
**GUIDELINES FOR
LOCAL AUTHORITIES
ON THE
IMPLEMENTATION OF
COMMISSION
REGULATION (EU)
2017/2158**

ESTABLISHING MITIGATION MEASURES
AND BENCHMARKING LEVELS FOR THE
REDUCTION OF THE PRESENCE OF
ACRYLAMIDE IN FOOD

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For all queries about this guidance - please use contacts below.

Telephone: 01224 285100

Email: enforcement@fss.scot

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1. Summary

This information note is intended to help authorised officers (AOs), as required in the Food Law Code of Practice, with the interpretation and implementation of [Commission Regulation \(EU\) 2017/2158](#) ('the Regulation'). For the purposes of this information note the term 'authorised officer (AO)' refers to those officers who undertake assessment of compliance with food law and enforcement action as appropriate.

This guidance uses the terminology set out in the Regulation. It uses terms such as "mitigation measures" and "Benchmark Levels" (BMLs), rather than "control measures" and "control limits" with which local authorities (LAs) will be more familiar in terms of the HACCP requirements in Regulation (EC) 852/2004.

The information provided in this note does not represent an authoritative interpretation of the law and is no substitute for an understanding of the legal requirements. This note is not legally binding and it should be read in conjunction with the regulations.

2. Background and purpose of the Regulation (EU) 2017/2158

In June 2015, the European Food Safety Authority (EFSA) produced its full Scientific Opinion on the risks related to the presence of acrylamide in food, and concluded that the current level of acrylamide in food is a concern for public health. This position was supported by the EU and in 2017 Regulation (EU) 2017/2158 was published.

The overall aim of the Regulation is to ensure that food businesses put in place steps to mitigate acrylamide formation where practicable to ensure levels in food are As Low As Reasonably Achievable (the ALARA principle) through the application of appropriate mitigation measures by all Food Business Operators (FBOs) along the food chain.

The Regulation, establishing mitigation measures and BMLs for the reduction of the presence of acrylamide in food, came into force 11 April 2018 and applies directly to UK food businesses. The Regulation is enforced in Scotland by the [Food Hygiene \(Scotland\) Regulations 2006](#) (as amended).

Article 5 of Regulation (EC) No 853/2004 requires all FBOs to put in place, implement and maintain HACCP-based Food Safety Management System (FSMS). This is to ensure that food safety hazards associated with the production of food are identified and monitored and that controls are in place to mitigate risks to consumers. The regulation requires FBOs to consider chemical contaminant hazards (e.g. acrylamide) within the scope of their FSMS. Additionally Regulation (EC) No 853/2004 also provides significant flexibility which allows HACCP-based FSMS to be tailored to the size and nature of the business without compromising food safety itself. This Regulation formalises how this should be approached by certain businesses producing affected products.

3. What is Acrylamide?

Acrylamide is a chemical substance formed by a reaction between amino acids and sugars, typically in foods with high starch content, when cooked at high temperatures such as in frying, roasting, toasting and baking. Acrylamide is considered to be a chemical hazard in the food chain and a probable genotoxic carcinogen in humans.

4. Scope

Who is affected?

The Regulation applies to all FBOs that produce and place on the market the foods listed below. However, the extent to which the Regulation affects specific businesses will depend on business type.

What foods are affected?

Foods that typically have a high starch content, which are cooked at high temperatures such as frying, roasting, toasting and baking.

Per Article 1(2) of the Regulation, foodstuffs within the scope of the Regulation are:

- **French fries, other cut (deep fried) products and sliced potato crisps from fresh potatoes;**
- **Potato crisps, snacks, crackers, and other potato products from potato dough;**
- **Bread;**
- **Breakfast cereals (excluding porridge);**
- **Fine bakery wares: cookies, biscuits, rusks, cereal bars, scones, cornets, wafers, crumpets and gingerbread, as well as crackers, crisp breads and bread substitutes. In this category, a cracker is a dry biscuit (a baked product based on cereal flour);**
- **Coffee: (i) roast coffee; (ii) instant (soluble) coffee; coffee substitutes;**
- **Baby food and processed cereal-based food intended for infants and young children as defined in regulation (EU) No. 609/2013.**

What is expected of a food business operator?

FBOs are required to adopt relevant mitigation measures set out in the Regulation. In general, FBOs are expected to:

- Be aware of acrylamide as a food safety hazard and have a general understanding of how acrylamide is formed in the food they produce.
- Take necessary steps to mitigate acrylamide formation in the food they produce, ensuring that levels are reduced, where possible, to meet with ALARA principles as part of their HACCP-based FSMS.

