

Annex B



Labelling and Composition of Meat Products

Guidance Notes

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Important Note

The aim of this guidance is to offer informal, non-statutory advice relating to the European definition of meat for labelling purposes (Directive 2001/101) as it relates to The Meat Products Regulations 2004 (MPR), and the provisions of the Food Labelling Regulations 1996 (FLR), and in particular Regulation 19 of the FLR on Quantitative Ingredient Declarations (QUID). Separate Agency Guidance is available on the general provisions of QUID.

Every effort has been made to ensure that these guidance notes are as helpful as possible. However, it is ultimately the responsibility of individual businesses to ensure their compliance with the law. Businesses with specific queries may wish to seek the advice of their local authority.

Legislation in the devolved assemblies

Following the process of devolution, food legislation is now commonly made on a separate basis in Scotland, Scotland, Wales and Northern Ireland. This is the case with the FLR, and MPR; there are four sets of each Regulation. Therefore the England Regulations apply only in England, the Scotland Regulations apply only in Scotland, and so on.

However, the four sets of each Regulation differ only in the powers under which they are made, and the food authorities given responsibility for enforcement. The provisions relating to the composition and labelling of meat products will be **similar** in each of the four sets of Regulations.

SECTION 1 – THE EUROPEAN DEFINITION OF MEAT

1. What is the European definition of meat?

Commission Directive 2001/101/EC was agreed in July 2001 and published in November 2001¹. It amends the Food Labelling Directive (2000/13/EC), and introduces a European generic definition of meat for the purposes of labelling. The definition puts meat ingredient declarations in meat products on the same basis throughout the European Union, and hence provides consumers with consistent and more transparent information. *The Annex to the Directive (which provides the definition itself) is reproduced in Annex A to this Guidance.*

The new definition:

- Restricts the generic term “meat” (as well as species names such as “beef”, “pork”, “chicken” etc.) to skeletal muscle with naturally included or adherent fat and connective tissue;
- Introduces maximum numerical limits for associated fat and connective tissue, depending on the species of the meat. Any fat or connective tissue in excess of these limits cannot be counted towards the meat content and must be declared separately in the ingredients list (although a QUID declaration will not be required for this fat and connective tissue);
- Excludes mechanically recovered meat (MRM), which must already be declared separately in the ingredients list. MRM may not be counted towards the “meat” content; and
- Requires other parts of the carcass such as liver, kidney, heart etc to be labelled as such. The generic term “offal” may not be used. In addition, these parts of the carcass may not be counted towards the QUID declaration for any meat ingredient.

2. What are the percentage limits on fat and connective tissue?

Species	% Fat	% Connective Tissue
Pork	30	25
Birds and rabbits	15	10
All other red meats and mixtures	25	25

3. How is the new definition different from that previously in force in the UK?

¹ OJ Reference L310, 28.11.01, p.19

- The European definition differs therefore by basing the definition only on skeletal muscle. As a result, certain parts of the carcass can no longer be regarded as meat (e.g., heart, tongue, liver, kidney, head meat etc.)
- There are specific percentage limits on the amount of fat and collagen that may be counted, along with the skeletal muscle, as meat.

4. How will the European definition be implemented, and how will it work in practice?

Implementation of the European definition is in two distinct parts, and is achieved by two separate Statutory Instruments (SI):

(i) *The Food Labelling (Amendment) Regulations 2003*

These Regulations amend the FLR to implement the new definition, which now appears in Schedule 6. There are three effects of this amendment:

- Where the word “meat” (or words such as “beef”, “pork”, “lamb”, “chicken” etc.) is used in a product’s list of ingredients, the ingredient in question must be “meat” within the meaning of the new definition.
- Where a QUID declaration is given for an ingredient described in this way, the quantity declared must be calculated in terms of the new definition, and must therefore take account of the limits for fat and connective tissue.
- Where an ingredient described in this way contains fat or connective tissue in excess of the limits in the definition, this excess must be declared separately in the product’s list of ingredients.

(ii) *The Meat Products Regulations 2004*

These Regulations revoke and replace the Meat Products and Spreadable Fish Products Regulations 1984 (MPSFPR). The new Regulations carry forward some of the national provisions of the MPSFPR, while bringing them

in line with the new definition. The principal changes of the new Regulations are that:

- The minima for the amount of meat products must contain in order to be described by the reserved descriptions are now expressed in terms of the new definition.
- There are labelling requirements only in relation to the ***name of the food*** under which meat products are sold (i.e., this includes restrictions on the use of the reserved descriptions, and the declaration of added ingredients in certain products).
- The labelling rules ***no longer cover quantity declarations*** for meat. These have been replaced by the requirements of QUID (as described above) QUID declarations are therefore completely independent of the compositional requirements of the Meat Products Regulations.

5. When does it come into force?

(i) The Food Labelling Amendment (Scotland) Regulations 2002

Came into force on the 1st January 2003. The Regulations include a transitional provision until 1st July 2003. The effect of which is that meat products labelled and placed on the market after 1st July, must be ***labelled*** on the basis of the new definition of meat (i.e., using the definition as described in paragraph 4(i) above).

(ii) The Meat Products Regulations 2004

Will come into force in Scotland on 1st February 2004 and contain a transitional provision to 1st July 2004. The effect of which is that:

- a meat product labelled and placed on the market between February and July 2004, that is described using one of the reserved descriptions must meet either the relevant compositional requirements in the MPSFPR 1984, or the relevant compositional requirement in the MPR 2004.
- a meat product labelled and placed on the market after July 2004, that is described using one of the reserved descriptions must meet the relevant compositional requirements in the MPR 2004.

Regardless of which compositional standard is followed, after 1st July 2003, the product must be labelled as described at paragraph 4(i) above. This means that the new definition of meat must be used as the basis of any relevant QUID declaration.

6. Do the percentage limits apply to each meat ingredient – or to all the meat ingredients taken as a whole?

Many meat products will contain a number of ingredients of the same species. The hypothetical “pork and beef sausage” product at Annex D for example contains four separate pork ingredients: lean trimmings, fatty trimmings, rind and back fat.

The definition of meat refers to “skeletal muscles . . . with naturally **included** or adherent tissue”. Therefore, as the “pork and beef sausage” example shows, the limits for fat and connective tissue apply to the group of ingredients from the same species taken as a whole - as if they were a single ingredient.

This applies both for the purposes of calculating the QUID declaration for the meat ingredients, as well as calculating the minimum meat content required by the reserved descriptions.

7. Can fat and connective tissue be added separately?

Normal butchery practice is to trim and separate the fat, skin and connective tissue from primal joints where appropriate. Manufacturers then mix these component ingredients back together at the mixing bowl stage of the meat product e.g. as back fat, rind or dried rind. As described in paragraph 6 above, this practice may continue, and all the meat ingredients from the same species may count towards the meat content – subject to the limits for fat and connective tissue applied to the group of ingredients as a whole.

This will mean that meat cuts and ingredients with high levels of fat or connective tissue (such as back fat, pork rind, chicken skin, jowl in association with pork shoulder etc.) can in practice contribute towards the meat content, where they are combined with other ingredients of the same species with higher proportions of skeletal muscle. Again, the limits for fat and connective tissue will apply to the group of ingredients as a whole.

However, separate fat and connective tissue (whether or not it has separated from the meat during cooking) may only be added towards a QUID declaration for meat (of “beef” “pork” “lamb” etc.) where the meat ingredients are described and quantified on the basis of the definition (such that the limits for fat and connective tissue apply).

As described on page 25, where a meat product contains a cooked meat ingredient, that ingredient may be described and quantified in its cooked form. In which case, the limits for fat and connective tissue do not apply, and the QUID declaration will be based simply on the weight of the cooked ingredient

at its time of use in the recipe. This means that any fat that has separated from the meat during the cooking process may not be added back into the recipe and counted towards the meat content, nor can any other fat or connective tissue be counted in the same way.

8. Will the European definition require recipes to be changed?

The European definition relates simply to the **labelling** of meat products. The definition does not in itself prohibit the use of any meat ingredients.

However, the reserved descriptions previously contained in the MPSFPR have been carried forward into the MPR, and adjusted so that they are now based on the new definition of meat. Meat products described using the reserved descriptions will need to be examined to ensure they will continue to meet the requirements. Where products contain meat ingredients such as heart and MRM (which no longer count as meat) some changes to the recipe may be necessary to achieve the new minimum meat content.

9. In what cases will the definition not apply?

The definition of meat is included in Schedule 6 of the FLR. The generic names laid down in the Schedule are for the purpose of describing food *ingredients*. Therefore, the European definition applies only to meat used as an ingredient in other foods. The definition does not apply to raw meat and cuts of meat which are not ingredients of composite meat products.

The use of the generic names laid down in Schedule 6 is optional. Manufacturers may choose, for example, not to use the generic ingredients names, but to describe a meat ingredient:

- as the *specific cut* of meat used (e.g., “pork belly”, “chicken breast” etc.)
- in a *cooked or processed form* (e.g., “roast chicken”, “roast pork” etc.)
- Additionally, in some instances it may be necessary to describe meat ingredients by referring to *compound ingredients* (e.g., “sausage”, “ham” etc.)

In these three instances, the definition will not apply . Section 3, Paragraph 5 below discusses when these alternatives may be used, and under what conditions.

Other meat derived ingredients used in meat products such as gelatine, stock, and casings are not meat as defined above and hence cannot be counted in the meat declaration. They should be declared separately in the ingredient list, with an indication of the species of animal from which they are derived.

NB - The minimum meat content required by the reserved descriptions will continue to apply regardless of the basis on which the meat ingredients are described and quantified in the labelling.

10. What about mechanically recovered meat (MRM)?

Meat products covered by the Community definition of mechanically recovered meat are specifically **excluded** from the new definition. This means that MRM cannot count towards the meat content for the purposes of a QUID declaration, nor can it count towards the minimum meat content required by the reserved descriptions. As is currently the case, any MRM present in a meat product must be declared separately in the list of ingredients, and the species of meat from which the MRM was prepared must also be declared. It is recommended that MRM is declared using a description such as, “mechanically recovered pork” or “mechanically recovered chicken” as appropriate.

The European Commission has recognised that the current Community definition of MRM in Article 2(c) of the Fresh Meat Directive 64/433/EEC needs updating in the light of technical progress. In addition, the current Community definition applies only to red meat. In 2000, the Commission issued 5 linked proposals to consolidate and simplify food hygiene legislation.

For the purposes of the proposals, a definition of MRM can be found in Annex I, 'Definitions' (1.14) of the second proposal, 'Proposal for a Regulation of the European Parliament and of the Council laying down specific hygiene rules for products of animal origin'. MRM is referred to as *'Mechanically Separated Meat' (MSM) and means 'the product obtained by removing meat from flesh bearing bones after boning or from poultry carcasses, using mechanical means resulting in loss or modification of the muscle fibre structure'*.

The Commission aims to have the new definition come into force in 2005. The Commission have also stated that during the interim period the current definition of MRM should apply to poultry MRM as well as that from red meat.

Products obtained by mechanical deboning, which remove definitive pieces of meat from meaty bones or carcass, which may or may not have had the primal muscles previously removed, such that the muscle fibre structure of the meat is substantially intact are not considered to be MRM or MSM. This meat may then be de-sinewed and have the appearance of finely minced meat. These products may still be considered meat, and may be counted towards the QUID declaration.

SECTION 2 – THE MEAT PRODUCTS REGULATIONS

This section describes only those rules provided specifically by the MPR. As such it covers:

- Compositional requirements: - i.e., the prohibition on the use of some parts of the carcass in uncooked meat products.
- Labelling requirements in respect of the reserved descriptions: - i.e., the compositional criteria that meat products must meet in order to be described using the reserved descriptions.
- Labelling requirements for meat products having the appearance of a cut, joint, slice etc of meat: - i.e., declarations in the name of the food for such products of the presence of added water and certain other added ingredients.
- There is now a QUID requirement for foods sold loose. Please refer to the QUID provisions in section 3 below.

The MPR contain no labelling provisions other than those described above. Quantity declarations for the labelling of meat products are now covered solely by the general rules contained in the QUID provisions of the FLR. The QUID requirements are therefore quite separate from the MPR. To avoid confusion, it is helpful to consider the QUID requirements entirely separately from the requirements relating to the reserved descriptions in the MPR. For this reason, the QUID provisions are described in Section 3 below.

1. How do the new MPR differ from the old Regulations?

The new MPR differ from the MPSFPR, which they replace, in the following areas:

(i) By simplifying the labelling of meat products

The MPR omit some of the previous general labelling requirements for meat products – these provisions have been replaced by the general provisions of the FLR. In particular, the Regulations no longer contain a requirement to give a meat content declaration. Instead, the provisions of QUID (FLR Regulation 19) will apply to meat ingredients.

(ii) By bringing the Regulations in line with the European definition

The Regulations define “meat” by direct reference to the European definition. Similarly, the minimum meat content for each reserved description is expressed on the basis of the European definition. (Schedule 2 of the Regulations, which provides the minimum requirements for the reserved descriptions, is reproduced in Annex F).

(iii) By including fewer reserved descriptions

The Regulations contain reserved descriptions for burgers, sausages, pies, chopped meat, corned meat, and luncheon meat. The reserved descriptions (previously contained in the MPSFPR) for paste or pate, and spreads have been removed as they are no longer covered by the Regulations. The Regulations therefore no longer contain any provisions relating to spreadable fish products. The provisions relating to pies have also been simplified.

2. What is a meat product?

Regulation 2 defines a meat product as “any food, other than one specified in Schedule 1 to these Regulations (see below) which consists of meat or which contains as an ingredient, or as ingredients, any of the following: meat; mechanically recovered meat; or, from any mammalian or bird species recognised as fit for human consumption, heart, tongue, the muscles of the head (other than masseters), the carpus, the tarsus, or the tail.”

Schedule 1 of the Regulations provides that the following foods are “not meat products for the purposes of these Regulations”

- Raw meat to which no ingredient, or no ingredient other than proteolytic enzymes has been added.
- Poultrymeat falling within the scope of EC Regulation 1906/90 (as amended) as read with Regulation 1538/91 (as amended), which lay down certain marketing standards for poultry.
- Any product containing the fat, but no other meat, of any animal or bird.

3. To what meat products do the Regulations apply?

The Regulations apply to meat products that are ready for delivery to the ultimate consumer or to a catering establishment. In this context, “catering establishment” has the same meaning as that described in section 3 paragraph 1 below.

However, the Regulations do not apply to a meat product that is not intended for sale for human consumption, or to a food that is intended for consumption by babies or young children, and labelled to that effect.

Regulation 4 (restrictions on the use of certain names) will **not apply** to meat products imported from another EEA state (i.e., one of the 14 other EU

Member States, as well as Iceland, Norway and Liechtenstein). This will mean that a food lawfully described by one of the reserved descriptions in that country may be described by that name in the UK providing that the product's labelling otherwise satisfies the requirements of relevant European legislation, and appears in a language easily understood by the consumer. The provisions of Regulation 5 (name of the food for certain meat products) will apply to all products, regardless of their country of origin.

4. Which parts of the carcass may not be used in uncooked meat products?

The Regulations provide that the following parts of the carcass may not be used in the preparation of uncooked meat products: brains, feet, large and small intestine, lungs, oesophagus, rectum, spinal cord, spleen, stomach, testicles and udder.

