. using an area designated for RTE foods based on time separation (also referred to as a 'temporary clean area'). This area will have been cleaned and disinfected to the required standards prior to being used for RTE foods. When taking this option the following needs to be taken into consideration: • Time separation is to be managed in such a way that ensures that contamination from *E. coli* O157 has been effectively removed from all surfaces (including staff hands) that come in contact with RTE foods. Worktops must be thoroughly cleaned and disinfected after the area has been used to prepare raw foods before it can be used for RTE foods. Depending on the activities carried out it might also be required to clean and disinfect the walls in the area. (see **Section 3: Cleaning and disinfection**). • When using time separation, work surfaces must not be used as food contact surfaces. A suitable barrier, such as a chopping board or a container, can be used as the surface directly in contact with food. • The spaces above and below the work surface will need to be taken into consideration to avoid anything stored in them becoming contaminated or becoming a potential source of contamination.	It is recommended that separate areas are provided for raw and RTE foods. Where practicable, use separate rooms that include: • separate fridges, freezers, display units, • separate designated staff/uniforms, • separate equipment, • separate utensils, • separate sinks, • separate wash-hand basins. When time separation is used, it is recommended, where possible, to prepare RTE foods first in a designated area before undertaking preparation of raw foods.

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Annex II Chapter IX	**2.3 Storage and display**	**2.3 Storage and display**
(2) Raw materials and all ingredients stored in a food business are to be kept in appropriate conditions designed to prevent harmful deterioration and protect them from contamination. (3) At all stages of production, processing and distribution, food is to be protected against any contamination likely to render the food unfit for human consumption, injurious to health or contaminated in such a way that it would be unreasonable to expect it to be consumed in that state. (5) ...Food businesses manufacturing, handling and wrapping processed foodstuffs are to have suitable rooms, large enough for the separate storage of raw materials from processed material and sufficient separate refrigerated storage.	If practical, use separate storage and display facilities for raw and RTE foods. However the same storage (for example same fridge/freezer) or display unit can be used for raw and RTE foods as long as the storage space is of sufficient size and the storage is planned in such a way that contamination is avoided. Adequate separation within storage and display will often mean raw food has to be stored below RTE food unless other measures in place ensure that cross-contamination can be avoided. Door handles can be a potential source of cross-contamination. In practice, one way to control this is that staff handling raw foods wash their hands before touching door handles, this will keep handles clean for staff handling RTE foods. If the food stored is wrapped or packaged, attention needs to be paid to the integrity and condition of the packaging to avoid the possibility of it becoming a source of contamination (for example damaged or soiled packaging). Staff need to be instructed on adequate separation within storage and display equipment so that they are clear on where to store food safely.	It is good practice to use separate storage and display facilities including refrigerators, freezers and display units for raw and RTE foods. It is good practice to store raw and RTE foods in separate designated areas even if the food is in sealed containers. Door handles should be included on cleaning checklists/ schedules. Ensure packaging is robust, not damaged or leaking and food is checked regularly to ensure integrity and adequate condition of packaging. It is good practice to label designated areas to make them clearly identifiable to all staff as being for the storage of RTE or for the storage of raw foods.
(EC) No 852/2004 Annex II Chapters II, III and V	**2.4 Equipment and utensils**	**2.4 Equipment and utensils**
Chapter II (2) Adequate facilities are to be provided, where necessary, for the cleaning, disinfecting and storage of working utensils and equipment. These facilities are to be constructed of corrosion-resistant materials, be easy to clean and have an adequate supply of hot and cold water. **Chapter V** (1) All articles, fittings and equipment with which food comes into contact are to: (a) be effectively cleaned and, where necessary, disinfected. Cleaning and disinfection are to take place at a frequency sufficient to avoid any risk of contamination; **Chapter III, Requirements for movable and/or temporary premises...** (2) in particular, where necessary: (c) adequate provision is to be made for the cleaning and, where necessary, disinfecting of working utensils and equipment'	If equipment and utensils (for example chopping boards, containers, tongs) are to be used for raw and RTE foods, they must be disinfected by heat or an adequate dishwasher cycle between uses (see **Section 3: Cleaning and disinfection**). If heat disinfection is not possible, separate equipment and utensils must be used for handling raw and RTE foods and must be stored and washed separately. Equipment, utensils, dishes and wrapping materials used for RTE foods are not to be stored in open storage (i.e. a storage area that cannot be closed) underneath a worktop where preparation of raw foods is undertaken as this could lead to cross-contamination.	Equipment and utensils should be washed in a dishwasher following the manufacturer's instructions. Designated equipment and utensils used for raw and RTE foods should be easily identifiable for example colour coded.

