European Code to good practice for the collection, transport, storage, trading and industrial manufacture of safe feed/food ingredients

Sector reference document on the manufacturing of safe feed ingredients from malt




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Sectors covered by the European Guide

The following sector specific sector documents have been developed by the respective European sector organisations in cooperation with EFISC-GTP:

Starch Europe	Sector reference document on the manufacturing of safe feed materials from starch processing
FEDIOL	Sector reference document on the manufacturing of safe feed materials from oilseed crushing and vegetable oil refining
Coceral	Sector reference document on the collection, storage, transport and trading of feed/food ingredients
EBB	Sector reference document on the manufacturing of safe feed materials from Biodiesel processing
EUROMALT	**Sector reference document on the manufacturing of safe feed ingredients from malt production**

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1.0 Introduction Euromalt

Presentation sector, volumes, feed material, commitment to safe feed ingredients.

Regulatory framework (see Code chapter 7)

Council Regulation 852/2004 of 29th April 2004 stipulates in Article 5 that "food business operators shall put in place, implement and maintain a permanent procedure or procedures based on the HACCP principles". It should be noted that all maltings are classified as Food Businesses and should be registered as such, under the requirements of national legislation. Subsequently, more detailed legislation relating to microbiological criteria for specified foodstuffs has been introduced under Commission Regulation No. 2073/2005. This Regulation applies to specified raw foodstuffs, all of which are animal products, and to ready-to eat foods. As such this does not apply to malt or malt products which will be further processed in brewing, distilling or food industries. However, it does apply in instances where malt or malt products are supplied as ready-to-eat products, for example malt extract where no further processing is carried out. Such products are outside the scope of this Sector Document.
Co-products from the malting process are used in animal feed, and therefore maltings must also comply with the requirements of the European Parliament and Council Regulation 183/2005 of 12th January 2005 on feed hygiene. This Regulation lays down general rules on feed hygiene and traceability, and for the approval and registration on feed businesses.

The scope of the Euromalt Sector Document

This Sector Document applies to the industrial production of malt from barley, wheat and other cereals, for supply to breweries and distilleries. It includes ale, lager and distilling malts (white malt) and also speciality malts (such as crystal and roasted malt) as well as unmalted roasted cereals. It also covers the production of cereal co-products of the malting process, for supply as animal feed.
It deals with operations from the intake of raw materials to the loading of malt at the maltings. In this document, the terms "barley "or "cereals" at intake refer to the intake of stored grain rather than raw freshly harvested grain.
The risks considered are only those which relate to consumer health; risks to beer quality which have no safety implications are not considered.
The purpose of this Protocol is to assist in the identification of biological, chemical, physical and allergenic hazards that could occur in malting raw materials, malting processes and environments, which may cause the end product to be unsafe for human or animal consumption, as appropriate.

2.0 Table of Contents

3.0 List of definitions used (EU Feed Catalogue 2022/1104)

Deculming – process by which rootlets are removed from malt after kilning
Direct heating – kiln in which the gases from the combustion of the fuel pass through the malt bed. Oxides of nitrogen in these gases can react with the malt to give rise to nitrosamines
Germination – period in which the cereal grain starts to grow or "sprout". Carefully controlled during malting in order to produce different types of malt.
Gibberellic acid – a natural plant hormone which may be added as a processing aid during malting to encourage malt modification
Indirect heating or indirect kilning – kilns in which the malt is heated by hot air so that the combustion gases do not pass into the malt bed. These kilns give rise to much lower levels of nitrosamines than do directly heated kilns.
Industry approved chemicals - chemicals which have been assessed by the malting and brewing industry and shown to pose no threat to the integrity of the process or the product
Kilning – process by which malt is dried and heated in order to stop further germination and to develop colour and flavour in the malt. Different types of malt are kilned to different extents. See also roasting, speciality malt
Low NOx burner- burner which produces less oxides of nitrogen than a standard burner
Malting- Allowing grain to commence germination to activate naturally occurring enzymes able to break down starch to fermentable carbohydrates and proteins to amino acids and peptides (Reg 68/2013)
Modification – term given to the changes which occur in the cereal endosperm during malting. It involves the production of enzymes by the plant cells and the breakdown of cell walls and protein.
Peat – compressed remains of ancient decomposed vegetable matter, generally from boggy areas, traditionally burnt during kilning to impart specific flavour notes
Peated malts – malts prepared using peat, and used in the manufacture of certain brands of whisky
Roasting – process of heating for malted or unmalted cereals in order to develop strong colours and flavours
Screening – stage where cereal grains or malt are sorted, for example to remove undersized or damaged grains
Speciality malt – a malt which has been subjected to specific conditions of temperature and moisture during its manufacture in order to develop certain qualities of colour and flavour
Starter culture – an inoculum of harmless bacteria and/or moulds which may be added to a batch of barley during malting in order to inhibit the growth of other, undesirable micro-organisms
Steeping – process in which cereal grains are soaked in water to initiate germination