However, the Regulations do allow intestines to be used to produce the skin for sausages and similar products. It is important to note that this exemption applies not just to products meeting the reserved description "sausage". Intestines may also therefore be used to produce the casing for products such as haggis, black pudding etc.

5. Reserved descriptions - General

Reserved descriptions are controlled sales names that apply to meat products. The Regulations provide that a meat product offered for sale to the ultimate consumer or a catering establishment may not be described using one of the reserved descriptions unless it meets the relevant compositional criteria laid down in Schedule 1. The Schedule lays down minimum required meat contents for products described using the reserved descriptions.

Additionally, the reserved descriptions are "names prescribed by law" for the purposes of Regulation 6(1) of the FLR. Therefore, where a meat product meets the requirements for the use of a reserved description, the name under which that meat product is sold must be (or include) that reserved description.

6. How is the meat content determined for the purposes of ensuring compliance with the reserved descriptions?

The Schedule stipulates that the required meat content applies on the basis of the weight of the uncooked product.* (i.e., the weight of the ingredient at the mixing bowl stage, as a percentage of the total weight of the ingoing ingredients).

By contrast, the QUID declaration is made on the basis of the final weight of the product. (i.e., the weight of the ingredient at the mixing bowl stage, as a percentage of the total weight of the final product). Where a product has been processed (by cooking or drying for example) the weight of the final product may be less than the sum of the ingoing ingredients. It is possible therefore that the percentage of meat declared in the QUID may be different from the product's "compositional meat content" (i.e., the meat content determined for the purpose of checking the product meets the compositional requirements).

If the product's QUID declaration is based on a "specific cut", a cooked ingredient, or a compound ingredient (see section 3, paragraph 5 below), it is again possible that the percentage declared will be different from the product's "compositional meat content". However, it is important to note that the minimum required meat content as required by the Schedule always applies in **terms of meat according to the EU definition** – regardless of how the ingredients are described or quantified in the product's labelling.

* Note – the minimum required meat content for the reserved description "corned meat" is 120%. This percentage is calculated on the basis of the final product (i.e., at least 120g of meat must be used to make every 100g of finished product).

7. What are the requirements relating to pies?

The minimum meat content requirements for pies have been simplified in comparison to those previously contained in the MPSFPR. The same minima apply, regardless of the type of meat used. The new minima contained in the MPR are all calculated on the basis of the weight of the ingredients in the uncooked food. Therefore, where the pie is sold cooked, it is possible that the QUID declaration will not be the same as the "meat content" for the purposes of the compositional requirements (Example 4 in Annex D provides an example of this).

Item 9 in the Schedule applies to the name “pie” or “pudding” qualified by the word meat or the name of a type of meat, and also by the name of a food other than meat. An example might be “chicken and mushroom pie”.

This description would also apply to e.g., “steak and kidney pie”, since kidney is the name of a food which is not “meat” within the meaning of the new definition and Regulation 2 of the MPR.

8. Have the requirements of the reserved descriptions changed?

The reserved descriptions in the MPR have been revised to bring them into line with the European definition. However, it is not the intention that the revised reserved descriptions should significantly alter the composition of meat products.

The reserved descriptions previously contained in the MPSFPR laid down a minimum meat content (based on the definition of meat contained in the MPSFPR), and required that a specified percentage of the meat content was lean meat, free of visible fat. The new Regulations take a slightly different approach by laying down just a minimum meat content (based on the European definition of meat). There are no limits as such on fat content, but any fat or connective tissue in the product in excess of the maxima laid down in the European definition must be declared separately in the list of ingredients. Only fat within the percentage limits in the regulation may be counted towards the final meat content.

The new meat content minima are equivalent to those in the MPSFPR; they have simply been “converted” so that they are expressed by reference to the European definition. Products are still required to contain an equivalent proportion of fat-free meat. Therefore, where a meat product meets the current requirements of a reserved description from the MPSPFR, then (assuming that the meat content is made up of skeletal muscle within the connective tissue limits, and does not include any MRM or parts of the carcass which are no longer considered meat under the European definition e.g., heart, kidney) the product will also meet the new requirements.

9. Why does the minimum meat content differ depending on the species used?

The European definition allows different levels of fat and connective tissue depending on whether the meat is from pork, birds and rabbits, or other

mammals and mixtures of species. Accordingly, all the reserved descriptions, with the exception of those for pies and corned meat, contain three different minima for total meat to take account of the different allowances for fat. However, the new minima ensure that, regardless of the species, the product must contain the same proportion of fat-free meat.

The minimum meat content for corned meat is the same regardless of species, because the limit for fat in corned meat (i.e., 15%) is equal to or below the limits for fat in the Directive. The minima for pies are the same across species in order to simplify the provisions for pies, which have more groups than those for other products.

10. Name of the food for certain meat products

Regulation 5 requires that where certain meat products contain added water and/or other added ingredients, these ingredients **must be declared in the name of the food**. The Regulation only applies to a meat product that has the appearance of a cut, joint, slice, portion or carcass of meat (with the exception of a meat product described using one of the reserved descriptions, or a meat product with the appearance of minced raw meat that has been shaped).

In addition, where a relevant meat product contains an ingredient of animal origin, but the product contains no apparent “meat” (within the meaning of the new definition) from that species, the ingredient must still be declared in the name of the food. (An example might be a chicken breast containing beef protein).

Where added water is declared in the name of the food, it is not necessary to declare the *quantity* of the added water in the name of the food. Nor is it necessary to provide a QUID declaration for added water in the list of ingredients. However, it will be necessary to provide a QUID declaration in respect of the meat ingredients in the product – except that QUID declarations are not required for the meat content of cured products containing less than 5% added water.

The “name of the food” for a meat product to which Regulation 5 applies must include a declaration of any added ingredient other than those listed in Schedule 3 (i.e., the ingredients on the list need not be declared in the name of the food). Namely:

- an ingredient used solely as a garnish or decorative coating
- salt, herbs or spices used as seasoning

- curing salt
- additives
- sugar used solely to impart a sweet taste
- ingredients added solely to impart an odour or taste or both
- any starch that is added only for a technological purpose*
- any protein of vegetable origin that is added only for a technological purpose*.
- any animal protein derived from the same species as any meat contained in the product that is added only for a technological purpose*
- in the case of cooked cured meat, added water making up not more than 5% of the weight of the product
- in the case of uncooked cured meat, added water making up not more than 10% of the weight of the product

*the term “technological purpose” is not specifically defined either in the MPR, or in Directive 77/99 (as amended), from which this provision originates. However, “technological purpose” should be understood to *exclude* the use of these ingredients as a meat replacer, simply to bulk up the meat product.

The requirement in Regulation 5(a) to declare “foreign animal proteins” overrides the exemption in Regulation 5(b) allowing animal proteins not to be declared when they have a technological function.

11. How do these “name of the food” requirements relate to the Poultrymeat Marketing Regulations?

The European Poultrymeat Marketing Regulations (EC Regulation 1906/90 (as amended) as read with Regulation 1538/91 (as amended)) contain provisions controlling the quantities of extraneous water present in poultrymeat. The European Regulations are directly applicable in UK law.

The term “extraneous water” describes any water present in the meat as a result of the absorption of water during the normal processes of plucking, spray washing and cooling. The term does not include any water that has been deliberately added as an ingredient.

Poultrymeat falling within the scope of the Poultrymeat Marketing Regulations is specifically **excluded** from the scope of the MPR. However, where the meat contains any added water (i.e., that is not “extraneous water”), or any other added ingredient, the provisions of the MPR, and specifically Regulation 5, **will apply**.

SECTION 3 - LABELLING OF MEAT PRODUCTS

The MPR no longer contain any rules on quantifying meat in the labelling of meat products. Meat products will now fall within the scope of the general rules for food labelling provided by the FLR.

The principal change therefore is that the rules previously provided by the MPSFPR relating to “minimum meat content” declarations have been revoked. The broader provisions of Quantitative Ingredient Declarations (QUID) (which apply to all foods) will effectively replace the requirements for “minimum meat content” labelling.

It is very important to be aware that this move over to QUID represents a very different basis for labelling. This is described below.

QUANTITATIVE INGREDIENT DECLARATIONS - QUID

1. Scope of QUID

In general, the requirements of QUID apply only to foods that are sold pre-packed. Usually, QUID declarations are not required for foods sold loose, or pre-packed for direct sale ¹. However, the rules for meat products are slightly different:

QUID declarations **will** be required for:

- Meat products sold pre-packed
- Meat products sold loose, or pre-packed for direct sale from a retail outlet (i.e., butchers, bakers, delicatessen counters etc.) However, QUID declarations are required only for those ingredients that fall within the definition of meat – see para 4 below for a full explanation.

QUID declarations will **not** be required for:

- Meat products sold loose or pre-packed for direct sale from catering establishments ².

¹ The FLR define “pre-packed for direct sale” as: “prepacked by a retailer for sale by him or her on the premises where the food is packed or from a vehicle or stall used by him or her.”

² The FLR define “catering establishment” as “a restaurant, canteen, club, public house, school, hospital or similar establishment (including a vehicle or fixed or mobile stall) where, in the course of a business, food is prepared for

delivery to the ultimate consumer and is ready for consumption without further preparation”.

NB – Although the Regulations exempt certain meat products or ingredients from the QUID requirements (either because of the way in which they are sold, or the type of product), retailers are free to provide QUID declarations for any ingredient on a voluntary basis, if they wish to do so. Where a declaration is given voluntarily, it must still be provided in line with the rules described below.

2. How will QUID declarations work in practice?

The MPSFPR contained requirements for minimum meat content declaration, which required to be labelled with the total meat content. This requirement has been replaced by QUID. This is very much a change of emphasis. The declaration is now linked with the quantification of **ingredients** rather than total meat content.

A QUID declaration informs the consumer of the quantity (i.e., usually the weight) of the relevant ingredient that has been used to make the food. This is usually expressed as a percentage of the weight of the final food. Now that meat ingredients are included within the scope of QUID, meat should be treated just like any other ingredient when providing QUID declarations.

The one exception to this rule is that the actual quantity declared will need to be determined according to the new definition of meat. Where a meat ingredient contains excess fat or connective tissue, that excess may not count towards the QUID declaration. This has the effect that the quantity of meat on which the QUID is based may be less than the weight of the meat ingredient actually used to make the product.

The following paragraphs discuss two issues:

- (a) How to decide which ingredients should have a QUID declaration, and in what form the ingredient will be described and quantified. (paragraphs 3 and 5)
- (b) How to determine the actual quantity (i.e., the percentage) that will be declared (paragraphs 6 to 14).

3. What types of ingredients will need to be QUIDed?

This section explains general rules of QUID and the situation may be different for loose foods. See paragraph 4 on page 23

The FLR require that a QUID declaration is provided for an ingredient that appears in the name of the food, or is usually associated with that food by the consumer.

“... appears in the name of the food”

For example:

Name of the food:	QUID required for:
Beef Burger	Beef
Pork and Leek Sausage	Pork, Leek
Steak and Kidney Pie	Steak (or beef), Kidney
Sweet and Sour Chicken with Rice and Cashew Nuts	Chicken, Cashew nuts
Liver pate	Liver

“... is usually associated with that food”

There may be instances where the meat ingredients of a product are not mentioned in the name of the food. This will often be where the product is described with a traditional or customary name. Where a food is described using a customary name alone (and no additional descriptive name) a useful guide for deciding which ingredients should be QUIDed is to consider what an appropriate descriptive name for the food might be.

Again, it is important to remember that the QUID relates not to the meat content as such, but to the ***characterising ingredient***. This may be particularly important with some traditional products that are based on offals and parts of the animal other than muscle meat.

Name of the food:	Possible descriptive name:	QUID required for:
Shepherd's pie	minced lamb with carrot and onion in gravy, topped with mashed potato.	(minced) lamb, potato
Cornish Pastie	Pastie filled with diced beef, potato, carrot and swede	Beef
Toad in the Hole	sausages in batter pudding	Sausages
Foie Gras Pate	Goose liver pate	Goose liver

some exceptions ...

There may be instances where an “ingredient” is mentioned in the name of the food, but has not been used in its manufacture. In these cases, a QUID will of course not be required. A good example (although not a meat product) is a “cream cracker” which contains no cream. Similarly, a “beef tomato” contains no beef.

This exception will also apply to products such as “chicken flavour crisps” where the chicken flavour is derived from one or more ingredients that are not chicken.

4. QUID rules specific to meat products sold loose

This paragraph relates to food sold loose. Loose means non-prepacked or “pre-packed for direct sale”. The phrase “pre-packed for direct sale” means: “prepacked by a retailer for sale by him or her on the premises where the food is packed or from a vehicle or stall used by him or her”.

QUID declarations will be required for meat products sold by retail outlets in this way, (i.e., supermarkets, butchers, bakers, delicatessens etc.) However, QUID declarations will only need to be provided for ingredients that are “meat” within the meaning of the definition – for example:

Product	QUID required for:	QUID <u>not</u> required for:
Chicken and Mushroom Pie	Chicken	Mushroom
Steak and Kidney Pie	Steak (beef)	Kidney
Chicken and Ham Pie	Chicken	Ham
Corned Beef Pastie	-	Corned Beef

NB – This table applies only to foods sold loose, but regardless of how the ingredients are QUIDed, products must still meet any necessary minimum meat content (i.e. compositional) requirements

In addition, foods listed in Schedule 4 of the Regulations do not need to carry any QUID declaration when sold loose, namely:

- sandwiches, filled rolls and similar products
- pizzas and similar topped products
- soup, broth and gravy
- ready to eat individual portions assembled from two or more ingredients (e.g., salads that are made up from a self-service counter, or to order by serving staff)

NB - These foods **will** need to carry QUID declaration if they are sold prepacked.

5. How should the ingredient be described and quantified?

In most cases, a food will be labelled with a list of ingredients. The QUID declaration should therefore relate to the ingredient in the form in which it is described in the list of ingredients.

Where a food does not have a list of ingredients (e.g., foods sold loose and not pre-packed) the QUID declaration will appear alongside the name of the food (whether this appears on a ticket or notice etc, or on the food itself) in a form such as “contains x% pork” or “x% pork”. The QUID declaration should therefore relate to the ingredient in the form in which it is described in this declaration. There is no need to QUID excess fat or connective tissue in this context.

In general therefore, where an ingredient is described as simply meat from the named species (e.g., “beef”, “lamb”, “pork”, “chicken” etc) the QUID declaration will be based on the new definition of meat. Therefore any excess fat or connective tissue present in the ingredient cannot count towards the QUID declaration. It is possible therefore that the actual amount of meat declared is less than the weight of the meat ingredients

However, there will also be instances where the new definition will not apply – because of the nature of the meat ingredient, or the way in which that ingredient is described. These will fall into four areas – as described below:

It is important to note that the minimum meat content required by the reserved descriptions will continue to apply in terms of **meat according to the EU definition**, regardless of how the ingredients are described or QUIDed.

(i) Animal-derived ingredients not covered by the definition of meat

Many parts of the carcass not covered by the new definition are commonly used in traditional meat products. Some examples include kidney in pies; liver and tongue in patés and sausages; oxtail in soups; and feet and head meat in products such as brawn and potted head. In addition, ingredients such as MRM, head meat and heart are often used in processed meat products. The definition of head meat excludes masseter.

These ingredients must be declared separately in the product’s list of ingredients. The ingredient in question must be described specifically, and not by a generic name such as “offal”. The species source must also be declared: e.g., “beef heart”, “pig’s kidney”, “lamb’s liver”, “Mechanically Recovered Chicken”, “pork head meat”, etc.