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Article 5 and Annex II Chapter IX (3)	**2.5 Complex equipment[4]**	**2.5 Complex equipment**
Article 5 (2) The HACCP principles consist of the following: (a) identifying any hazards that must be prevented, eliminated or reduced to acceptable levels; (b) identifying the critical control points at the step or steps at which control is essential to prevent or eliminate a hazard or reduce it to acceptable levels; (c) establishing critical limits at critical control points which separate acceptability from unacceptability for the prevention, elimination or reduction of identifiable hazards. **Chapter IX** (3) see above	There is a risk of cross-contamination where the same piece of complex equipment, such as vacuum packers, slicers and mincers, are used to process raw and RTE foods. Depending on the complexity of equipment the contamination may not be adequately removed during routine cleaning and disinfection process and can result in any RTE foods subsequently processed becoming contaminated. **FBOs must ensure that:** **Vacuum packers, slicers and mincers** are not to be dual used as there is a risk of cross-contamination, unless the equipment is fully dismantled and disinfected between uses. The reason is that contamination can occur throughout the internal components of the machines that cannot be adequately disinfected without a full dismantle. In the case of vacuum packers, a full dismantle should only be undertaken by a competent engineer as the internal components need to be accessible, cleaned and disinfected. In the case of slicers and mincers, whilst a full dismantle to facilitate cleaning and disinfection may be less complicated than for a vacuum packer, it is nevertheless considered that this process could not be undertaken effectively during the normal operations of a working day, but, subject to effective cleaning procedures, may be possible on an occasional basis, for example during a period when the business is not operating, when sufficient time and attention can be given to ensure thorough dismantling, cleaning and disinfection. Dismantling will depend on the type of machine used, but the FBO must be able to easily access and disinfect all surfaces that could be contaminated. **For other types of less complex equipment**, such as temperature probes, mixers and weighing scales, the FBO needs to determine whether it is safe to dual use during the normal operations of a working day. This will involve: • determining how complex the equipment is; • how the equipment is used / dual used by the business (for example continuous use versus occasional); • the activities of the business; and • the required cleaning and disinfection to minimise the risk of cross-contamination. The required cleaning and disinfection will be dependent on the equipment, such that simple flat surfaces will be easier to disinfect than lots of smaller moving parts. It may therefore be possible to dual use certain types of less complex equipment if the business has the correct controls in place. The LA will have to determine whether the controls in place are adequate to ensure the safety of food.	It is recommended to label or colour code complex equipment so all staff are aware of its intended use. If permanent areas for raw and RTE food preparation have been designated then complex equipment should be located in the suitable area depending on its use.