Where required,

- Undertake representative sampling and analysis to monitor the levels of acrylamide in their products as part of their assessment of the mitigation measures.
- Keep appropriate records of the mitigation measures undertaken to demonstrate ALARA together with sampling plans and results of any testing undertaken.

The measures are intended to be proportionate to the nature and size of the business so as to ensure that small and micro-businesses are not burdened disproportionately.

5. Business Types and Mitigation Measures

Article 2 sets out the three different categories of FBOs affected and the mitigation measures that are applicable. The mitigation measures relevant to the food businesses affected are set out in Annex I and II of the Regulation. These measures are not intended to lead to any significant changes in the quality and organoleptic properties of foods.

There may be instances where an FBO does not fit neatly under the different categories set out in Article 2. In such occasions it is important that constructive conversations take place with the FBO in order to determine where the FBO falls within the Regulation in a practical and proportionate manner.

Manufacturers

This refers to all food manufacturers others than those covered by Articles 2(2) and 2(3). FBOs which produce and place on the market foodstuffs listed in the Regulation shall apply mitigation measures provided for in Annex I of the Regulation.

Mitigation measures applicable to FBOs under Article 2(1).

- Annex 1 of the Regulation sets out the sector-specific requirements for these FBOs to adopt, in order to mitigate acrylamide formation in the foods listed in the Regulation.
- Not all the mitigation measures are relevant to all food manufacturers. It is expected that an FBO will choose the relevant measures for their product(s) and apply as appropriate to ensure that the levels of acrylamide in their products comply with the ALARA principle.

Retail / direct supply to local retail establishments

These are FBOs producing foodstuffs listed in the Regulation which perform retail activities and/or directly supply only local retail establishments.

Examples of Article 2(2) FBOs include **local and/or independent** businesses such as cafes, fish and chip shops and restaurants.

The definition of local is set out in the Code of Practice - [Food Law Practice Guidance \(Scotland\)](#).

Mitigation measures applicable to FBOs under Article 2(2) retail or local retail supply.

- Part A of Annex II outlines the relevant mitigation measures applicable for businesses which perform retail activities, and or directly supply only local retail establishments.
- FBOs should have in place appropriate procedures to show that they are following the mitigation measures. In practice, this could include manufacturers' instructions, colour charts/guides and/or procedures based on best practice industry guidance.
- Where products have intrinsically high levels of acrylamide (such as American style, flame grills, wood fired pizzas etc), then only limited acrylamide mitigation steps in such businesses may be possible. In such cases, businesses should be encouraged to reduce acrylamide in general terms, including across the wider range of products on offer – where possible, and in line with ALARA principles.

See Table 1 below for summary of actions required.

Table 1 - Mitigation Measures to be applied by FBOs under Article 2(2)

Products	Actions
<p>Potato Products French fries and other cut (deep fried) potato products</p>	<p>General steps:</p> <ul style="list-style-type: none"> • Potato varieties with lower sugar content shall be used, when available and insofar as compatible with the desired food product to be obtained. ^{1, 2} • Potatoes should be stored at a temperature higher than 6 °C; but if lower temperatures are unavoidable storage should be for as short a time as possible. <p>Before the frying process:</p> <p>One of the following measures shall be taken with raw French fries to reduce the sugar content, where possible and insofar as compatible with the desired food product to be obtained:</p> <ul style="list-style-type: none"> • Washing and soaking preferably for 30 minutes up to 2 hours in cold water. Rinse the strips in clean water before frying. • Soaking for a few minutes in warm water. Rinse the strips in clean water before frying. • Blanching of potatoes results in lower levels of acrylamide and therefore where possible, it is appropriate to blanch potatoes. <p>Exception: Frozen potato products, for which cooking instructions shall be followed.</p>

¹ <http://varieties.ahdb.org.uk/varieties>

² <https://potatoes.ahdb.org.uk/publications/r425-producing-low-acrylamide-risk-potatoes>

	<p>During the frying process:</p> <ul style="list-style-type: none"> • Frying oils and fats shall be used which allows quicker frying and/or lower temperature frying. Cooking oil suppliers shall be consulted for the best suited oils and fats. ³ • Frying temperatures shall be below 175 °C and in any case as low as possible taking into account the food safety requirements and nutritional aspects. • Frying oils and fats quality shall be maintained by skimming frequently to remove fines and crumbs. • For the cooking of French fries, it is appropriate that the FBOs make use of industry available colour guides providing guidance on the optimal combination of colour and low levels of acrylamide.
<p>Bread and fine bakery wares</p>	<p>Insofar possible and compatible with the production process and hygiene requirements:</p> <ul style="list-style-type: none"> • The extension of yeast fermentation time; • The moisture content of the dough for the production of a product with low moisture content, shall be optimised; • The lowering of oven temperature and the extension cooking time. • Products shall be baked to a lighter colour endpoint and dark roasting of crust shall be avoided where the strong roasting and not related to the specific composition or nature of the bread resulting in a dark crust.
<p>Toasted Sandwiches</p>	<ul style="list-style-type: none"> • When preparing sandwiches, the FBOs shall ensure that sandwiches are toasted to the optimal colour. • When using pre-packed bread or bakery products which are to be finished, cooking instructions are followed.