(NB – none of these ingredients may count towards the meat content for the purposes of complying with the minimum meat content requirements of the reserved descriptions – however where a product is described as “tongue sausage” or “liver sausage” or similar, no minimum required meat content requirements apply).

(ii) “Specific cuts”

Manufacturers may choose not to use generic names such as “beef”, “lamb”, “pork” etc, but instead to describe a meat ingredient according to the *specific cut* of meat used. Some examples might be “chicken breast”, “beef brisket”, “loin of lamb”. Where ingredients are described in this way, the European definition *will not apply*.

The name used to describe a “specific cut” must be **specific, familiar and understood by consumers**. The FLR require that a name used to describe an ingredient must be a name that could be used to describe that ingredient were it being sold as a food in its own right. As a general rule therefore, the name used to describe a “specific cut” may be considered acceptable where that name is also used to describe that meat ingredient when sold as fresh meat (e.g., in butchers’ shops and similar outlets).

In addition, the European Commission recommended that Member States use CLITRAVI’s (Liaison Centre for the Meat Processing Industry in the EU) guidance as a basis for national guidance. Therefore in line with this recommendation, the Agency recommends that where “specific cuts” are used to describe meat ingredients in comminuted meat products such as sausages and burgers then the maximum limits on fat and connective tissue in the meat definition apply.

Where a QUID declaration is provided in relation to a “specific cut”, the declaration must be based only on the meat that is from that declared cut (e.g., the declared quantity of “chicken breast” must not include any meat that is not breast meat). In addition, the declared quantity must not include any skin or other tissue that is not attached to the muscle meat. (See also paragraph 13 below relating to “bone-in” cuts).

(iii) Dried or cooked meat ingredients

Where the meat ingredient is described in the list of ingredients (or declaration where there is no list of ingredients) as having been cooked e.g., “fried chicken”, “roast pork” etc., the limits for fat and connective tissue will not

apply. The QUID declaration will therefore be based on the weight of the cooked ingredient at the time of its use in the recipe.

Manufacturers may if they wish base the QUID for such ingredients on the weight of the raw equivalent, provided that the basis of the declaration is made clear to the consumer. Where a “raw equivalent” is declared, and the meat is described using a generic description (“pork”, “beef”, “chicken” etc) the limits for fat and connective tissue will apply.

It is possible that a product may contain cooked and uncooked meat from the same species. In which case, the manufacturer may choose either to QUID the cooked and uncooked meat separately, or to provide a single QUID for the all the meat ingredients of the same species, based on the raw equivalent.

The MPR define “cooked” as it relates to whole meat products as: “subjected to a process of cooking throughout the whole food so that the food is sold for consumption without further cooking”. This definition is also useful in defining what constitutes a “cooked” ingredient. An ingredient should only be described as cooked (and QUIDed on that basis) if it has been thoroughly cooked and could be consumed without further cooking. *This would therefore exclude ingredients that have been merely flash fried, lightly seared etc., from being described as “cooked”, and QUIDed on that basis.*

(iv) Compound ingredients

A compound ingredient is a food used as an ingredient, that is itself made up of a number of ingredients. Some examples would be “sausage”, “ham” and “bacon”. A compound ingredient will usually be an ingredient that the consumer would recognise as a food in its own right, and which would also be sold on its own.

A QUID for the compound ingredient will be required where it is referred to in the name of the food (e.g., “chicken and ham pie”, “bacon sandwich”) or where it is usually associated with that food (e.g., sausage in “toad in the

The QUID declaration should relate to the ingredient as described (either in the ingredients list or point of sale declaration). For example, in the case of “chicken and ham pie” and “pepperoni pizza”, the QUID declaration should be based on the weight of the ham and pepperoni respectively, at their time of use in the recipe. It is not necessary to quantify the meat itself, either as a percentage of the compound ingredient, or of the total product.

There may also be instances where the meat ingredient is described generically in the name of the food, but is declared as a compound ingredient in the list of ingredients. A QUID based on a compound ingredient will of course be greater than a QUID based on the meat content of the whole product. Care must therefore be taken to ensure that providing a QUID on this basis does not mis-represent the true composition of the food.

6. How is the QUID declaration calculated?

The QUID declaration informs the consumer of the quantity of ingredient used, as a proportion of the final weight of the product. The QUID declaration is therefore calculated as follows:

$$\text{QUID (\%)} = \frac{\text{declarable weight of ingoing ingredient}}{\text{weight of finished product}} \times 100$$

NB – the “declarable weight” means the quantity of the ingoing ingredient that may be counted towards the QUID declaration. This will not necessarily be the same as the actual weight of the ingoing ingredient – because where the QUID is provided on the basis of the new definition, any excess fat and connective tissue may not be counted towards the QUID.

7. “weight of finished product”

In this context, the “weight of finished product” means the weight of the product when sold. This will not necessarily be the same as the combined weight of all the ingredients. Cooked products for example will often lose moisture in the cooking process – resulting in the final product weighing less than the sum of the ingredients.

8. “the ingoing ingredient”

As discussed in paragraphs 5 and 6 above, the QUID declaration must relate to the ingredient as described in the list of ingredients, and this in turn must be linked to the way that ingredient is named in the name of the food. The following diagram shows how the “ingoing weight” is determined, depending on the type of ingredient to which the QUID declaration relates – which will be either:

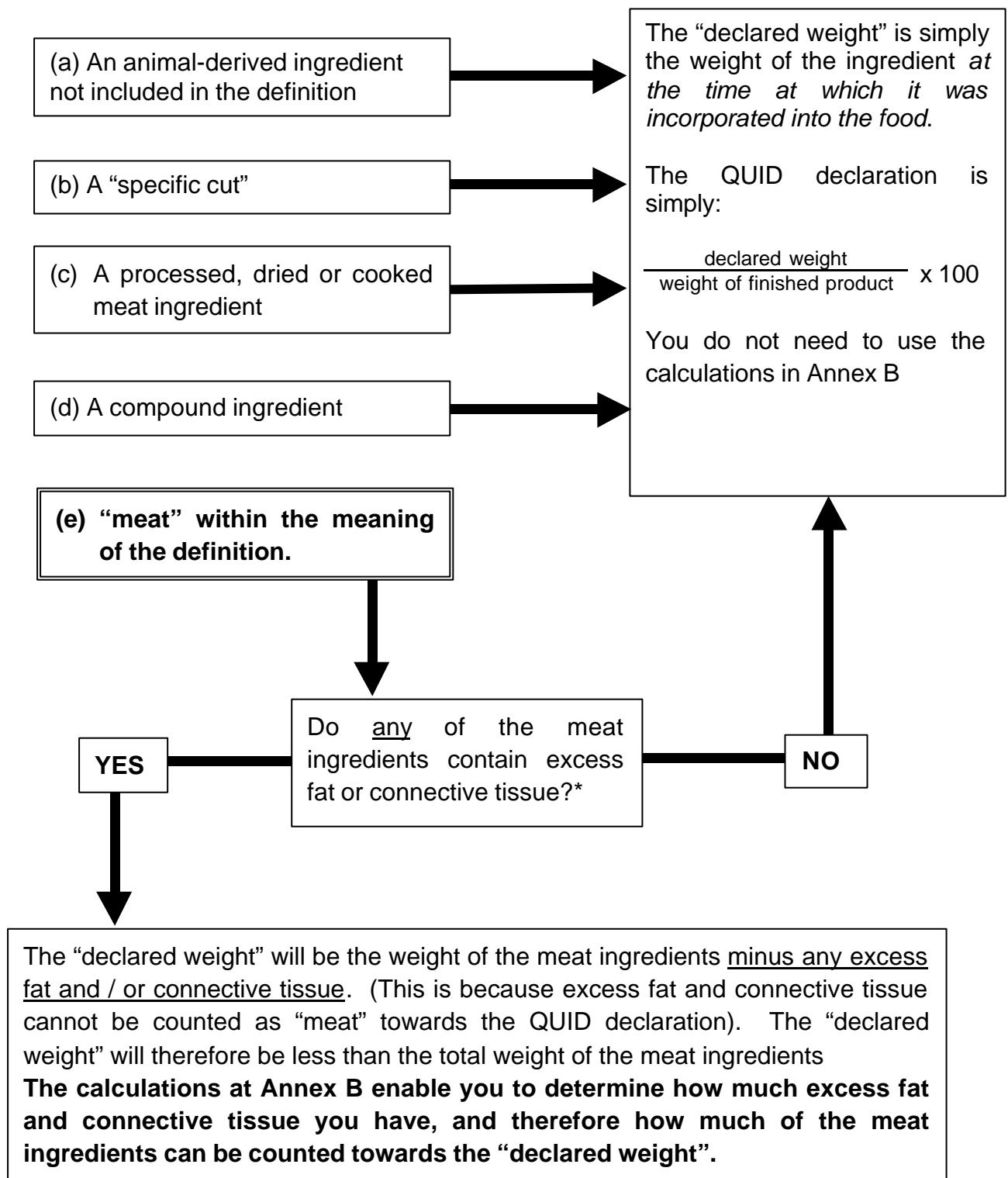
- (a) an animal-derived ingredient not included in the definition – (e.g., “liver”, “kidney”, “tongue” – see also paragraph 5(i) above)

- (b) a “specific cut” – (e.g., “chicken breast”, “pork belly”, “sirloin steak” – see also paragraph 5(ii) above)
- (c) a cooked or processed meat ingredient – (e.g., “fried chicken”, “roast pork”, “smoked [pork]” – see also paragraph 5(iii) above)
- (d) a compound ingredient – (e.g., “sausage”, “ham”, “bacon” – see also paragraph 5(iv) above)

or

- (e) **“meat” within the meaning of the definition – (e.g., “beef”, “lamb”, “chicken”).**

9. How is the “declarable weight” determined?



* Annex B, paragraph 1 below tells you how to find out if you have excess fat and connective tissue.

10. How should the QUID declaration be presented?

In most cases, the QUID declaration will be expressed as a percentage. The declaration must appear on the labelling either in or next to the name of the food, or in the list of ingredients in connection with the ingredient in question.

In the case of meat products sold non-prepacked, or prepacked for direct sale the QUID declaration should appear either on a label attached to the food, or on a ticket or notice that is readily discernible by an intending purchaser at the place where he or she chooses the food. (This could include point of sale ticketing, posters etc.)

11. What if the QUID declaration is more than 100%?

Regulation 19(4) of the FLR provides for situations where, because a food has lost moisture as a result of treatment, the quantity of an ingoing ingredient is greater than the weight of the finished product (i.e., where a QUID declaration would be greater than 100%). In such cases, the QUID declaration must indicate the weight of ingredient used to prepare 100g of finished product.

One example of such a product is the food covered by the reserved description for corned beef, which is produced by pre-cooking beef (which loses fat and moisture) then sterilising the product. This in effect produces a concentrated meat product.

The reserved description requires that corned meat has a meat content of 120%. Therefore an example of a suitable QUID declaration for corned beef would be as follows:

Corned beef: - Made with 120g of beef per 100g of finished product
--

12. The list of ingredients – Description of excess fat and connective tissue

The FLR require (with certain exceptions) all foods sold pre-packed to be labelled with a list of ingredients. The ingredients must be listed in descending order of weight at the time of their use in the food. Where a meat ingredient contains excess fat and connective tissue, this must be declared separately in the product's list of ingredients. Where the product does not

have a list of ingredients (e.g., foods sold loose) there is no requirement to declare excess fat or connective tissue in the labelling.

How should the excess fat or connective tissue be described?

Excess fat must be declared in the ingredients list (where there is one) together with an indication of the species from which it is derived (e.g., “pork fat”). The ingredients must be listed in the descending order based on its proportion in the mixing bowl. For this purpose, the “quantity” of excess fat is not the total fat in the product, but the quantity by which the fat exceeds the allowed limit.

Similarly, excess connective tissue must be declared along with an indication of the species from which it is derived. The connective tissue may be declared as simply “x connective tissue”, (where x is the species of meat) or alternatively it may be described as the name of the component of meat which is in excess. In the case of pork for example, this is most likely to be pork rind, for chicken or turkey it is most likely to be chicken or turkey skin. Where a specific description other than “connective tissue” is used, the description must be accurate and not misleading; it should also be readily understandable to the consumer.

As is the case with excess fat, the declaration must appear in the correct position in the list of ingredients, according to its proportion in the mixing bowl. Again, the “quantity” is the quantity by which the connective tissue exceeds the allowed limit.

Is a QUID required for the excess fat or connective tissue?

There is no requirement to QUID (or to quantify in any other way) the amount of excess fat or connective tissue on the product’s labelling. However, it will be necessary to determine the quantity when designing product labelling, in order that the excess is declared in the appropriate place in the list of ingredients. (The calculations in Annex B show how to determine the quantities of excess fat and connective tissue).

13. How should “bone-in” cuts be treated?

Where a food includes as an ingredient a cut of meat which customarily includes bone (e.g., a chicken wing, a lamb chop etc.) it is recommended that the meat ingredient be described as a specific cut, rather than the generic name “meat” (or “chicken”, “lamb” etc).

The ingredient will therefore be QUIDed in the same way as a “specific cut” (see paragraph 5(ii) above). For the purposes of this calculation, the weight of the bone should be ***included*** in the calculation, since consumers will understand that e.g., a “lamb chop” includes a bone.

14. What are the rules relating to meat content claims (made in addition to QUID)?

Consumers are accustomed to seeing labelling such as “beefburger – 100% beef” or “chicken curry – made with 100% chicken breast”. There is nothing to stop manufacturers and other businesses from continuing to use such labelling statements.

However, in doing so, manufacturers must satisfy themselves that the statement in question complies with Regulation 15 of the Food Safety Act 1990. This provision makes it an offence to describe, by way of labelling or advertising, a food falsely, or in a way likely to mislead a purchaser as to its nature, substance or quality.

SECTION 4 - ENFORCEMENT

1. Who is responsible for enforcing the requirements?

Enforcement of the Regulations is the responsibility of local authority authorised officers who are also responsible for enforcing the regulations in respect of imports.

Businesses with specific enforcement or compliance queries may wish to seek the advice of their local enforcement agency (or home authority if appropriate), who may be able to offer practical advice.

2. What is the penalty for non-compliance?

The Meat Products Regulations make it an offence to:

- sell a meat product described using a reserved description that does not meet the requirements set out in the Regulations for that reserved description; or
- sell a meat product that is not labelled in accordance with the requirements of the Regulations.

Under the Food Labelling Regulations, it is an offence to:

- sell a food (including a meat product) that is not labelled in compliance with the Regulations. (i.e., this offence will relate to the provision of QUID declarations).

The penalty on conviction for an offence under the MPR or FLR is a fine of not more than level 5 on the standard scale (currently £5,000).

3. Do the requirements apply to foods intended for export?

Meat products that are intended for export to another country, must comply either with the MPR, or with the relevant domestic legislation in force in the importing country.

The Regulations also provide a defence in proceedings for an offence under the Regulations, where the food in question was intended for export and marked or labelled before July 2004 ? providing that the product complies with the requirements of the MPSFPR.

SECTION 5 – CALCULATION OF MEAT CONTENT

This section describes two separate methods that may be used to calculate the meat content of meat products. Both methods use details from the product recipe as the basis for the calculation. Each method is described in detail below.