4 Machinery intended for use with foodstuffs is required to comply with the European Machinery Directive 2006/42/EC

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Article 5 and Annex II Chapter IX (3)	**2.6 Cash registers**	**2.6 Cash registers**
see above	Cash registers and other non-food contact equipment (for example pens, phones, chip and pin machines, light switches, etc.) may be shared by staff handling raw and RTE foods. The main control is that staff wash their hands before handling any RTE foods (see **Section 4: Personal hygiene and handling practices**).	Good practice would be to have separate cash registers ensuring one is kept in the raw area and one is kept in the RTE area. Cash registers should be included in the cleaning schedules.
(EC) No 852/2004 Annex II Chapters II and III	**2.7 Sinks**	**2.7 Sinks**
Chapter II (2) Adequate facilities are to be provided, where necessary, for the cleaning, disinfecting and storage of working utensils and equipment. These facilities are to be constructed of corrosion-resistant material, be easy to clean and have an adequate supply of hot and cold water. (3) Adequate provision is to be made, where necessary, for washing food. Every sink or other such facility provided for the washing of food is to have an adequate supply of hot and/or cold potable water consistent with the requirements of Chapter VII and be kept clean and, where necessary, disinfected. **Chapter III** Requirements for movable and/or temporary premises. (2) In particular, where necessary: (d) where foodstuffs are cleaned as part of the food business' operations, adequate provision is to be made for this to be undertaken hygienically; (e) an adequate supply of hot and/or cold potable water is to be available;	If reasonably possible, separate sinks should be used for raw and RTE foods and equipment. However sinks can be shared provided that the sink, including the taps and any other fittings, is cleaned and disinfected between uses. When the sink is shared for raw and RTE foods, the food must not come into direct contact with the sink. A container can be used to avoid direct contact. Disinfectants used to disinfect shared sinks are required to comply with the BS EN 1276 or 13697 or equivalent standards (see **Section 3: Cleaning and disinfection**).	It is recommended to have separate sinks: • one for washing equipment and utensils used for raw foods and/or for rinsing raw foods such as fruits and vegetables • one for washing equipment and utensils used for RTE foods and/or for rinsing RTE foods such as cooked rice or pasta. It is not recommended to wash raw meat (for example poultry), due to the increased risk of splashing bacteria onto surrounding surfaces. It is not recommended to rewash vegetables or fruit that have been supplied as RTE.
(EC) No 852/2004 Annex II Chapter X	**2.8 Wrapping and packaging materials**	**2.8 Wrapping and packaging materials**
(1) Material used for wrapping and packaging are not to be a source of contamination. (2) Wrapping materials are to be stored in such a manner that they are not exposed to a risk of contamination. (3) Wrapping and packaging operations are to be carried out so as to avoid contamination of the products. Where appropriate and in particular in the case of cans and glass jars, the integrity of the container's construction and its cleanliness is to be assured. (4) Wrapping and packaging material re-used for foodstuffs is to be easy to clean and, where necessary, to disinfect.	Materials used to wrap and/or pack RTE foods must be stored in a designated area and the wrapping material must be kept free from contamination at all times. Staff handling wrapping and packaging materials must ensure that their clothes and hands are not vehicles for contamination when loading or removing wrapping and packaging materials. Food businesses must ensure that food received wrapped and/or packaged from other establishments is visually checked to ensure that the integrity and condition of the packaging do not pose a risk of cross-contamination, and that the separation between raw and RTE foods during transport is adequate. When unpacking / unwrapping packaged foods, ensure that packaging and wrapping materials are removed hygienically and are not a source of contamination.	It may be possible to establish an assured standard of cleanliness of the wrapping and packaging material through contractual arrangements with the supplier. For example, auditing the packaging material supplier or requesting written confirmation detailing the hygienic procedures followed to ensure that the wrapping/packaging materials are safe to be used with RTE food. Food businesses may consider having a written agreement with their suppliers about the delivery requirements. Where necessary, raw foods should be unpacked and/or unwrapped and placed in designated containers before they are brought into the kitchen or storage area.

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Annex II Chapter XII	**2.9 Staff**	**2.9 Staff**
Food business operators are to ensure: (1) That food handlers are supervised and instructed and/or trained in food hygiene matters commensurate with their work activity.	Staff must not be a source of contamination. Staff need to be supervised, instructed and/or trained to ensure movement between raw and RTE areas is managed in such a way that the risk of cross-contamination is minimised. In areas designated for RTE foods based on time separation and in catering environments, shops and similar premises where it may not be practical to have permanent separate staff for different tasks, it is essential that staff are trained to the required standard and that the highest levels of training and personal hygiene are to be maintained to ensure that staff are not vehicles of cross-contamination (see **Section 4: Personal hygiene and handling practices**).	Good practice, where appropriate, is to have separate staff for handling raw and RTE foods.

Section 3: Cleaning and Disinfection

When complete physical separation is not possible, cleaning and disinfection procedures are considered critical to control cross-contamination and to ensure food safety.

E. coli O157 and other harmful bacteria have to be effectively removed from all surfaces and equipment before they can be used in the preparation of RTE foods.

If cleaning and disinfection is not performed properly, it may result in the contamination of food and subsequently a health risk for consumers.

It is essential that staff designated for carrying out cleaning and disinfection procedures are adequately supervised, instructed and/or trained to ensure the procedures are carried out effectively every time.