³ <http://www.neoda.org.uk/>

Trademark or Commercial License establishments

These are FBOs which operate in facilities under direct control, and that are operating under one trademark or commercial license, as a part of, or franchise of, a larger, interconnected operation and under the instructions of the food business operator that centrally supplies the foodstuffs listed in the Regulation.

Examples of Article 2(3) FBOs covered in this category include large restaurants, hotels and café chains. It does not include local independent operators that may have a few outlets or interconnected businesses.

Mitigation measures applicable to FBOs under Article 2(3)

- In addition to the mitigation measures set out in Table 1 above, food businesses covered by Article 2(3) are also required to adopt the relevant mitigation measures detailed in Part B of Annex II of the Regulation
- This is intended to place some extra obligations on certain FBOs in addition to those referred to in Article 2(2). The requirement typically applies to larger, centrally controlled and centrally supplied chains with standardised menus and operating procedures. The mitigation measures, referred to in Part B of Annex II, are to be applied by the FBOs. The requirement to demonstrate that sampling and analysis has been undertaken to assess the effectiveness of the mitigation measures may be satisfied by the central business rather than the individual outlet.
- One of the mitigation steps FBOs are required to apply when making French fries and other cut (deep fried) potato products (e.g. chips, fried roast potatoes) is the use of Standard Operating Procedures and calibrated fryers equipped with computerised timers and programmed to standard settings (time-temperature). However, the Regulation does not require FBOs to immediately purchase such equipment, if their current equipment is operationally fit for purpose and well maintained.
- It should be noted that, in the absence of calibrated fryers, FBOs are expected to follow the measures set out in Part A of Annex II under 'French fries and other cut (deep fried) potato products' where these products are produced.
- Not all the mitigation measures outlined in the box below may be applicable;

See Table 2 below for summary of actions required.

Table 2 - Mitigation Measures to be applied by FBOs under Article 2(3) in addition to the mitigation measures referred to in Table 1.

1. General requirement

FBOs shall accept products referred to in Article 1(2) only from FBOs that have implemented all mitigation measures set out in Annex I.

2. French fries and other cut (deep fried) potato products

FBOs shall:

- Follow the instructions on storage of provided by the FBOs or the suppliers or provided for in the relevant mitigation measures in Annex I;
- work with SOPs and calibrated fryers equipped with computerised timers and programmed to standard settings (time-temperature);
- Monitor the level of acrylamide in finished products to verify that the mitigation measures are effective in keeping acrylamide levels below the BML.

3. Bakery products

FBOs shall monitor the level of acrylamide in finished products to verify that the mitigation measures are effective in keeping acrylamide levels below the BML.

4. Coffee

FBOs shall ensure that the level of acrylamide in supplied coffee is lower than the BML specified in Annex IV taking into account however that this may not be possible for all coffee types depending on blend and roast characteristics. In these cases a justification is provided by the supplier.

6. What are Benchmark Levels?

Benchmark Levels (BMLs), set out in [Annex IV of the Regulation](#), are performance indicators to be used to verify the effectiveness of the mitigation measures. BMLs are to be used by FBOs to gauge the success of the application of the relevant mitigation measures. Their main aim is to ensure that the levels of acrylamide in products comply with ALARA principle. Exceeding a BML in a product does not mean that the product cannot be placed on the market. However, an FBO should be able to demonstrate relevant mitigation steps are being taken and reviewed where appropriate.

BMLs are not maximum limits and are not to be used for enforcement purposes.

It is important to note that some foods within the scope of the Regulation will not be able to consistently achieve the BMLs or, in some cases, meet the BMLs at all, despite FBOs taking appropriate mitigation steps to reduce the levels of acrylamide. This may be due to variable factors such as seasonality, geographic conditions and the organoleptic and traditional characteristics of the product.

For example:

- The concentration of acrylamide precursors (reducing sugars and asparagine) in potato varies depending on the potato varieties, season of the crop, storage and climatic conditions, which could in turn affect the acrylamide formation in the potato product during cooking.
- Different types of coffee may have different levels of acrylamide depending on the coffee bean and the coffee blend as well as the degree of roasting. Therefore, due to many characteristics that affect the levels of acrylamide in coffee, it is not possible for the level of acrylamide in all coffee to be consistently below the BML.