Each of the methods described in this section can be used to calculate both;

- (i) *The meat content for the purposes of ensuring that meat products meet the “minimum meat requirement” laid down by the reserved description;*

The reserved descriptions relate to the total meat content in the product. In the case, therefore, of products containing meat from more than one species, the content of each species should be calculated separately, and added together to give the total meat content.

The reserved descriptions for all products (with the exception of “corned meat” are specified on the basis of the uncooked product. The meat content (for the purposes of ensuring that the product meets the relevant compositional requirements) must therefore be calculated on the basis of the sum of the ingoing ingredients. This will not necessarily be the weight of the final product as purchased by the consumer (i.e., if the product is cooked or otherwise processed in such a way as to make it lose moisture).

- (ii) *The QUID declaration - where this will be based on the generic definition.*

Where a product contains meat from more than one species, a QUID declaration will be required for each species. The calculation will therefore need to be carried out separately for each species. The “pork and beef sausage” example in Annex D shows this in practice.

The following methods **should not** be used where the QUID declaration relates to a “specific cut”, a cooked or processed ingredient, a compound ingredient, or a meat-based ingredient not covered by the definition. (See section 3, paragraph 5).

1. The “FSA Method”

This method is explained in full in Annex B below.

This method is recommended for use by manufacturers and retailers (and in particular small businesses) when determining if and how labels of their products need to be changed. The method is based on the use of typical values for the fat and connective tissue content of the meat ingredients.

The table at Annex C lists typical values for fat, collagen and protein for a wide range of cuts used in the production of meat products. These values derive from both AMC analytical data and typical values for meat ingredients determined over many years based on the visual lean system.

For ease of reference, the table indicates those ingredients that contain excess fat or connective tissue. Where the value for fat or connective tissue (as appropriate) is in excess of the limit allowed by the definition for that species, this is marked with a shaded box.

The Agency has carried out a validation exercise on the FSA method to demonstrate that it gives comparable results to the CLITRAVI method. The report of this exercise is attached at Annex G below.

2. THE CLITRAVI (LIAISON CENTRE FOR THE MEAT PROCESSING INDUSTRY IN THE EU) METHOD

This method is explained in full in Annex E below.

This method requires the use of analytical data for the level of fat, meat protein and hydroxyproline/collagen present in the meat ingredients. This will require chemical analysis of representative samples of ingredients from the mixing bowl.

THE EUROPEAN DEFINITION OF MEAT – DIRECTIVE 2001/101/EC

Designation - "...meat", preceded by the name(s)* of the animal species from which it comes.

Definition - Skeletal muscles** of mammalian and bird species recognised as fit for human consumption with naturally included or adherent tissue, where the total fat and connective tissue content does not exceed the values indicated below and where the meat constitutes an ingredient of another foodstuff. Ingredients resulting from the mechanical separation of meat which remains on the bone after boning such as to break down the cellular structure of the meat are excluded from this definition.

Maximum fat and connective tissue content for ingredients designated by the term "...meat".

Species	Fat (%)	Connective tissue(%)***
Mammals (other than rabbits and porcines) and mixtures of species with mammals predominating	25	25
Porcines	30	25
Birds and rabbits	15	10

Where these maximum limits for fat and/or connective tissue are exceeded, and all the other criteria for defining "...meat" are met, the "...meat" content must be adjusted downwards accordingly, and the list of ingredients must mention, in addition to the term "...meat", the presence of fat and/or connective tissue.

* For labelling in English, this designation may be replaced by the generic name of the ingredient for the animal species concerned.

** The diaphragm and the masseters are part of the skeletal muscles, while the heart, tongue, the muscles of the head (other than the masseters), the muscles of the carpus, the tarsus and the tail are excluded.

*** The connective tissue content is calculated on the basis of the ratio between collagen content and meat protein content. The collagen content means the hydroxyproline content multiplied by a factor of 8.

THE FSA METHOD**1. Where do I get the data?**

The table in Annex C lists a wide range of meat ingredients used in the industry. The table classifies meat ingredients by the cut (e.g., “pork loin”, “pork belly”) and also by the visual lean (VL) content. (Systems based on visual lean estimations have been employed successfully for over 30 years in the UK, and many manufacturers will purchase their meat ingredients by specifying the visual lean content they require). Typical values are given for the percentage of fat, collagen and protein content present in the ingredients. The first step is to match up the ingredients you are using with the appropriate entry in the table. You can then use the data for that cut as the basis of your calculation.

Where a cut on the table has excess fat or connective tissue, this is indicated by a shaded box. You will need to note which (if any) of your ingredients have excess fat or connective tissue.

Important Note

The accuracy of your result depends entirely on the data you use. Therefore it is very important that you match your ingredients to the ingredients in the table (at Annex C) as closely as possible. In particular, great care must be taken when estimating the visual lean content of your ingredients, to ensure that the estimation is as accurate as possible.

2. Where is the data in the table from?

The data in the table is the result of work carried out by the Analytical Methods Committee of the Royal Society of Chemistry. The data has been published in *The Analyst* (references below). Supplementary data is taken from the BMMA’s *Standard for Acceptable Levels of Pork Rind and Other Collagenous Material in Meat Products* (1996).

Nitrogen Factors for Pork: A Reassessment, *The Analyst*, July, 1991, No. 7, pp. 761-766
 Nitrogen Factors for Beef: A Reassessment, *The Analyst*, September, 1993, Vol. 118, pp. 1217-1225
 Nitrogen Factors for Sheepmeat, Part 1 Mutton *The Analyst*, June, 1995, Vol. 120, pp. 1823-1824
 Nitrogen Factors for Sheepmeat, Part 2 Lamb Meat, *The Analyst*, July, 1996, Vol. 121, pp. 889-896
 Nitrogen Factors for Chicken Meat, *The Analyst*, 2000, June, Vol. 125, pp. 1359-1366
 Nitrogen Factors for Turkey Meat, *The Analyst*, 2002, April, Vol. 127, pp. 859-869

3. What if the ingredient I am using has a different VL?

It is possible that manufacturers will be using meat ingredients with a different visual lean content to those included in the table. For example, a manufacturer may be using pork belly with a VL of 60%, while the table includes values for only “pork belly lean” and “pork belly 80VL”. In such cases, you can use the values for collagen and protein listed for the cut that is most similar to the ingredient you are using. You will then need to estimate the correct fat content using the following formula:

$$\text{Total fat \%} = (100 - \% \text{Visual lean}) + (0.1 \times \% \text{Visual lean})$$

NB – the formula assumes that the visual lean meat contains a further 10% intramuscular (non-visible) fat.

For example:

Pork Belly 60VL would have a connective tissue content of 15% (i.e., 2.48 / 16.3: the same as Pork Belly 80VL) and a fat content of 46% (i.e., $(100 - 60) + (0.1 \times 60)$)

4. Can I use my own data, rather than that in the table?

Businesses are free to use their own data instead of that provided in the table if they wish to do so. Businesses may for example wish to carry out their own analysis on their ingredients, or they may wish to use published data from other sources if they believe that to be more appropriate to the ingredients they are using.

Where businesses choose to use alternative data however, they would be well advised to ensure they can support the use of this data in the event of any legal challenge. Businesses taking this approach are strongly advised therefore to keep paper records setting out the data they are using, together with their reasoning for using that data.

5. How is the calculation itself done?

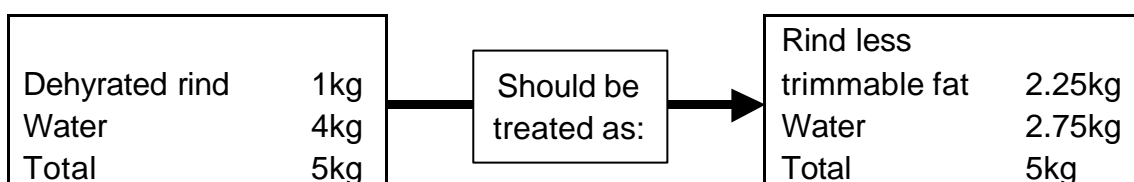
The flow chart on page 41 takes you through the calculation. It is vital that you only carry out those steps that you are instructed to.

6. Dehydrated ingredients

Where your recipe contains dehydrated meat ingredients, the calculation should treat these ingredients on the basis of their weight, and of their fat and connective tissue level, **when re-hydrated**.

Therefore it is also important to deduct from the weight of your “non-meat ingredients”, the weight of the water included in your recipe for the purposes of re-hydrating the dehydrated ingredients (otherwise the water will effectively be counted twice).

For example, a hypothetical recipe contains dehydrated rind, that will be rehydrated at a factor of 1.25:1 – so the ingredients:



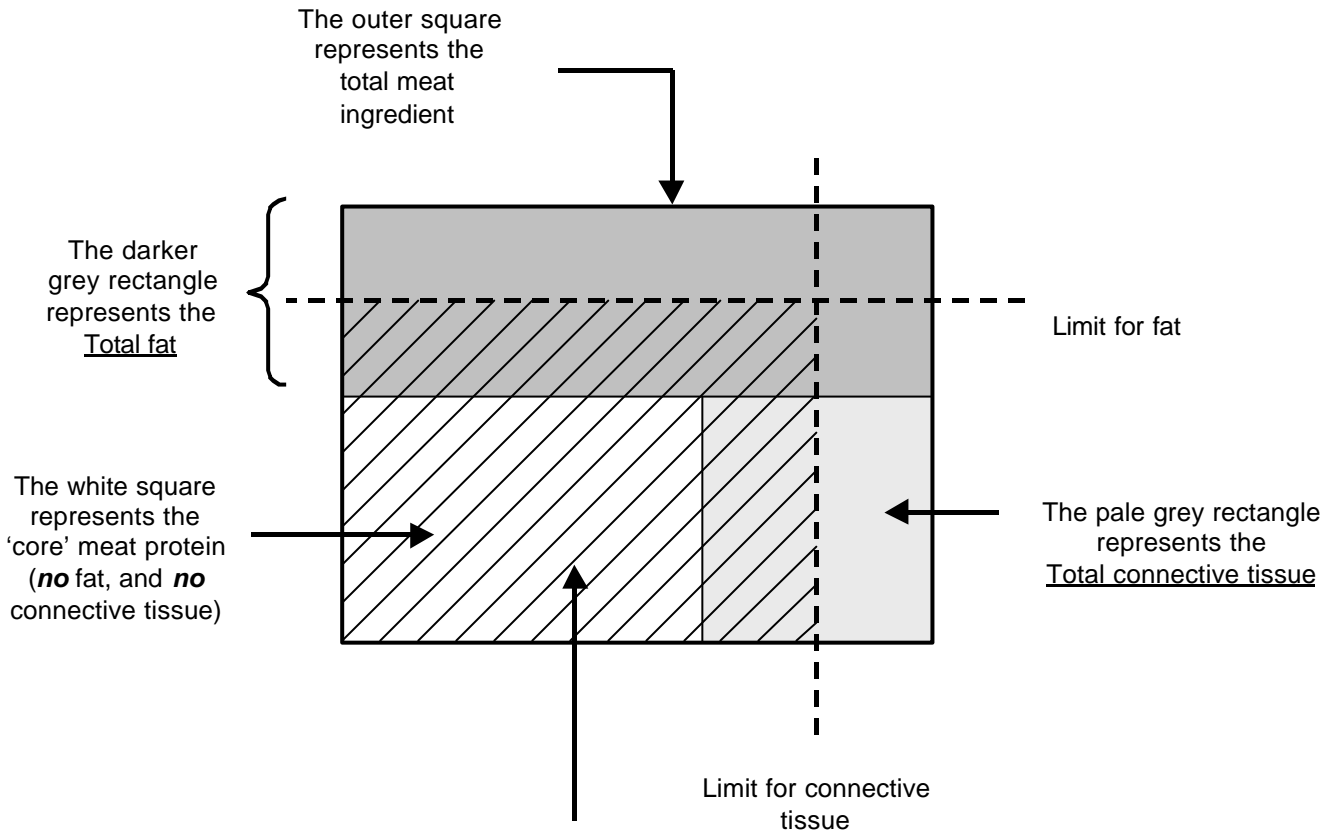
NB – *this recipe also contains other muscle meat ingredients, rusk and seasoning not shown above.*

7. Before you start . . .

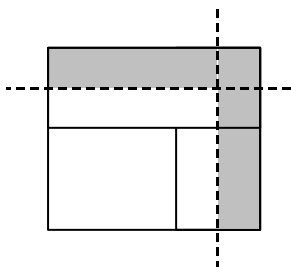
You may wish to note the following points:

- Remember that if you are using the calculation to determine your QUID declaration, and your product contains meat from more than one species – you will need to follow the calculation for each species; each time including all the ingredients from one species.
- The initials “CT” stand for “connective tissue”.
- **You may find the visual aid on the following page useful**

The visual aid below is used over the following few pages to help explain what is happening at each stage of the calculation. The total meat ingredients are represented by the outer square. The rectangles within this outer square represent the separate components of the meat - the fat, the connective tissue, and the core meat protein.

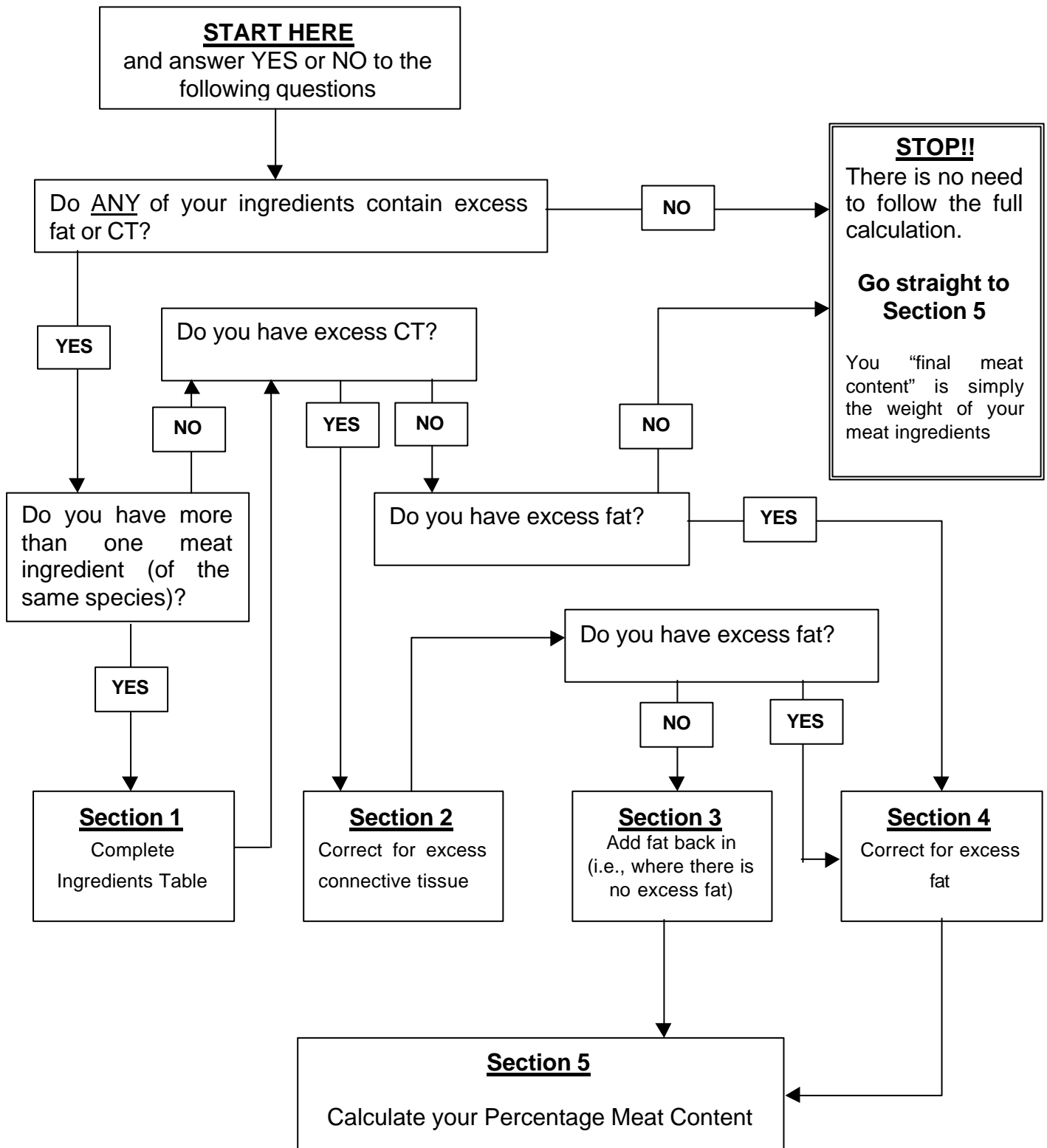


The **diagonally shaded** rectangle represents the meat ingredient content on which the QUID declaration is based. i.e. the 'core meat protein' plus fat and connective tissue within the allowed limits. The steps set out below therefore calculate the weight of the total meat falling within this rectangle



Note - The fat and connective tissue above and to the right of the dashed lines is in excess of the limits and may not be counted towards the QUID declaration and must be declared as excess fat and connective tissue.