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Annex II Chapters I and V	**3.1 Heat disinfection**	**3.1 Heat disinfection**
Chapter I (1) Food premises are to be kept clean and maintained in good repair and condition. (2) The layout, design, construction, siting and size of food premises are to: (a) permit adequate maintenance, cleaning and/or disinfection, avoid or minimise air-borne contamination and provide adequate working space to allow for the hygienic performance of all operations. **Chapter V** (1) All articles, fittings and equipment with which food comes into contact are to: (a) be effectively cleaned and, where necessary, disinfected. Cleaning and disinfection are to take place at a frequency sufficient to avoid any risk of contamination; (d) be installed in such a manner as to allow adequate cleaning of the equipment and the surrounding area. **Chapter IX** (3) see above *Note that the legislation quoted above applies to the whole Cleaning and disinfection section.*	Heat is the most reliable way to kill *E. coli* O157. If the same utensils and equipment are used for both raw and RTE foods at separate times, they must be heat disinfected or put through the adequate dishwasher cycle between uses. Any method of heat disinfection is acceptable provided that the process removes *E. coli* O157 from all surfaces; for example a dishwasher, a sterilising sink, or a steam cleaner. Adequate time and temperature combinations may need to be considered and utensils and equipment should be visibly clean prior to any heat disinfection. If heat disinfection is not available, food contact surfaces, equipment and utensils cannot be shared and need to be specifically designated for either raw or for RTE foods only (see **Section 2: Separation**).	The use of dishwashers to clean utensils and food equipment is good practice as long as they are properly maintained, serviced routinely and the full cycle is not interrupted once it has started. Food businesses should follow the manufacturer's instructions of use which usually include instructions on removal of food particles, correct loading (i.e. avoid overloading), pre-rinsing equipment and utensils, removal of limescale from water jets, filters and drains, appropriate use of chemicals and regular cleaning of the machine. If chemical disinfection is used within a dishwasher, this should be discussed with the relevant chemicals' manufacturer to ensure the chemicals used are adequate. Where heat is not available it is good practice to use separate sinks to wash equipment and utensils designated for raw and RTE foods.
	3.2 Chemical disinfection	**3.2 Chemical disinfection**
	When the same non-food contact surfaces such as worktops, sinks, etc. are used at different times to prepare raw and RTE foods, they must be cleaned and disinfected between uses. Chemical disinfectants used in these areas need to comply with BS EN standards 1276 and/or 13697 or equivalent. Disinfection will only be effective if carried out on visibly clean surfaces that are free from grease, film or solid matter. Chemical disinfection must always be carried out as a two-stage process: **Stage 1: general cleaning using a detergent.** This involves the physical removal of visible dirt, food particles and debris from surfaces and equipment, followed by a thorough rinse to ensure the removal of all residues from the surface before moving to stage 2.	It is good practice for businesses to 'clean as you go' to ensure that work areas, utensils and equipment are kept to the required levels of hygiene during the working day.

Legal requirement	Guide to compliance	Advice on good practice
See Above	**3.2 Chemical disinfection**	**3.2 Chemical disinfection**
	Stage 2: disinfection. This involves the use of a disinfectant following the manufacturer's instructions for its dilution rate and contact time. Disinfectants will not be effective if used on dirty surfaces, or if applied at the incorrect dilution or for the insufficient contact time or the incorrect temperature. When using a sanitiser the two stage cleaning process as described above is still required. Therefore apply the sanitiser (or a detergent) first for general cleaning, rinse and then apply the sanitiser again for the disinfection stage. Chemicals must always be used in accordance with the manufacturer's instructions regarding dilution, contact times and rinsing. Staff involved in cleaning procedures must be supervised, instructed and/or trained as required (see **Section 5: Management controls and training**).	When choosing disinfectants for chillers/freezers you should check with the supplier if the disinfectant chosen is effective when used at low temperatures. Chemicals should be purchased from reputable suppliers. Training on cleaning procedures should include: all appropriate health & safety information; materials and equipment required; name of products; required dilutions and required contact times as well as the overall standard to be achieved as part of the cleaning and disinfection process.
	3.3 Standards for disinfectants and sanitisers	**3.3 Standards for disinfectants and sanitisers**
	Any disinfectant or sanitiser used to control cross-contamination with *E. coli* O157 should at least meet the requirements of one of the following published standards at the recommended use, dilution and contact time: • **BS EN 1276; or** • **BS EN 13697** or, as a minimum, other test standards that meet the conditions and requirements used in these standards. These standards provide assurance that the disinfectant (or sanitiser) is capable of reducing a range of harmful bacteria, including *E. coli*, to acceptable levels if used as stated by the manufacturer. FBOs and staff must ensure that they are using the appropriate disinfectants; if the standard is not displayed on the product's label they need to contact the supplier or manufacturer for confirmation.	Disinfectants should be freshly prepared according to manufacturer's instructions. If disinfectants or sanitisers are being prepared in advance or transferred into new bottles (for example to dilute concentrated products) then it is good practice to put label instructions on the bottle on how to use the chemical, for example to specify contact time, expiry date of the product, dilution rate and if it requires rinsing. Further information on chemicals can be obtained through the Health and Safety Executive, www.hse.gov.uk. A list of products that comply with BS EN 1276 and/or 13697 can be accessed at http://www.disinfectant-info.co.uk/. *This list is maintained externally and the FSA has no responsibility for its content. We recommend to contact the chemicals' suppliers to confirm that specific products comply with the required standard.*
See Above	**3.4 Cleaning materials**	**3.4 Cleaning materials**