Additionally the Regulation itself recognises where there is such a broad food category there may be specific production, geographic or seasonal conditions or product characteristics for which it is not possible to achieve the BML despite the application of all mitigation measures.

7. Sampling and analysis

Article 4 of the Regulation sets out the sampling and analysis requirements for FBOs. These are further elaborated in Annex III. FBOs, where required, are expected to undertake representative sampling and analysis to monitor the levels of acrylamide in their products as part of their assessment of the mitigation measures.

The Regulation requires FBOs **except for those referred to in Article 2(2)** to have a sampling plan that:

- Is representative of product types they produce. This does not mean that every single product line must be sampled.
- Revised at least annually for products that have a well-known and well controlled acrylamide levels.
- Is devised on a risk basis and is proportionate, with a focus on foods that are likely to have higher levels of acrylamide and for which further mitigation measures are feasible.
- Where there are significant changes to a recipe or process that are likely to impact acrylamide levels, representative sampling and analysis should be undertaken.

The sampling plan and results should be available to relevant AOs upon request. The information should also include any mitigation steps taken to reduce acrylamide levels where the BMLs have been exceeded.

For businesses covered by Article 2(3), the sampling and analysis plans and results may be made available by the central business rather than each individual outlet/chain.

8. Compliance

The purpose of the Regulation is to promote and support best practice in managing acrylamide as a food safety hazard.

FBOs are required to:

- Implement the relevant measures listed in the Annexes to the Regulation within reason as part of their HACCP-based FSMS;
- Provide evidence to demonstrate that the appropriate HACCP-based FSMS are in place to ensure the relevant mitigation measures have been implemented.

In practice, compliance means:

- Obtaining assurance that the FBO understands how acrylamide is formed in the food they produce;
- Confirming evidence of documented procedures that demonstrate how the business has put in place relevant mitigation measures as part of their HACCP-based FSMS;
- Evidence that these procedures are followed, and that they are reviewed and updated where necessary;
- For manufacturers; evidence of how the food business controls the presence of acrylamide, such as sampling and analysis of products/product types.

Record Keeping

FBOs referred to in Articles 2(1) and 2(3) are required to document and maintain suitable records in order to demonstrate that the relevant mitigation measures have been applied per product or product group, as part of their HACCP-based FSMS, to reduce the levels of acrylamide.

The documents should show:

- How the FBO has applied the relevant mitigation measures, including the main procedures or methods used in the business to mitigate acrylamide formation;
- How the FBO has selected the mitigation measures;
- The sampling plan, evidence of review, where appropriate, and the results of analytical testing undertaken.

Food businesses referred to in Article 2(2) are required to maintain evidence that mitigation measures are being applied in their premises and/or to the products they produce. This should be incorporated into their HACCP-based FSMS. This could include SOPs, manufacturers' instructions, colour charts/guides and/or procedures based on best practice industry guidance to demonstrate their due diligence in fulfilling

their obligations to identify and implement mitigation measures to reduce the levels of acrylamide in food.

9. Enforcement

It is not expected that the requirements for this Regulation will require additional inspection visits, rather discussions with FBOs would be expected to take place within the programmed inspection schedule. Inspection frequencies are for LAs to determine in line with the COP.

In general FBOs should be able to provide enforcement officials with:

- Information on how best practice has been identified and implemented. This may include Standard Operating Procedures (SOPs) that show practical steps being taken by the food business to mitigate acrylamide in their products;
- Appropriate documentation to show how the relevant mitigation measures have been applied.

AOs may wish to take samples on a risk basis in line with the provisions of Regulation (EC) 882/2004 to check the levels of acrylamide in food, although this is not necessary for assessing compliance with Regulation (EU) 2017/2158.

Where an FBO cannot demonstrate appropriate mitigation steps have been considered within their FSMS and subsequently implemented, the AO may consider taking action. The Regulation is enforced in Scotland by the Food Hygiene (Scotland) Regulations 2006 (as amended).

10. Useful Information and Resources

The following are sources of advice and information for FBOs on acrylamide reduction;

- [FSS information to Food Businesses on the new legislation](#)
- [FSA communication on how to reduce acrylamide at home](#)
- [The FoodDrinkEurope Acrylamide Toolbox](#)
- [The European Potato Processors' Association frying guide](#)
- [UK Hospitality Industry Guide to Acrylamide - Catering and Food Service](#)
- [Codex Code of Practice for the Reduction of Acrylamide in Foods \(CAC/RCP 67-2009\)](#)
- [European Food Safety Authority - Acrylamide](#)