The calculation is broken down into 5 separate sections (these are set out on the following pages). Depending on the nature of the ingredients you are using, it may not be necessary to complete all of the sections. This diagram tells you which sections you will need to follow – only complete those sections you are instructed to.



Section 1 – Complete ingredients table

The purpose of this section is to work out the overall levels of fat and connective tissue in your ingredients as a whole.

Step 1 – Write in all the ingredients from the same species in Column A. Use the table of typical values (at Annex C) to write in the figure for fat, collagen and protein for each ingredient (these are percentages).

Step 2 – For each ingredient, multiply the weight of the ingredient (column B) by the figures for fat (column C), collagen (column D), and protein (column E) in turn. Write the answers in the corresponding columns on the right of the table i.e., column F (fat), column G (collagen) and column H (protein).

Step 3 – Add up the totals of columns F, G and H, and enter the totals in the respective boxes for total fat, total collagen and total protein.

Step 4 – Divide the total fat (column F) by the total weight of the ingredients (column B). Multiply this by 100. This is the overall percentage of fat in your ingredients; enter it in the relevant box at the bottom right. Where this is above the fat limit for the species in question – bear in mind you may need to re-calculate this later).

Step 5 – Divide the total collagen (column G) by the total protein (column H). Multiply this by 100. This is the overall connective tissue percentage of your ingredients; enter it in the relevant box at the bottom right. Where this is above the connective tissue limit for the species in question – you have “excess connective tissue”.

Example: Pork and Beef Sausage (pork ingredients).

(The full calculation for this example is given at Annex D, example 2).

Column A	B	C	D	E	F	G	H
Ingredient	Weight	fat	collagen	protein	fat	collagen	protein
		data from the table at Annex C			$\frac{B \times C}{100}$	$\frac{B \times D}{100}$	$\frac{B \times E}{100}$
Lean trimmings 80vl	100	27.4	3.40	17.0	27.4	3.40	17.0
Lean with Fat 50vl	100	53.6	1.90	11.5	53.6	1.90	11.5
Rind with fat uncooked	35	35.0	14.20	22.0	12.3	4.97	7.7
Back fat	45	78.6	3.68	5.1	35.6	1.66	2.3
Total	280				128.9	11.93	38.5
Total fat percentage =	total fat, divided by the total weight, multiplied by 100					P	46.04
Total CT percentage =	total collagen, divided by total protein, multiplied by 100					P	30.99

Blank Tables - (This page may be photocopied as many times as necessary).

Column A	B	C	D	E	F	G	H
Ingredient	Weight	fat	collagen	protein	fat	collagen	protein
		data from the table at Annex C			$\frac{B \times C}{100}$	$\frac{B \times D}{100}$	$\frac{B \times E}{100}$
Total							
Total fat percentage =	total fat, divided by the total weight, multiplied by 100					P	
Total CT percentage =	total collagen, divided by total protein, multiplied by 100					P	

Column A	B	C	D	E	F	G	H
Ingredient	Weight	fat	collagen	protein	fat	collagen	protein
		data from the table at Annex C			$\frac{B \times C}{100}$	$\frac{B \times D}{100}$	$\frac{B \times E}{100}$
Total							
Total fat percentage =	total fat, divided by the total weight, multiplied by 100					P	
Total CT percentage =	total collagen, divided by total protein, multiplied by 100					P	

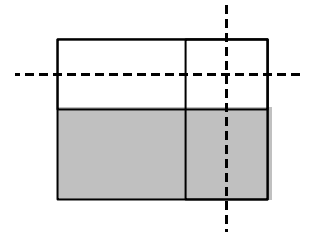
Section 2 – Correct for Excess Connective Tissue

The purpose of this step is to work out how much of your connective tissue may be counted towards the meat content – and how much must be deducted from your total.

1. Calculate fat-free meat

$$\text{total meat} \times \frac{\text{percentage of fat}}{100} = \text{total weight of fat}$$

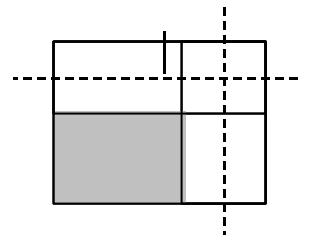
$$\text{total meat} - \text{total weight of fat} = \text{fat-free meat}$$



3. Calculate fat-free, connective tissue-free meat

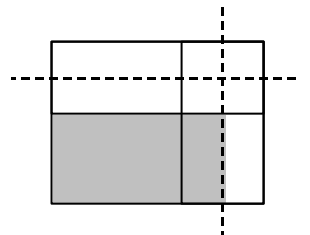
$$\text{total CT percentage} \times \frac{\text{fat-free meat}}{100} = \text{total connective tissue}$$

$$\text{fat-free meat} - \text{total connective tissue} = \text{fat-free, CT-free meat}$$



4. Include allowed connective tissue

$$\text{Fat-free, CT-free meat} \times \frac{100}{(100 - \text{limit for CT})} = \text{fat-free meat with CT allowance}$$



You now need to re-calculate your overall fat percentage, as this will have changed because of the correction you have made for excess CT.

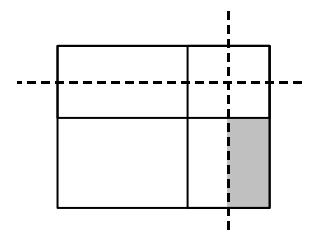
5. Re-calculate overall fat percentage

$$\frac{\text{weight of fat}}{\text{weight of fat} + \text{fat-free meat with CT allowance}} \times 100 = \text{overall fat percentage}$$

If your product is to be labelled with a list of ingredients, you now need to calculate the weight of excess connective tissue in order that it can be declared in the correct position in the list.

6. Calculate weight of excess connective tissue (for purposes of ingredient listing)

$$\text{fat-free meat} - \text{fat-free meat with CT allowance} = \text{excess CT (kg)}$$

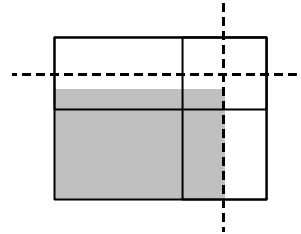


Section 3 – Add fat back in (i.e., where there is no excess fat)

The purpose of this step is simply to include your existing fat in your final meat content.

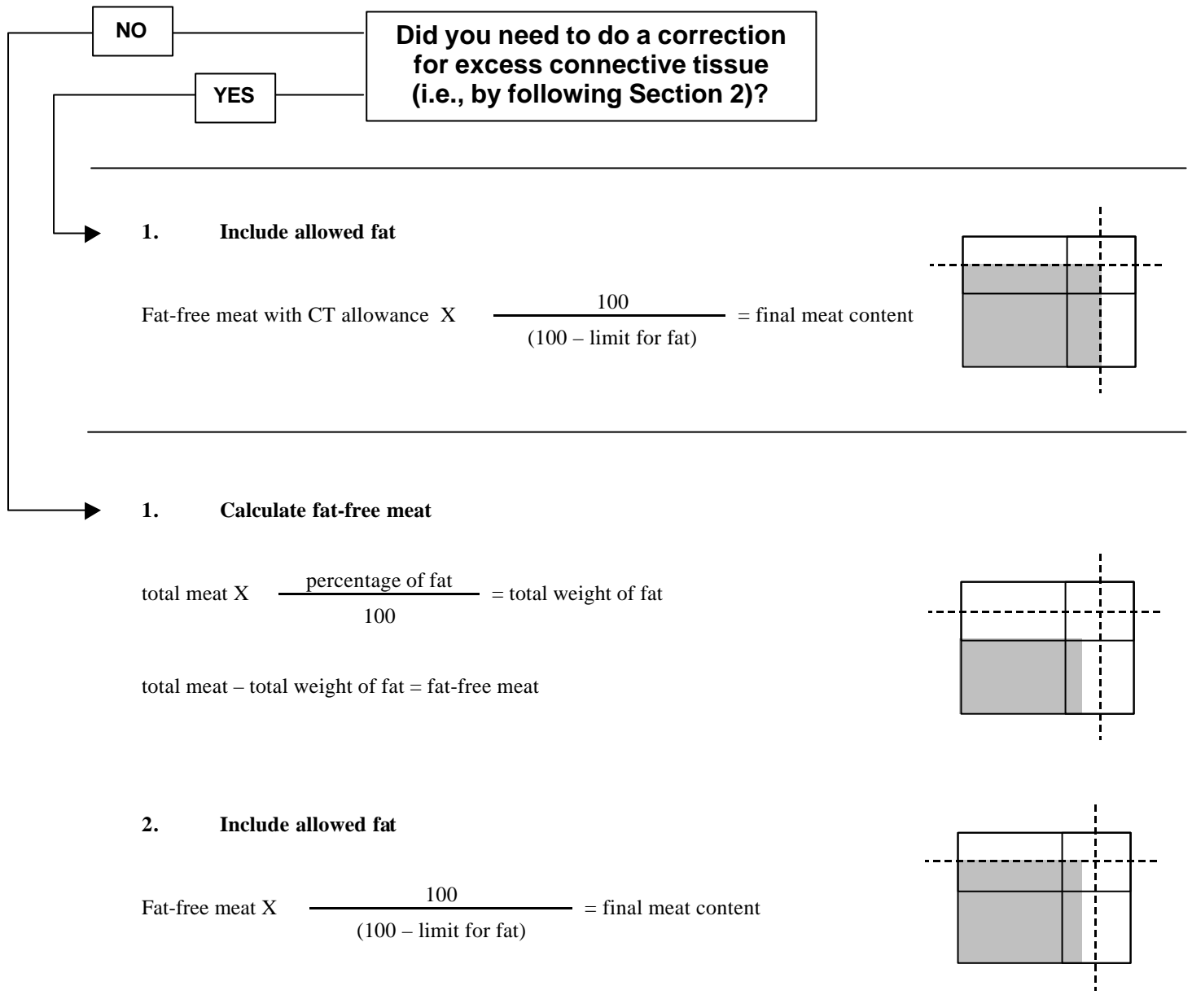
1. **Add back in fat (only where there is no excess fat)**

fat-free meat with CT allowance + total fat = final meat content



Section 4 – Correct for excess fat

The purpose of this step is to work out how much of your fat may be counted towards your meat content, and how much must be deducted from your total.



If your product is to be labelled with a list of ingredients, you now need to calculate the weight of excess fat in order that it can be declared in the correct position in the list.

3. Calculate weight of excess fat (for purposes of ingredient listing)

total fat – (final meat content – fat-free meat with CT allowance) = excess fat

Section 5 – Calculate final meat content percentage

The purpose of this step is to work out either a QUID declaration, or your compositional meat content, based on the "final meat content" you have calculated.

To calculate the QUID declaration:

1. Calculate QUID declaration

$$\frac{\text{final meat content}}{\text{total weight of final product}} \times 100 = \text{QUID declaration}$$

To calculate your “meat content” in order to ensure that the product meets the relevant compositional standards

1. Calculate compositional meat content

$$\frac{\text{final meat content}}{\text{total weight of all ingredients}} \times 100 = \text{compositional meat content}$$

ANNEX C

TABLE OF TYPICAL VALUES FOR MEAT INGREDIENTS

Pork Ingredients

	Ingredient	Fat	Collagen	Protein	CT
Pork1	Lean-top quality 100VL	8.9	1.00	19.0	5.3
Pork2	Lean containing a small amount of visible fat and connective tissue 95VL	13.8	1.40	18.0	7.8
Pork3	Lean containing no major gristles 90VL	19.3	2.00	16.5	12.1
Pork4	Sow lean 80VL	26.4	2.30	18.0	12.8
Pork5	Lean trimmings (inc. hock) 80VL	27.4	3.40	17.0	20.0
Pork6	Lean with fat 50VL	53.6	1.90	11.5	16.5
Pork7	More fat than lean 40VL	61.8	1.10	6.5	16.9
Pork8	Coarse fatty tissue containing a little lean	76.5	1.50	5.0	30.0
Pork9	Pork Back Fat	78.6	3.68	5.1	71.8
Pork10	Pork Flare Fat	82.6	1.80	3.0	60.0
Pork11	Semi-lean rind on	48.6	3.20	16.0	20.0
Pork12	Rind with fat uncooked (35% fat)	35	14.20	22.0	64.5
Pork13	Rind less trimmable fat uncooked (10% fat)	10	22.40	34.5	64.9
Pork14	Rind with fat cooked (derived from A12)		11.00	17.0	64.7
Pork15	Gristle		14.20	22.0	64.5
Pork16	Masseter Muscle		3.90	20.0	19.5
Pork18	Diaphragm		10.60	15.0	70.7
Pork19	Rehydrated rind (equivalent to uncooked rind with fat)		14.20	22.0	64.5
Pork 20	Rehydrated rind 95VL (equivalent to uncooked rind less trimmable fat)		22.40	34.5	64.9
Pork26	Pork Neck Lean	11.5	1.92	18.6	10.3
Pork27	Pork Neck 85VL	22.2	2.24	16.6	13.5
Pork28	Pork Neck 85VL + Rind	21.1	3.12	17.4	17.9
Pork29	Pork Hand Joint Lean	8.8	2.08	19.4	10.7
Pork30	Pork Hand 90VL	16.8	2.64	17.9	14.8
Pork31	Pork Hand 90VL + Rind	16	3.84	18.9	20.3
Pork32	Pork Loin Lean	8.4	1.68	20.9	8.0
Pork33	Pork Loin 85VL	23.9	2.08	17.4	12.0
Pork34	Pork Loin 85VL + Rind	22.5	3.76	18.9	19.9
Pork35	Pork Belly Lean	9.9	1.84	19.8	9.3
Pork36	Pork Belly 80VL	25.5	2.48	16.4	15.1
Pork37	Pork Belly 80VL + Rind	23.8	4.16	17.8	23.4
Pork38	Pork 90VL 3mm		0.50	17.3	2.9
Pork39	Pork Leg Lean	5	1.60	20.7	7.7
Pork40	Pork Leg 95VL	13.8	2.00	18.8	10.6
Pork41	Pork Leg 95VL including Rind	14	2.96	19.4	15.2
Pork42	Pork 95VL Desinewed	12	0.55	17.3	3.2