Legal requirement	Guide to compliance	Advice on good practice
	FBOs must ensure that the cleaning equipment is not a source of contamination.	Cleaning equipment should be in good condition and regularly cleaned and disinfected or replaced as required.
	Cloths that have been used to clean raw food areas must not be used to clean RTE areas unless suitably washed between uses in such a way that ensures that *E. coli* O157 has been destroyed.	For example, a suitably high temperature can be obtained using a hot cycle in a washing machine that typically operates at 90˚C.
	Steeping dirty cloths in bleach is not considered an effective measure to control cross-contamination with *E. coli* O157. Any organic matter, such as grease, dirt or food left on the cloths will reduce the effectiveness of the disinfectant properties in the bleach.	The use of disposable single-use cloths is recommended to prevent cross-contamination.
	Cleaning materials (for example cloths, brushes, etc.) used on the floor must be separated from materials used on other surfaces such as worktops.	Cleaning materials for different areas should be easily identifiable (for example colour coded), and stored separately.
	Cleaning of floors must be carried out in a way that does not contaminate surfaces in a clean environment (for example by splashing).	Floors can never be regarded as clean and any food or surfaces of food equipment that come into contact with any floor must be considered as potentially contaminated (food should be discarded and containers should be cleaned and disinfected).

Section 4: Personal Hygiene and Handling Practices

It is essential that staff follow good personal hygiene practices to help prevent cross-contamination of harmful bacteria to RTE foods. Effective handwashing and suitable clean protective clothing can help prevent harmful bacteria spreading to food, work surfaces, equipment etc. through hand contact or clothing.

An example of washing hands effectively

Step 1: Wet your hands thoroughly under warm running water and squirt liquid soap onto your palm

Step 2: Rub your hands together palm to palm to make a lather

Step 3: Rub the palm of one hand along the back of the other and along the fingers. Repeat with the other hand

Step 4: Put your palms together with fingers interlocked and rub in between each of the fingers thoroughly

Step 5: Rub around your thumbs on each hand and then rub the fingertips of each hand against your palms

Step 6: Rinse off the soap with clean water and dry your hands thoroughly. Ensure the taps are turned off hygienically, for example using a disposable towel.

There must be procedures in place to monitor and manage strict adherence to a documented handwashing procedure and to the appropriate use of protective clothing to control the risk of cross-contamination with *E. coli* O157.

The FSA has produced hand washing videos as well as printable diagrams on effective hand washing for use by food businesses:

Videos – http://www.youtube.com/user/FoodStandardsAgency

SFBB handwashing – http://www.food.gov.uk/multimedia/pdfs/publication/handwashing-sfbb-0513.pdf

Safe catering handwashing – http://food.gov.uk/northern-ireland/safetyhygieneni/safecateringni/

CookSafe handwashing – http://food.gov.uk/multimedia/pdfs/csposter.pdf

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Annex II Chapters I, III & VIII	**4.1 Hand washing**	**4.1 Hand washing**
Chapter I (4) An adequate number of washbasins is to be available, suitably located and designated for cleaning hands. Washbasins for cleaning hands are to be provided with hot and cold running water, materials for cleaning hands and for hygienic drying. Where necessary, the facilities for washing food are to be separate from the handwashing facility. **Chapter III** Requirements for movable and/or temporary premises... (2) In particular, where necessary (a) appropriate facilities are to be available to maintain adequate personal hygiene (including facilities for the hygienic washing and drying of hands, hygienic sanitary arrangements and changing facilities) **Chapter VIII** (1) Every person working in a food-handling area is to maintain a high degree of personal cleanliness...	Washbasins must be located so as to prevent contamination of RTE foods by splashing, and have an adequate supply of hot and cold, or appropriately mixed, running water, cleaning materials and hygienic means of drying hands. Taps can be a source of contamination, and therefore it may not be appropriate for hands to come into contact with taps after they have been washed. For example a disposable paper towel can be used to turn the taps off. In order to control cross-contamination, handwashing is required: • prior to handling RTE food • after touching raw food and its packaging, including unwashed fruit and vegetables • after a break • after going to the toilet • after cleaning • after removing waste • after blowing your nose, and • measures are to be taken before touching phones, light switches, door / fridge / freezer handles and cash registers to ensure these are kept clean. Although there may be slight variations on handwashing techniques all include the following steps: • wetting of hands prior to applying soap • a prescribed technique for hand rubbing, aimed at physically removing contamination from all parts of the hands • rinsing of hands; and • hygienic drying It is important that staff dry their hands thoroughly as bacteria can spread more easily if hands are wet or damp.	It is good practice to use non-hand operated taps at handwashing facilities as they reduce the risk of cross-contamination. Single use, disposable towels are recommended for hygienically drying hands. Re-usable towels are not recommended. For extra protection against harmful bacteria and contamination, it is recommended to use an anti-bacterial hand wash that has disinfectant properties conforming to the European standards BS EN 1499. This information should be available on the label of the product, or can be obtained from the supplier/manufacturer. Hand sanitising gels can provide an additional level of protection when applied after handwashing. Gels, if used, should conform to BS EN 1500 standard. It should be noted that these gels do not necessarily remove visible dirt and should never be used as a replacement for handwashing. Where possible, working practices should minimise the requirement of frequent handwashing, for example by preparing raw foods at different times to RTE food or by having separate staff for different dedicated activities (so one handling raw foods and one handling RTE foods). Minimising direct hand contact with food by using clean tongs or other utensils may help reduce cross-contamination risks. Even with these procedures effective handwashing needs to be followed to help further reduce any risks, for example the risk of cross-contamination with utensil handles. Gloves are not a substitute for effective handwashing. If gloves are used they should be changed as per the list for when handwashing is required and if they become damaged or torn. Hands should also be washed prior to putting gloves on and when necessary after taking them off (for example it may not be required when only RTE food is handled). The use of separate identifiable or colour coded packs of disposable gloves for different activities might assist with cross-contamination

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Annex II Chapter VIII	**4.2 Protective clothing**	**4.2 Protective clothing**
(1)...and is to wear suitable, clean and, where necessary, protective clothing	Protective clothing must not present a cross-contamination risk, and therefore if contaminated it needs to be changed prior to handling RTE foods. Staff members must wash their hands after changing contaminated clothing and before putting on clean clothing. When the same staff handle raw and RTE food alternately (for example during cooking, or in a shop with only one member of staff) there is no need to change protective clothing for different activities but care is required to ensure that clothing does not become contaminated, or pose a risk of cross-contamination in which case it will need to be changed. Systems in place must ensure that any visitor entering the premises follows the established hygiene controls.	Where appropriate, it is good practice for food businesses to have separate sets of clothing for handling raw and RTE foods (and ideally separate staff). When appropriate, food businesses may consider using designated colour coded aprons or disposable aprons for different activities. There is not a recommended specific temperature to wash staff uniforms. The important point is that staff working with RTE foods should always wear suitable, clean clothing that does not present a risk of indirect cross-contamination.

The Food Standards Agency has produced guidance for food businesses on actions to take for staff that have an illness or have been ill; Food handlers' fitness to work guide can be accessed at: http://food.gov.uk/multimedia/pdfs/publication/fitnesstoworkguide09v3.pdf.

Section 5: Management Controls and Training

Effective food safety management controls are critical to control cross-contamination with *E. coli* O157.

The food hygiene legislation requires Food Business Operators (FBOs) to put in place food safety management procedures based on the HACCP principles. It is not the intention of this guidance to explain those requirements in full; however, some of these requirements are dealt with in this section.

FBOs must ensure that food handlers are supervised and instructed and/or adequately trained to understand the importance of food hygiene matters in line with their work activity.

Training / instruction should cover the importance of separation of raw and RTE foods, the importance of personal hygiene, in particular effective hand washing and the hazards associated with inadequate cleaning and disinfection. All staff involved in cleaning procedures need to be trained to ensure they are competent before being asked to undertake heat or chemical disinfection.

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Article 5	**5.1 Documented procedures**	**5.1 Documented procedures**
(1) Food businesses operators shall put in place, implement and maintain a permanent procedure or procedures based on the HACCP principles. (2) The HACCP principles referred to in paragraph 1 consist of the following: (a) identifying any hazard that must be prevented, eliminated or reduced to acceptable levels; (b) identifying the critical control points at the step or steps at which control is essential to prevent or eliminate a hazard or to reduce it to acceptable levels; (c) establishing critical limits at critical control points which separate acceptability from unacceptability for the prevention, elimination or reduction of identified hazards; (d) establishing and implementing effective monitoring procedures at critical control points; (g) establishing documents and records commensurate with the nature and size of the food business to demonstrate the effective application of the measures outlined in subparagraphs (a) to (f).	FBOs must keep up-to-date documented procedures that cover cross-contamination control and be part of the relevant staff training. FBOs should consider and, where appropriate, document: • Potential sources of *E. coli* O157 in the business. • Method of separation (for example permanent separate areas). • Cleaning procedures for surfaces, equipment and utensils. Detail the type of disinfection required for each area / equipment (i.e. heat disinfection, chemical disinfection, etc.). • Personal hygiene procedures (for example hand washing requirements, personal hygiene rules and use of protective clothing). • staff training	You may find the following helpful: • Safer Food Better Business (SFBB) • Safe Catering • CookSafe It is good practice to use labels to identify designated areas and/or to use colour coded equipment and utensils designated for RTE foods. It is recommended to display posters describing the correct hand washing technique and the personal hygiene rules.
(EC) No 852/2004 Article 5	**5.2 Record keeping**	**5.2 Record keeping**
(g) establishing documents and records commensurate with the nature and size of the food business to demonstrate the effective application of the measures outlined in subparagraphs (a) to (f).	Record keeping is essential to demonstrate that procedures for the control of cross-contamination are adhered to. Records must be kept for an appropriate time long enough to ensure information is available in case a product needs to be traced back. Depending on the activities of the business these may include: • Records of monitoring and verification activities. • Records of non-conformances and corrective action taken. • Records of cleaning, maintenance and pest control. • Records of review of the food safety management systems. Systems have to be reviewed whenever substantial changes are made (for example when introducing a new product or when using new ingredients in a recipe). • Evidence of training and supervision which should include training on cross-contamination procedures.	It is not necessary to set up complex systems – simple records easy to understand will be sufficient in accordance to the size of the business and the activities that it undertakes. Documents and records should be retained for a period of time which relates to factors such as the shelf life of the product, period of staff employment (for training records), frequency of scheduled cleaning programmes, etc. It is good practice to review the systems at least once a year.