Beef Ingredients

	Ingredient	Fat	Collagen	Protein	CT
Beef1	Lean-top quality 100VL	8.7	1.50	21.0	7.1
Beef2	Lean containing a small amount of visible fat and connective tissue 95VL	12.6	3.00	20.0	15.0
Beef3	Lean with a moderate amount of visible fat and connective tissue 85VL	22.3	3.40	17.0	20.0
Beef4	Lean with some fat 75VL	30.6	4.80	16.0	30.0
Beef5	More fat than lean 30VL	72.5	3.00	10.0	30.0
Beef6	Beef Fat	74.8	5.76	7.3	79.4
Beef7	Beef Brisket Lean	27.6	2.56	16.3	15.7
Beef8	Beef Brisket 75VL	32.4	2.88	15.2	19.0
Beef9	Beef Jacobs Ladder Lean	18.4	2.40	18.6	12.9
Beef10	Beef Jacobs Ladder 85VL	22.1	2.48	17.8	14.0
Beef11	Beef Fore Rib Lean	20.9	2.16	18.3	11.8
Beef12	Beef Fore Rib 80VL	25.9	2.24	17.1	13.1
Beef13	Beef Chuck Lean	13.1	2.48	19.4	12.8
Beef14	Beef Chuck 95VL	15.8	2.64	18.9	14.0
Beef15	Beef Thin Flank Lean	21.1	2.32	18.4	12.6
Beef16	Beef Thin Flank 80VL	28.8	2.64	16.6	15.9
Beef17	Beef Shin & Leg Lean	6.2	3.92	21.8	18.0
Beef18	Beef Shin & Leg	9.9	4.72	21.4	22.0
Beef19	Beef Clod & Sticking Lean	14.7	2.96	19.2	15.4
Beef20	Beef Clod & Sticking 90VL	18.2	3.20	18.5	17.3
Beef21	Beef Topside Lean	6.3	1.60	21.8	7.4
Beef22	Beef Topside 95VL	11.6	1.84	20.6	8.9
Beef23	Beef Loin Rump & Fillet Lean	14.8	2.00	19.6	10.2
Beef24	Beef Loin Rump & Fillet 85VL	22.2	2.16	18.0	12.0
Beef25	Beef Thick Flank & Silverside Lean	9.6	2.48	20.6	12.1
Beef26	Beef Thick Flank & Silverside 95VL	13.2	2.72	19.9	13.7
Beef27	Beef Side Lean	14.9	2.48	19.4	12.8
Beef28	Beef Side 90VL	19.7	2.72	18.4	14.8
Beef29	Beef Pistola Lean	11.4	2.24	20.4	11.0
Beef30	Beef Pistola 90VL	16.8	2.48	19.3	12.9
Beef31	Beef Fore Quarter Lean	17.9	2.64	18.6	14.2
Beef32	Beef Fore Quarter 85VL	22.3	2.80	17.6	15.9

Poultry Ingredients

	Ingredient	Fat	Collagen	Protein	CT
Bird1	Skinless Chicken Breast	2.1	0.62	23.7	2.6
Bird2	Skinless Chicken Leg	5.2	1.84	19.9	9.3
Bird3	Skinless Chicken Thigh	7.1	1.12	19.7	5.7
Bird4	Skinless Mixed Chicken Meat	7.7	1.68	19.4	8.6
Bird5	Chicken Skin	44.2	5.68	11.8	48.3
Bird6	Chicken Breast with Skin	6.7	1.20	22.1	5.4
Bird7	Chicken Leg with Skin	10.1	2.40	18.8	12.8
Bird8	Chicken Thigh with Skin	12.9	1.84	17.2	10.7
Bird9	Mixed Chicken Meat with Skin	23.2	3.44	16.1	21.4
Bird10	Chicken Ground Desinewed (Fronts)	15.6	0.69	17.1	4.0
Bird11	Chicken Fat		2.00	3.0	66.7
Bird12	Turkey Skin	49.4	6.56	12.3	53.6
Bird13	Skinless Turkey Breast	2	0.64	23.9	2.7
Bird14	Skinless Turkey Leg Meat	6	1.44	19.6	7.4
Bird15	Skinless Turkey Thigh	5.7	1.12	19.8	5.7
Bird16	Skinless Mixed Turkey Meat	6.5	1.6	22.1	7.2
Bird17	Mixed Turkey Meat with Skin	17.9	2.88	18.4	15.6
Bird18	Turkey Breast with Skin	5.4	1.04	23	4.5
Bird19	Turkey Leg with Skin	9.7	1.92	18.9	10.1
Bird20	Turkey Thigh with Skin	10.3	1.68	19.1	8.8
Bird21	Turkey Fat		2.00	3.0	66.7

Lamb and Mutton Ingredients

	Ingredient	Fat	Collagen	Protein	CT
Lamb1	Lean Lamb of the Leg and Chump	10.1	1.68	19.4	8.7
Lamb2	Lean Lamb of the Loin and Best End Neck	18	1.76	18.4	9.5
Lamb3	Lean Lamb of the Scrag Shoulder Middle Neck and Breast	21.3	1.92	17.1	11.2
Lamb4	90VL Leg and Chump	17.8	1.92	17.9	10.7
Lamb5	80VL Loin and Best End Neck	29.8	1.84	16.0	11.5
Lamb6	80VL Scrag Shoulder Middle Neck and Breast	27.4	2.00	15.9	12.6
Lamb7	Lean Fore-quarter Mutton	23.1	2.00	16.7	12.0
Lamb8	Lean Hind-quarter Mutton	11.6	1.76	19.3	9.1
Lamb9	80VL Fore-quarter Mutton	29.1	2.08	15.4	13.5
Lamb10	90VL Hind-quarter Mutton	19.6	1.92	17.7	10.9

N.B. – shaded boxes indicate where fat and connective tissue levels are in excess of limits laid down by Commission Directive 2001/101/EC.

EXAMPLES OF MEAT CONTENT CALCULATION – USING THE FSA METHOD

Example 1 – Beefburger

	kg
Lean with some fat 75VL	246
Other ingredients	54
Total ingredients	300

Other ingredients	kg
Water	24
Onion	10.5
Seasoning	7.5
Rusk	7.5
Textured veg. protein	4.5

Q. Do any of your ingredients contain excess fat or connective tissue? – Yes

Q. Do you have more than one ingredient of the same species? - No

Q. Do you have excess connective tissue? – Yes

> Complete Section 2 – Correct for excess connective tissue

1. Calculate fat free meat

$$246 \times \frac{30.6}{100} = 75.28$$

$$246 - 75.28 = 170.72$$

2. Calculate fat-free, connective tissue-free meat

$$30 \times \frac{170.72}{100} = 51.22$$

$$170.72 - 51.22 = 119.5$$

3. Include allowed connective tissue

$$119.5 \times \frac{100}{(100 - 25)} = 159.34$$

4. Re-calculate overall fat percentage

$$\frac{75.28}{(75.28 + 159.34)} \times 100 = 32.1$$

5. Calculate weight of excess connective tissue

$$170.72 - 159.34 = 11.38$$

End of Section 2

- Q. Do you have excess fat? – Yes**

> Complete Section 4 – Correct for excess fat

- Q. Did you need to do a correction for excess connective tissue – Yes**

1. Include allowed fat

$$159.34 \times \frac{100}{(100 - 25)} = 212.45$$

3. Calculate weight of excess fat

$$75.28 - (212.45 - 159.34) = 22.17$$

End of Section 4

> Complete Section 5 – Calculate your percentage meat content

1. Calculate QUID declaration

$$\frac{212.45}{300} \times 100 = 70.82 \% = \mathbf{71\%}$$

Example 2 – Pork and Beef Sausage – Pork ingredients only. Repeat calculation for beef ingredients.

	kg
Lean Trimmings 80VL	100
Lean with fat 50VL	100
Pork rind & back fat 70VL	35
Pork back fat	45
Total pork ingredients	280
Beef with some fat 75VL	40
Other ingredients	305
Total ingredients	625

Other ingredients	kg
Starch	50
Rusk	75
Seasoning	20
Water	160

Q. Do ANY of your ingredients contain excess fat or connective tissue? – **Yes**

Q. Do you have more than one meat ingredient of the same species? – **Yes**

> Complete Section 1 – Ingredients table

Column A	B	C	D	E	F	G	H
Ingredient	Weight	fat	collagen	protein	fat	Collage n	protein
		data from the table at Annex C			<u>B x C</u> 100	<u>B x D</u> 100	<u>B x E</u> 100
Lean trimmings 80vl	100	27.4	3.40	17.0	27.4	3.40	17.0
Lean with Fat 50vl	100	53.6	1.90	11.5	53.6	1.90	11.5
Rind with fat uncooked	35	35.0	14.20	22.0	12.3	4.97	7.7
Back fat	45	78.6	3.68	5.1	35.4	1.66	2.3
Total	280				128.7	11.93	38.5
Total fat percentage =	total fat, divided by the total weight, multiplied by 100					P	45.96
Total CT percentage =	total collagen, divided by total protein, multiplied by 100					P	30.99

End of Section 1

Q. Do you have excess connective tissue? - **Yes**

> Complete Section 2 – Correct for excess connective tissue

1. Calculate fat free meat

$$280 \times \frac{45.96}{100} = 128.7$$

$$\frac{\quad}{100}$$

$$280 - 128.7 = 151.3$$

2. Calculate fat-free, connective tissue-free meat

$$30.99 \times \frac{151.3}{100} = 46.89$$

$$151.3 - 46.89 = 104.41$$

3. Include allowed connective tissue

$$104.41 \times \frac{100}{(100 - 25)} = 139.21$$

4. Re-calculate overall fat percentage

$$\frac{128.7}{(128.7 + 139.21)} \times 100 = 48.04$$

5. Calculate weight of excess connective tissue

$$151.3 - 139.21 = 12.09$$

End of Section 2

- Q. Do you have excess fat? - Yes

> Complete Section 4 – Correct for excess fat

1. Include allowed fat

$$139.21 \times \frac{100}{(100 - 30)} = 198.87$$

3. Calculate the weight of excess fat

$$128.9 - (198.87 - 139.21) = 69.51$$

End of Section 4

> Complete Section 5 – Calculate your percentage meat content

1. Calculate QUID declaration

$$\frac{198.87}{625} \times 100 = 31.82 \% = \mathbf{32\%}$$

Example 3 – Chicken Nuggets

	kg
Skinless mixed chick meat	50
Chicken leg with skin	40
Chicken skin	10
Total chicken ingredients	100
Other ingredients	100
Total ingredients	200

Other ingredients	kg
Water	25
Wheat flour / starch	20
Salt	3
Seasoning	2
Breadcrumbs / coating	50

Q. Do ANY of your ingredients contain excess fat or connective tissue? – Yes

Q. Do you have more than one meat ingredient of the same species? – Yes

> Complete Section 1 – Ingredients table

Column A	B	C	D	E	F	G	H
Ingredient	Weight	fat	collagen	protein	fat	collagen	protein
		data from the table			<u>B x C</u> 100	<u>B x D</u> 100	<u>B x E</u> 100
Skinless mixed ch meat	50	7.7	1.68	19.4	3.85	0.84	9.70
Chicken leg with skin	40	10.1	2.40	18.8	4.04	0.96	7.52
Chicken skin	10	44.2	5.68	11.8	4.42	0.57	1.18
Total	100				12.31	2.37	18.4
Total fat percentage =	total fat, divided by the total weight, multiplied by 100					P	12.31
Total CT percentage =	total collagen, divided by total protein, multiplied by 100					P	12.88

End of Section 1

Q. Do you have excess connective tissue? – Yes

Complete Section 2 – Correct for excess connective tissue

1. Calculate fat free meat

$$100 \times \frac{12.31}{100} = 12.31$$

$$100 - 12.31 = 87.69$$

2. Calculate fat-free, connective tissue-free meat

$$12.88 \times \frac{87.69}{100} = 11.29$$

$$87.69 - 11.29 = 76.40$$

3. Include allowed connective tissue

$$76.40 \times \frac{100}{(100 - 10)} = 84.89$$

4. Re-calculate overall fat percentage

$$\frac{12.31}{(12.31 + 84.89)} \times 100 = 12.66$$

5. Calculate weight of excess connective tissue

$$87.69 - 84.89 = 2.8$$

End of Section 2

- Q. Do you have excess fat? - Yes

> Complete Section 3 – Add fat back in

$$84.89 + 12.31 = 97.2$$

End of Section 3

> Complete Section 5 – Calculate your percentage meat content

1. Calculate your QUID declaration

$$\frac{97.2}{200} \times 100 = 48.6 \% = \mathbf{49\%}$$

Example 4 – Meat Pasty

	kg
Beef brisket 75vl	100
Other ingredients	400
Total weight of ingredients	500
Final weight (after cooking)	450

Other ingredients	kg
Potato, Swede, Carrot	135
Water	10

- Q. Do ANY of your ingredients contain excess fat or connective tissue? – Yes
- Q. Do you have more than one ingredient of the same species? - No
- Q. Do you have excess connective tissue? - No
- Q. Do you have excess fat? – Yes

> Complete Section 4 – Correct for excess fat

- Q. Did you need to do a correction for excess connective tissue? – No

1. Calculate fat-free meat

$$100 \times \frac{(100 - 32.4)}{100} = 67.6$$

2. Include allowed fat

$$67.6 \times \frac{100}{(100 - 25)} = 90.13$$

3. Calculate weight of excess fat

$$32.4 - (90.13 - 67.6) = 9.87$$

End of Section 4

> Complete Section 5 – Calculate your percentage meat content

1. Calculate QUID declaration

$$\frac{90.13}{450} \times 100 = 20.03 \% = \mathbf{20\%}$$

2. Calculate your “compositional meat content” on a raw basis

$$\frac{90.13}{500} \times 100 = 18.03 \% = \mathbf{18\%}$$

THE CLITRAVI METHOD

This method requires the use of analytical data for the level of fat, meat protein and hydroxyproline/collagen present in the meat ingredients. This will require chemical analysis of representative samples of ingredients from the mixing bowl.

1. Determining the fat and connective tissue content of the meat ingredients

Connective Tissue Content

Where the collagen and protein content are determined by analysis from the hydroxyproline content, the connective tissue is calculated from the collagen content by using a suitable conversion factor (normally 37÷8) as follows:

Collagen = hydroxyproline x 8

Connective tissue % = Collagen x 37÷8

Notes:

1. The values for protein, collagen and fat in the formulae below relate to the **percentage** of protein, collagen or fat in the total meat.
2. The chemical fat, hydroxyproline and protein nitrogen can be determined using ISO methods or equivalent.
3. Step 3 below requires the use of a suitable conversion factor for the conversion of collagen into connective tissue. The generally accepted factor of 37÷8 is recommended. However, where the specific nature of the connective tissue is known, and all the collagen derives from that source, then other more specific conversion factors may be used.

The Calculation

1. Calculate allowed collagen content

$$\text{allowed collagen content (\%)} = \frac{\text{limit for CT (\%)} \times (\text{protein in meat (\%)} - \text{collagen in meat (\%)})}{(100 - \text{limit for CT})}$$

2. Calculate excess collagen

excess collagen (%) = collagen in meat (%) – allowed collagen content (%)

If excess collagen (%) is £ 0, then there is no excess collagen or connective tissue; go to step 4. See also note for calculation 6 below.

3. Convert excess collagen into excess connective tissue

excess connective tissue (%) = excess collagen (%) X [conversion factor]

4. Calculate allowed fat content

- **Where excess collagen > 0**

$$\text{allowed fat content (\%)} = \frac{\text{limit for fat (\%)} \times (100 - \text{excess CT} - \text{percentage of fat in total meat})}{(100 - \text{limit for fat (\%)})}$$

- **Where excess collagen £ 0**

$$\text{allowed fat content (\%)} = \frac{\text{limit for fat (\%)} \times (100 - \text{percentage of fat in total meat})}{(100 - \text{limit for fat (\%)})}$$

5. Calculate excess fat

excess fat (%) = percentage of fat in total meat – allowed fat content

If excess fat (%) £ then there is no excess fat. See also note for calculation 6 below.

6. Calculate declarable meat

declarable meat (%) = 100 – excess fat – excess connective tissue

NB – values for “excess fat” or “excess connective tissue” should only be included in calculation 6, where there is actually an excess of fat or connective tissue (as appropriate) in the product. If the value for excess fat or excess connective tissue are < 0, you should not include those values in calculation 6.

7. Calculate QUID declaration

The ‘declarable meat’ represents the percentage of the total meat on which the QUID declaration may be based.

$$\text{QUID declaration (\%)} = \text{declarable meat} \times \frac{\text{total meat}}{\text{total weight of product}}$$

NB: - The percentages for excess connective tissue and excess fat calculated above represent the percentage of the *total meat* that is in excess of the statutory limits. Where excess connective tissue or fat is declared in a product's list of ingredients, it will be necessary to calculate this excess as a percentage of total *product* weight – as follows

$$\text{percentage excess} = \text{excess [CT or fat]} \times \frac{\text{total meat}}{\text{total weight of product}}$$

THE RESERVED DESCRIPTIONS – COMPOSITIONAL REQUIREMENTS

Column 1	Column 2			Column 3
Name of Food	Meat or Cured Meat Content Requirements			Additional Requirements
	The food shall contain not less than the indicated percentage of meat, where the meat ingredient consists of the following:			
	Meat or, as the case may be, cured meat from pigs only	Meat or, as the case may be, cured meat from birds only, rabbits only, or a combination of birds and rabbits only	Meat or, as the case may be, cured meat from other species or other mixtures of meat	
<p>1. Burger – <i>whether or not forming part of another word, but excluding any name falling within items 2 or 3 of this Schedule.</i></p>	67%	55%	62%	<p>1. Where the name “hamburger” is used, the meat used in the preparation of the food must be beef, pork or a mixture of both.</p> <p>2. Where either of the names “burger” or “economy burger” is qualified by the name of a type of cured meat, the food must contain a percentage of meat of the type from which the named type of cured meat is prepared at least equal to the minimum required meat content for that food.</p> <p>3. Where any of the names “burger”, “economy burger” or “hamburger” is qualified by the name of a type of meat, the food must contain a percentage of that named meat at least equal to the minimum required meat content for that food.</p>

Column 1	Column 2			Column 3
Name of Food	Meat or Cured Meat Content Requirements			Additional Requirements
				4. Where any of the names "burger", "economy burger" or "hamburger" are used to refer to a compound ingredient consisting of a meat mixture and other ingredients, such as a bread roll, these requirements shall apply only to the meat mixture, as if the meat mixture were the meat product in the labelling or advertising of which the name was used as the name of the food.
2. Economy Burger – <i>whether or not "burger" forms part of another word.</i>	50%	41%	47%	
3. Hamburger – <i>whether or not forming part of another word.</i>	67%	Not applicable	62%	
4. Chopped X , <i>there being inserted in place of "X" the name "meat" or "cured meat" or the name of a type of meat or cured meat, whether or not there is also included the name of a type of meat</i>	75%	62%	70%	No additional requirement
5. Corned X , <i>there being inserted in place of "X" the name "meat" or the name of a type of meat, unless qualified by words which include the name of a food other than meat</i>	120%	120%	120%	1. The food shall consist wholly of meat that has been corned. 2. Where the name of the food includes the name of a type of meat, the meat used in the preparation of the food shall be wholly of the named type. 3. The total fat content of the food shall not exceed 15%.
6. Luncheon meat Luncheon X , <i>there being inserted in place of "X" the name of a type of meat or cured meat</i>	67%	55%	62%	No additional requirement

Column 1	Column 2			Column 3
Name of Food	Meat or Cured Meat Content Requirements			Additional Requirements
<p>7. Meat pie Meat pudding <i>The name "pie" or "pudding" qualified by the name of a type of meat or cured meat unless qualified also by the name of a food other than meat or cured meat</i> Melton Mowbray pie Game pie</p> <p>Based on the weight of the ingredients when the food is uncooked</p> <p>But if the food weighs –</p> <p style="padding-left: 40px;">not more than 200 g. and not less than 100 g.</p> <p style="padding-left: 40px;">less than 100 g.</p>	12.5%	12.5%	12.5%	<p>1. Where the name "Melton Mowbray pie" is used, the meat used in the preparation of the food must be meat from pigs only.</p>
<p>8. Scottish pie or Scotch pie</p> <p>Based on the weight of the ingredients when the food is uncooked</p>	10%	10%	10%	No additional requirement

Column 1	Column 2			Column 3
Name of Food	Meat or Cured Meat Content Requirements			Additional Requirements
<p>9. <i>The name “pie” or “pudding” qualified by the words “meat” or “cured meat” or by the name of a type of meat or cured meat and also qualified by the name of a food other than meat or cured meat –</i></p> <p><i>Where the former (meat-related) qualification precedes the latter</i></p> <p><i>Where the latter (non-meat-related) qualification precedes the former</i></p> <p>Based on the weight of the ingredients when the food is uncooked</p>	7%	7%	7%	No additional requirement
<p>10. Pasty or Pastie</p> <p>Bridie</p> <p>Sausage roll</p> <p>Based on the weight of the ingredients when the food is uncooked</p>	6%	6%	6%	No additional requirement
<p>11. Sausage (excluding the name “sausage” when qualified by the words “liver” or “tongue” or both), link, chipolata or sausage meat.</p> <p><i>Where the name is qualified by the name “pork” but not by the name of any other type of meat</i></p> <p><i>In all other cases</i></p>	42%	Not applicable	Not applicable	No additional requirement
	32%	26%	30%	

Note : The meat or cured meat content requirements specified in this Schedule are calculated by weight. In relation to items 1 to 6 and 11 they are based, subject to regulation 4(2)(a)(ii), on the weight of the food concerned as it is labelled or, as the case may be, advertised.

VALIDATION OF METHODS FOR THE CALCULATION OF MEAT CONTENTS

Executive Summary

1. The purpose of the exercise was to test the validity of the method for meat content calculation included in the Agency's *Guidance Notes on the Labelling and Composition of Meat Products* (see Annex G2 below). The exercise was not an enforcement exercise, nor was it intended to check the products' compliance with either current or forthcoming legislation.
2. In order to enable smaller businesses to calculate meat content (taking into account limits for fat and connective tissue laid down by the new EU definition of meat) it is necessary to develop a method that is not reliant on chemical analysis of ingredients. Fat content can be estimated using the visual lean method. Although visual lean estimates are subjective, the technique is used successfully in commerce to distinguish between similar products from single sources. It is not possible however to make a visual estimate of the connective tissue content of meat cuts. Therefore the use of agreed typical values for identified meat cuts is proposed as a practical alternative to chemical analysis. The *Guidelines* therefore propose a method on this basis (described throughout this report as the "FSA Method").
3. The range of meat ingredients used by the meat processing industry is large and the descriptions of them are often inconsistent. This suggests that a table of typical values may not be universally applicable. The effectiveness of the "FSA Method" was therefore assessed, by comparing the results obtained using the FSA method; the calculation method proposed by CLITRAVI; and an apparent meat content calculated with the use of appropriate nitrogen factors.
4. The 14 commercially available meat products sampled were taken from normal manufacturing processes in 10 factories throughout England and Scotland. Manufacturers also provided recipe details for each product. Products and manufacturers were chosen to give the widest range of raw materials with both large and small scale production.

Conclusions and Recommendations

5. The FSA method will, with careful application, provide an effective basis for the calculation of meat content by businesses.
6. Additions to the table of typical values will be required; in particular for jowl and masseter. Typical values for fat need to be added for cooked rind, dehydrated rind, and diaphragm.

7. Where there are significant differences between the results obtained using typical values (i.e., FSA method) and those obtained using analytical results (i.e., CLITRAVI and nitrogen factors) the principal reason for these differences is that the assumed fat content is overestimated. This overestimation does not arise because the data in the table of typical values is inaccurate. Rather the overestimation seems to arise because the VL contents stated in the recipe do not match the ingredients actually used. Therefore, when data is extracted from the table (and assigned to a particular ingredient in the recipe in order to carry out the calculation) this data is not in fact representative of the ingredient being used.
8. It will now be important therefore to estimate VL content as accurately as possible. Although the VL technique has been in common use for many years, accuracy of estimation has not generally been necessary. This is because producers have not generally needed to consider the fat content when determining meat content, because of the more generous limits for fat implied by the previous provisions. References to VL have been used more as a means of describing the cut for purchasing purposes.
9. Both the FSA and CLITRAVI method require full recipe details if they are to be used with confidence in all cases (i.e., details not only of any non-meat protein in the product, but also the relative quantities of the meat ingredients). Therefore neither of these methods will be fully effective to underpin enforcement checks on a final product basis alone. Enforcement bodies will still need therefore to use nitrogen factors to calculate meat content, and in some cases will also require recipe information.
10. When using the FSA method, producers will need to provide a QUID declaration that takes into account the variabilities not only of the production process, but also of the ingoing ingredients. In some instances, this variability was found to be significant.

Acknowledgements

11. The exercise was funded by the Food Standards Agency. The Agency is very grateful to the British Meat Manufacturers Association for their assistance in setting up the trial and calculating the results. It would like to thank all the participating businesses for providing their time, products and raw materials free of charge. The Agency wishes also to thank Somerset County Council for their work on the project.

CALCULATED MEAT CONTENTS - RESULTS

Product	Meat species	FSA	CLITRAVI	N Factor
1. Economy sausage	Pork	33	34	38
2. Pork sausage	Pork	68	73	73
3. Pork sausage	Pork	61	68	64
4. Pork Sausage	Pork	47	58	56
5. Canned sausage	Pork	35	33	57 ¹
	Chicken	28	28	-
6. Uncooked chipolata sausage	Pork	48	52	63
7. Economy burger	Pork	29	38	51 ¹
	Chicken	20	20	-
8. Economy burger	Pork	63	58	73 ²
9. Beefburger	Beef	90	90	93 ¹
	Pork	5	5	-
10. Beefburger	Beef	72	80	80
11. Beefburger	Beef	82	82	84
12. Cured Pork Pie Filling	Pork	60	85	89
13. Sausage roll meat mixture	Pork	18	21	20
14. Minced beef and onion pie filling	Beef	27	27	28

¹ These are products containing meat from two different species. The result obtained using the nitrogen factor calculation relates to the *total* meat content of the product.

² This product contains MRM (which is not considered "meat" under the new definition) The result however includes the protein contributed by the MRM in the calculation.

CALCULATIONS USED

1. The FSA method was devised as an accessible method for use by small businesses, and in other instances where analytical data is not available. The method is based on the use of a table of typical values for fat and connective tissue in commonly used meat cuts. The CLITRAVI Method is intended for use with analytically determined values for fat and connective tissue. The two calculations underpinning the FSA method and the CLITRAVI method differ in their treatment of connective tissue. However, assuming the same data is used, the results obtained will only differ where there is excess connective tissue in the product. The FSA Method and CLITRAVI Method are detailed in Annexes B and E respectively of these Guidelines.
2. Results were also calculated using appropriate nitrogen factors. The results include corrections for non-meat protein and excess collagen; and also take account of the statutory limits for fat. It should be noted therefore that this approach could only be taken in practice where full recipe details are available.

Nitrogen Factor Method**Step1 Calculate meat protein excluding contributions from non-meat nitrogenous sources:**

$$\text{Meat Nitrogen (N}_M) = \text{Total Nitrogen (N}_T) - \text{non-meat Nitrogen (N}_{NM})$$

$$\text{Meat Protein (P}_M) = 6.25 \times \text{N}_M$$

Carbohydrate % (C) is normally determined by difference:

$$\text{Carbohydrate \% (C)} = 100 - (\text{water\%} + \text{fat\%} + \text{protein\%} + \text{ash\%})$$

(Where there is no information on non-meat nitrogen it is assumed that

Non meat nitrogen = 0.02 x C.

(Where the non meat nitrogen is known from analysis of the ingredients this figure can be used)

Step2 Calculate the collagen free meat protein:

$$\text{Collagen-free meat protein (P}_{MCTFREE}) = P_M - \text{Collagen (8 x \%hydroxyproline)}$$

Step3 Calculate the ratio between the collagen content and the meat protein content

$$\text{Connective Tissue\% (CT\%)} = \frac{\text{Collagen \%}}{P_M} \times 100$$

Step4 Calculate the meat protein with the allowed collagen:

- a. If $\text{CT\%} < \text{CT}_{LIMIT} \%$

Where: $\text{CT}_{LIMIT} \%$ = Limits for connective tissue provided by the EU Definition.

$$\text{Meat protein with allowed collagen (P}_{M+CT}) = P_{MCTFREE} + \text{collagen}$$

- b. If $\text{CT\%} > \text{CT}_{LIMIT}$

$$\text{Meat protein with allowed collagen (P}_{M+CT}) = P_{MCTFREE} \times \frac{100}{(100 - CT_{LIMIT})}$$

Step5 Calculate excess collagen if CT% > CT_{LIMIT}

$$\text{Excess collagen \%} = \text{total Collagen} - (P_{M+CT} - P_{MCTFREE})$$

Step6 Calculate the fat free meat:

$$\text{Fat free meat \% (FFM)} = \frac{P_{M+CT}}{6.25 \times \text{Fat free Nitrogen Factor (N}_{ff})} \times 100$$

Step7 Calculate the meat content to include allowed fat:

a. If: $\frac{\text{fat}}{\text{FFM} + \text{fat}} \times 100 < \text{fat}_{LIMIT} \%$

Where: Fat_{LIMIT} % = Limit for fat provided by the EU Definition.

$$\text{Declarable meat content} = \text{FFM} + \text{fat}$$

b. If: $\frac{\text{fat}}{\text{FFM} + \text{fat}} \times 100 > \text{fat}_{LIMIT}$

$$\text{Declarable meat content} = \frac{\text{FFM}}{(100 - \text{fat}_{LIMIT})} \times 100$$

Step8 Calculate excess fat

$$\text{Excess fat} = \text{total fat} - (\text{declarable meat content} - \text{fat free meat})$$

SAMPLING PRINCIPLES AND PRACTICE

1. A range of product types were identified from both normal retail and economy ranges; some products were cooked and some included pastry. A total of 14 products from 10 sites throughout England and Scotland were sampled during October and November 2002.
2. The trial was conducted in a normal manufacturing production environment as far as was possible. A selection of small, medium and large companies were visited and a range of samples taken of raw meat ingredient materials and final products. Non-meat ingredients were also collected to ensure an accurate interpretation of final product analyses.
3. Production of meat products follows either a batch or linked batch process. The latter is where successive batches of material are made to the same recipe and then used sequentially throughout the production run. Traceability of each subsequent batch is usually not possible.
4. Appointments to visit the manufacturing sites were pre-planned to ensure that samples of identified products could be collected on specific days. On most occasions this worked well but due to production rescheduling at short notice, production breakdowns, and completion of commercial contracts, a few substitute products were included and sampling opportunities were rearranged at short notice. When substitution was necessary products aimed at the same market sector and containing similar ingredients to the intended product were chosen, after discussion on site with the manufacturer. One manufacturing site was revisited to complete sampling of a product line not available on the first visit.
5. Samples were requested from normal production processes. Raw materials, other ingredients and final products were taken. Not all samples collected were analysed; the collection of non meat ingredients was to ensure that all the components of the recipe, of a particular product, were available for analysis, if necessary, to resolve any questions subsequently raised after the first series of analyses.
6. The way sampling is carried out is critical to the determination of the legality of the product. In this project two separate 0.5 – 1 kg sub-samples were taken of each meat ingredient at the most appropriate point ie that point where the material was at its most homogeneous before the addition of other ingredients. The variation between these pairs, of what should be the same material, would provide an indication of the heterogeneity of the raw materials taken from the same source at the same time. This approach gives more information than duplicate analyses on a single sample.
7. The meat industry often uses frozen ingredients, 15 – 22 kg blocks of frozen meat are commonplace; they are sourced from Europe and around the world. The blocks are usually made up of similar cuts from many different animals. These products are inherently

heterogeneous and no sampling was attempted from such blocks directly. Where blocks were minced or chipped together, or utilised directly and mixed with other ingredients special arrangements were made with the factory staff, to mince a single block, with samples taken from the resulting material. It was acknowledged that this would provide no more information than the composition of the block used, however all other options were either not feasible or practical at that time.