Legal requirement	Guide to compliance	Advice on good practice
(EC) No 852/2004 Annex II Article 5	**5.3 Corrective actions**	
(e) establishing corrective actions when monitoring indicates that a critical control point is not under control;	When things go wrong, such as a loss of control, it is essential to take immediate action to ensure food safety. If a RTE product has potentially been contaminated with *E. coli* O157 the affected operation must stop immediately. The FBO must remove the contaminated product to a safe area and investigate the cause. Then the following may be appropriate: • Disposal of contaminated product. • Re-work of potentially contaminated product (for example heat treatment with temperatures that will destroy *E. coli* O157, for example 70°C for 2 minutes). • Withdrawal or recall of the contaminated product (inform the local authority and the FSA via: www.food.gov.uk/policy-advice/incidents/report/).	
(EC) No 852/2004 Annex II Article 5	**5.4 Verification and review**	**5.4 Verification and review**
(f) establishing procedures, which shall be carried out regularly, to verify that the measures outlined in subparagraphs a) to e) are working effectively and,	Periodic reviews of all procedures established to control cross-contamination with *E. coli* O157 are required regularly and whenever there are significant changes to operations. Food businesses are required to check and confirm that the controls in place are effective during both quiet and busy periods, and particularly when a new procedure is introduced. Any verification check that establishes a loss of control must be considered a serious risk of cross-contamination and corrective actions are to be taken immediately.	Verification should ideally be carried out by someone other than the person responsible for monitoring and can be done in house or by external independent third party (for example if you are member of a specific scheme). Verification procedures can include: audits to suppliers, validation of critical limits, corrective actions taken, calibration of instruments used for monitoring, servicing of machinery, environmental sampling, etc.
(EC) No 852/2004 Annex II Chapter XII	**5.5 Training**	**5.5 Training**
Food business operators are to ensure: (1) that food handlers are supervised and instructed and/or trained in food hygiene matters commensurate with their work activity; (2) that those responsible for the development and maintenance of the procedures referred to in article 5(1) of this regulation or for the operation of relevant guides have received adequate training in the application of the HACCP principles.	Staff must be instructed or trained in all safe methods that are relevant to the job they do and the competency of staff must be supervised and reviewed regularly to establish the need of refreshing any training. Staff responsible for the development and maintenance of the HACCP plan must receive specific training in HACCP.	Although there is no legal requirement to attend a formal training course, food businesses may consider using recognised training courses specific to the requirements of their particular business. The necessary skills can also be obtained through other methods such as on-the-job training, self-study or relevant prior experience.

Section 6: Glossary

The following definitions are specific to this guidance:

- **'anti-bacterial hand wash'** – hand sanitising products such as bactericidal liquid or foam soaps.
- **'area designated for RTE foods'** – Also referred to as a 'clean area' – an area within a food establishment that is specifically designated for RTE foods and managed in a way that ensures that harmful bacteria such as *E. coli* O157 have been effectively excluded from all surfaces and from food handlers that will come in contact with RTE foods. The designated area can be used on a permanent basis or a temporary basis, where it is used at different times for raw foods.
- **'BS EN'** – British Standard, European Norm. Disinfectants that comply with BS EN 1276 and/or BS EN 13697 published standards or alternative standards that meet the same conditions have shown to kill *E. coli* O157 if applied as directed by manufacturers.
- **'chemical disinfection'** – reduction of the levels of microorganisms using approved chemical agents (disinfectants or sanitisers).
- **'clean as you go'** – keeping the work area clean and tidy at all times whilst working. This may include cleaning up spills, wiping down surfaces, removing waste to bins and generally keeping the work area, tools and equipment and persons working in it to the required levels of hygiene to produce safe food.
- **'complex equipment'** - items of equipment that can be very difficult to clean adequately between uses. In particular this may be because it is hard to access all parts of the equipment or because they are made up of a number of small parts and surfaces which may not be smooth or easy to clean. For example slicers, mincers and vacuum packing machines.
- **'contact time'** – the period of time that the disinfectant needs to be left on the surface to work effectively.
- **'contamination'** – the presence or introduction of a biological, physical or chemical hazard in a food or food environment.
- **'critical limit'** – A criterion that separates acceptability from unacceptability for the prevention, elimination or reduction of identified hazards such as *E. coli* O157.
- **'cross– contamination'** – the transfer of hazards, for example bacteria, directly from raw food to ready–to–eat food, or indirectly from equipment, personnel and food handling environment.
- **'detergents'** – products used for general cleaning (to dissolve grease and remove dirt, debris etc.). Detergents do not have disinfectant properties (i.e. if used on their own they are not able to kill bacteria such as *E. coli* O157).
- **'dilution rate'** – quantity of water to use with a concentrated chemical before it can be used. Always follow the manufacturer's instructions.
- **'disinfectants'** – products capable of reducing the levels of specific bacteria when applied to visibly clean surfaces at the specified dilution and for the recommended contact time.
- **'FBO'** - Food business operator
- **'foodborne'** – microorganisms, such as bacteria which use food as a vehicle to move onto humans where they can multiply.
- **'HACCP'** – Hazard Analysis and Critical Control Points.
- **'hand sanitising gels'** – hand sanitising products, such as alcohol–based gels / bactericidal (capable of killing bacteria) hand gels and wipes.
- **'handling'** – to pick up and hold, move, or touch with the hands.
- **'hazard'** – a biological, chemical or physical agent in, or condition of, food with the potential to cause harm to the consumer's health.
- **'infective dose'** – the number of harmful bacteria that will cause infection in susceptible subjects.
- **'leafy vegetables'**– includes but is not limited to all varieties of lettuce, spinach, cabbage, watercress, chicory, endive and radicchio and fresh herbs such as coriander, basil, and parsley.
- **'monitoring'** – a pre–arranged programme of checks (observations or measurements) of critical and/or 'legal' limits to check whether control measures are in danger of failing and which determine the need to take corrective actions.
- **'non–food contact surfaces'** – surfaces that do not normally come in direct contact with food (for example walls), but can potentially cause cross–contamination due to its close proximity to exposed food.
- **'packaging'** – placing of one or more wrapped foodstuffs in a second container (and the second container itself).

- **'potable water'** – water meeting the minimum requirements laid down in Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption.
- **'protective clothing'** – coats, overalls, aprons, gloves, headgear and footwear.
- **'raw foods'** – in this context include raw meat and any raw food, including fruit and vegetables and any ingredient that are potential sources of *E. coli* O157 (fresh or frozen). Raw fish and shellfish are outside the scope of this guidance as they are not potential sources of *E. coli* O157.
- **'raw meat'**– uncooked red meat (including mince, bacon and sausages) poultry, game and offal. Raw meat includes both fresh and frozen meat.
- **'ready–to–eat foods'** (RTE) – foodstuff or ingredients that are intended to be consumed without the need of further heat treatment or processing. For example cooked meats, washed / peeled fruits, salads, pies, bread, cheese and sandwiches.
- **'recall'** – when customers are asked to return/dispose of a food product.
- **'root crops'**– include potatoes, onions, carrots, beets, and turnips.
- **'sanitisers'** – products that combine a disinfectant and a detergent in a single product. For effective disinfection they must be used twice: first to clean and then again to disinfect.
- **'sterilising sink'** - a sink unit used for sterilising equipment and utensils. Must be able to operate to a temperature capable to destroy *E. coli* O157.
- **'supervision'** – the process of overseeing the performing of tasks and procedures to ensure that they are carried out effectively and that the required standards are met.
- **'validation'** – collecting and evaluating scientific and technical information to determine whether the HACCP plan, when properly implemented, will effectively control the identified food hazards. "The business is going to do the right thing"
- **'verification'** – checking or confirming that the HACCP–based procedures are achieving the intended effect, i.e. food safety hazards are under control. "Confirmation that the business is doing what had planned to do".
- **'visibly clean'** – free from any visible grease or film or solid matter. A visibly clean surface can still be contaminated by harmful bacteria if it has not been disinfected.
- **'withdrawal'** – stop using/selling a food product.
- **'wrapping'** – placing of a foodstuff in a wrapper or container in direct contact with the foodstuff concerned, and the wrapper or container itself.