8. In the production of some of the more complex meat products, it was not always possible to take samples of ingredients and then follow those specific batches through to the final product. When this happened batches of the final product made at a different time but to the same recipe, were collected.
9. Each of the two sub-samples of each meat ingredient were collected in new 1 L plastic containers which were sealed and labelled in the factory and returned to the laboratory where each was separately further homogenised before analysis. Thus a pair of independently produced laboratory samples of each meat ingredient was tested.
10. Each laboratory sample was analysed once, and the pairs of results for each meat ingredient combined for interpretation. The variation between these pairs of results provided an indication of the heterogeneity of the raw materials taken from the same source at the same time.

<u>ANALYTICAL PROTOCOL</u>

The samples were photographed prior to preparation.

All of the samples, with the exception of the pork rinds were homogenised using a food processor to give as fine a mix as possible. A representative laboratory sub-sample was placed in a jar for analysis and the remaining sample was deep-frozen for future reference if required. This generally provided two separate samples of each meat ingredient for analysis.

The pork rinds could not be homogenised in the normal manner. These samples were freeze-dried and then defatted by refluxing with mixed ethers, the weight loss from each of these steps was quantified. The dried, defatted sample was then ground to a powder by blending under liquid nitrogen. This sample was analysed for moisture, nitrogen, fat, and ash and the results expressed on the original material.

Preparation of the finished products involved:

- *Sausages* - removal of the skin
- *Pies* - the product was weighed, the pastry was removed, the filling was weighed and then homogenised for analysis. The results are expressed on the filling only.
- *Canned meat products* - the meat product only, excluding any brine, was analysed.
- *Pork Pie analysis* - Meat separated from the jelly and analysed

The samples were analysed using the following methods:

Analyte	Method Reference	Principle
Nitrogen	JAOAC 1993 76(4) 780,787	Dumas Combustion Technique
Fat	BS 4401 Pt 4	Acid Hydrolysis/Solvent Extraction
Moisture	BS 4401 Pt 3 equivalent	Oven Drying at 100°C
Ash	BS 4401 Pt 1	Incineration at 500°C
Hydroxyproline	BS 4401 Pt 11	Acid hydrolysis, oxidation, colorimetry

The laboratory holds UKAS accreditation for all these methods of analysis.

Analytical Quality Control (AQC)

Each batch of samples analysed included the following AQC checks:

- Duplicate analysis of 1 in 10 samples or one sample per batch whichever was the most frequent.
- An in-house reference material consisting of FAPAS series 1 round 22 Canned Meat Test Material No T0122.

The results from each batch of samples analysed were considered acceptable if:

- the relative percent difference between the duplicate results was within normal laboratory AQC limits for the analytes
- the result from the reference material was within two standards deviations of the assigned value, and

- for meat ingredients other than rind, the sum of the fat, protein, moisture and ash was equal to 100+/- 2.
- In the case of the rind the use of the factor 6.25 to convert nitrogen to protein is inappropriate and the sum of the analytes is outside the range 100+/- 2; a more appropriate, and scientifically accurate factor is 5.7

Calculations used

- Protein = Nitrogen x 6.25
- Collagen = Hydroxyproline x 8

Annex G5

PRODUCT, RECIPES, AND RESULTS OF ANALYSIS

5.1 Economy Sausage

	Weight (kg)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Fatty Masseter	57	9.4	2.71	0.29	52.1	3.15
		10.0	3.13	0.31	53.2	3.43
Pork belly 80VL	23	9.9	2.69	0.27	56.4	3.64
		7.9	2.08	0.26	60.8	3.24
Back fat	23	5.9	1.94	0.33	69.6	3.09
		6.8	1.90	0.28	72.8	3.98
Lean with no major gristles 90VL	11	18.4	1.11	0.06	15.3	3.47
		18.2	0.98	0.05	13.0	3.35
OTHER	108.34					
FINAL PRODUCT						
Sausage		8.6	1.328	0.15	24.8	
Sausage		9.0	1.176	0.13	24.8	
TOTAL	222.34					

5.2 Pork Sausage

	Weight (kg)	Protein g/100g	Collagen g/100g	Collagen/Pr otein	Fat g/100	N g/100 g of of fat free meat
PORK INGREDIENTS						
Lean trimmings (including hock) 80VL	14.2	14.8	1.544	0.10	34.3	3.60
		15.0	1.392	0.09	31.6	3.50
OTHER	4.535					
FINAL PRODUCT						
Final sausages		12.3	1.096	0.09	24.7	
Final sausages		11.8	1.488	0.13	24.8	
TOTAL	18.735					

5.3 Pork Sausage

	Weight (lb)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of of fat free meat
PORK INGREDIENTS						
Pork belly 70VL	27	18.8	1.33	0.07	13.0	3.46
		18.8	1.41	0.07	10.3	3.35
Other	13					
FINAL PRODUCT						
Pork sausage		13.5	1.16	0.09	8.5	
		12.6	1.30	0.09	8.0	
TOTAL	40					

5.4 Pork Sausage

	Weight (kg)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Lean with no major gristles 90VL	9	17.7	2.08	0.12	18.0	3.45
		17.6	2.07	0.12	16.3	3.37
Lean with fat 50VL	12	15.3	1.65	0.11	28.8	3.44
		15.2	1.58	0.10	30.9	3.53
Fatty Masseter	14	13.4	2.95	0.22	37.1	3.41
		11.7	3.00	0.26	40.1	3.11
Desinewed pork	9	18.3	0.912	0.05	13.6	3.39
		18.2	0.696	0.04	14.9	3.43
Rind with fat cooked	5.9	25.2	15.26	0.60	17.2	4.88
		26.4	15.74	0.60	18.4	5.18
Back fat	15.1	4.9	2.11	0.43	77.0	3.44
		4.6	2.36	0.51	75.9	3.02
OTHER	35					
FINAL PRODUCT						
Pork sausages		9.6	2.22	0.23	25.8	
		10.8	2.18	0.20	23.8	
TOTAL	100					

5.5 Canned Sausages

	Weight (kg)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Sow lean 80VL	120	15.6	1.96	0.13	21.4	3.17
		15.6	2.00	0.13	17.9	3.05
Lean trimmings (including hock) 80VL	150	14.1	3.28	0.23	25.2	3.01
		15.4	3.44	0.22	23.8	3.23
Back fat	85	3.4	0.96	0.28	81.8	2.97
		3.3	1.04	0.31	84.0	3.31
POULTRY INGREDIENTS						
Chicken Ground Desinewed	270	16.2	1.20	0.07	16.3	3.09
		16.1	0.64	0.04	15.2	3.04
OTHER	335.1					
FINAL PRODUCT						
Canned sausage		9.7	1.11	0.12	14.2	
		9.5	1.33	0.14	14.1	
Final product mix		11.5	1.02	0.09	16.1	
		11.4	1.11	0.10	16.3	
Sausage mix		10.2	1.09	0.11	16.2	
		9.6	0.95	0.10	15.9	
TOTAL	960.1					

5.6 Cooked Chipolata Sausages

	Weight (%)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Rind with fat cooked	7.58	27.3	19.5	0.72	23.5	5.70
		25.9	19.6	0.76	21.9	5.30
Lean trimmings 80VL	9.91	17.6	2.12	0.12	16.9	3.40
		15.6	2.31	0.15	25.8	3.37
Pork neck 85VL	10.66	17.7	2.14	0.12	17.1	3.41
		17.8	3.09	0.17	14.8	3.34
Lean with fat 50vl	25.16	15.0	2.06	0.14	26.6	3.26
		11.2	3.82	0.34	45.0	3.26
Back fat	14.41	3.4	3.67	1.08	77.6	2.43
		3.8	2.22	0.59	81.9	3.31
OTHER	32.38					
FINAL PRODUCT						
Final chipolata		12.3	3.62	0.29	27.2	
		12.1	3.90	0.32	23.8	
Cooked chipolata		11.5	3.34	0.29	25.9	
		11.5	4.12	0.36	32.7	
TOTAL	100					

5.7 Economy Burger

	Weight (%)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Lean with no major gristles 90VL	11.98	17.5	1.19	0.07	17.6	3.40
		17.6	1.29	0.07	18.0	3.43
Lean with fat 50VL	16.05	8.7	2.04	0.23	56.9	3.23
		11.2	1.86	0.17	47.5	3.41
Course fatty tissue with a little lean	10.37	13.8	1.30	0.09	39.7	3.65
		13.6	1.01	0.07	37.7	3.69
Rind less trimmable fat	4.07	28.1	21.8	0.78	24.6	5.96
		28.0	20.8	0.74	26.7	6.11
POULTRY INGREDIENTS						
Chicken ground desinewed	20.00	18.0	0.79	0.04	11.7	3.26
		17.9	0.71	0.04	12.9	3.27
OTHER	37.53					
FINAL PRODUCT						
Economy burger		9.8	1.15	0.12	20.6	
		10.0	1.19	0.12	20.6	
TOTAL	100					

5.8 Economy Hamburger

	Weight (kg)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Lean trimmings 80VL	75	15.8	1.44	0.09	25.6	3.40
		15.9	1.84	0.12	24.7	3.39
Lean Masseter muscle	132	17.3	3.52	0.20	12.3	3.15
		16.8	2.96	0.18	12.9	3.09
Pork MRM *	30	17.2	1.04	0.06	13.0	3.16
* (not counted as "meat")		17.1	0.96	0.06	13.0	3.14
Lean trimmings (including hock) 80VL	39	14.1	3.28	0.23	25.2	3.01
		15.4	3.44	0.22	23.8	3.23
Rind less trimmable fat uncooked	69	22.6	15.3	0.68	36.1	5.66
		22.8	15.8	0.69	34.9	5.61
OTHER	105					
FINAL PRODUCT						
Final mix		13.0	3.62	0.28	15.3	
		14.4	3.74	0.26	13.9	
Economy hamburger		13.3	4.21	0.32	16.8	
		14.3	4.33	0.30	16.8	
Canned Economy hamburger		14.8	4.00	0.27	10.7	
		15.4	4.05	0.26	10.9	
TOTAL	450					

5.9 Beefburger

	Weight (lb)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
BEEF INGREDIENTS						
Beef clod and sticking 90VL	13	}				
		20.0	1.88	0.09	11.7	3.63
Beef forequarter 85VL	5	}	20.3	2.14	0.11	11.7
		}				3.68
PORK INGREDIENTS						
Rindless belly trim	1	14.7	1.54	0.11	33.5	3.53
		13.5	1.58	0.12	34.3	3.29
OTHER	1					
FINAL PRODUCT						
Final burger		18.7	1.10	0.06	11.8	
		18.5	1.10	0.06	11.9	
TOTAL	20					

5.10 Beefburger

	Weight (lb)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
BEEF INGREDIENTS						
Beef thin flank 80VL	8	20.3	1.87	0.09	13.2	3.74
		20.0	1.91	0.10	13.2	3.68
OTHER	2					
FINAL PRODUCT						
Beefburger		17.9	1.33	0.07	11.2	
		17.3	1.54	0.09	11.4	
TOTAL	10					

5.11 Beefburger

	Weight (lb)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
BEEF INGREDIENTS						
Beef forequarter 85vl	327.56	18.1	2.84	0.16	21.7	3.70
		18.5	2.96	0.16	19.1	3.66
		18.7	1.68	0.09	19.7	3.73
OTHER	72.44					
FINAL PRODUCT						
Beef burger		16.4	2.16	0.13	17.2	3.17
		15.8	2.4	0.15	16.3	3.05
TOTAL	400					

5.12 Cured Pork Pie Filling

	Weight (kg)	Protein g/100g	Collagen g/100g	Collagen/ Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Lean with fat 50VL	38.75	15.4	1.74	0.11	29.3	3.48
		16.1	1.70	0.11	28.3	3.59
Rind with fat cooked	3.75	25.2	15.26	0.60	17.2	4.88
		26.4	15.74	0.60	18.4	5.18
OTHER	7.5					
FINAL PRODUCT						
Retail pie 31/10/02		17.3	3.90	0.23	19.2	
Retail pie 10/11/02		16.2	3.36	0.21	24.6	
Retail pie 08/11/02		15.2	4.14	0.27	20.1	
		15.1	3.86	0.26	20.6	
TOTAL	50					

5.13 Sausage Roll Meat Mixture

	Weight (kg)	Protein g/100g	Collagen g/100g	Collagen/Protein	Fat g/100	N g/100 g of fat free meat
PORK INGREDIENTS						
Pork belly 80vl	24	13.0 11.6	2.38 2.22	0.18 0.19	48.00 45.8	4.00 3.41
Dehydrated rind	0.75	83.5	52.2	0.62	12.8	15.3
OTHER	61					
FINAL PRODUCT						
Sausage roll meat mix		6.0 5.4	1.35 1.20	0.22 0.22	14.8 10.8	1.13 0.98
TOTAL	85.75					

5.14 Minced Beef and Onion Pie Filling

	Weight (kg)*	Protein g/100g	Collagen g/100g	Collagen/Protein	Fat g/100	N g/100 g of fat free meat
BEEF INGREDIENTS						
Beef thin flank lean	102	16.1 16.7	2.15 2.24	0.13 0.13	28.3 22.1	3.59 3.43
OTHER	278					
FINAL PRODUCT						
Pie filling		4.8 5.4	1.04 0.47	0.22 0.09	8.4 7.8	0.84 0.93
Cooked pie filling		5.5 6.5	0.70 0.87	0.13 0.13	10.3 10.2	0.99 1.16
TOTAL	380					

* after cooking and cooling