4.0 Listing of the feed materials

The main raw materials processed by the EU Malt industry are barley and wheat.

N. in feed Catalogue Reg 2022/1104 [1]	Product	Description
1.1.13	Malting barley screenings	Product from mechanical screening (size fractionation) consisting of undersized barley kernels and fractions of barley kernels separated before the malting process.
1.1.14	Malting barley and malt fines	Product consisting of fractions of barley kernels and malt separated during the production of malt.
1.1.15	Malting barley husks	Product from malting barley cleaning consisting of fractions of husk and fines.
1.1.16	Barley distillers solids, wet	Product of ethanol manufacture from barley. It contains solid feed fraction from distillation.
1.1.17	Barley, distillers solubles, wet	Product of ethanol manufacture from berley. It contains soluble feed fraction from distillation.
1.1.18	Malt	Product for germinated cereals, dried, milled and/or extracted.
1.1.19	Malt rootlets	Product from malting cereals germination and malt cleaning consisting of rootlets, cereal fines, husks and small broken malted cereal grains. It may be milled.
1.11.1	Wheat	Grains of *Triticum aestivum* L., *Triticum durum* desf. And other cultivars of wheat. It may be rumen protected.
1.11.2	Wheat rootless	Product from malting wheat germination and malt cleaning consisting of rootlets, cereal fines, husks and small broken malted wheat grains
1.11.6	Wheat feed	Product of flour or malting manufacture obtained from screened grains or wheat or dehusked spelt. It consists principally of fragments of the outer skins and of particles of grain from which less of the endosperm has been removed that in wheat bran.
1.11.7	Wheat bran	Product of flour or malting manufacture obtained from screened grains of wheat or dehusked spelt. It consists principally of fragments of the outer skins and of particles of grain from which the greater part of the endosperm has been removed.

[1] Catalogue of feed materials of the COMMISSION REGULATION (EU) 2022/1104 of 1 July 2022 amending the Catalogue of the Regulation (EU) No 68/2013.

1.11.8	Malt fermented wheat particles	Product obtained by a process combining malting and fermentation of wheat and wheat bran. The product is than dried and ground.
1.11.23	Malting wheat screenings	Product from mechanical screening (size fractionation) consisting of undersized wheat kernels and fractions of wheat kernels separated before the malting process.
1.11.24	Malting wheat and malt fines	Product consisting of franctions of wheat kernels and malt separated during the production of malt.
1.11.25	Malting wheat husks	Product from malting wheat cleaning consisting of fractions of husk and fines.

5.0 Overview of the malting process

Malt is made from malting grade cereals, usually barley or wheat, although occasionally other cereals such as rye may be used. The grain is soaked in water, and then allowed to germinate under carefully controlled conditions. This first stage of the process is very similar to what occurs in nature when the grain is sown in the earth. However, when the changes inside the grain are sufficient for the maltsters' requirements, heat is applied in the final stage in the malting process, using a specially designed kiln. The resultant product, malt, has a moisture content of below 6.5%.

The kilning process imparts flavour and colour into the malted grain, and the low moisture content allows safe storage. The final malt superficially resembles the original grain in outward appearance, but is physically and bio-chemically much changed.

Malt intended for distilling use may have peat smoke introduced into the airflow through the malt kiln, to give the particular characteristics needed by the whisky to be made from it.

There are five product groups:

- White malts.
- Smoked or peated malts.
- Coloured malts (such as crystal and caramel malts)
- Roasted malts (range including both light and dark roasts).
- Roasted barley.

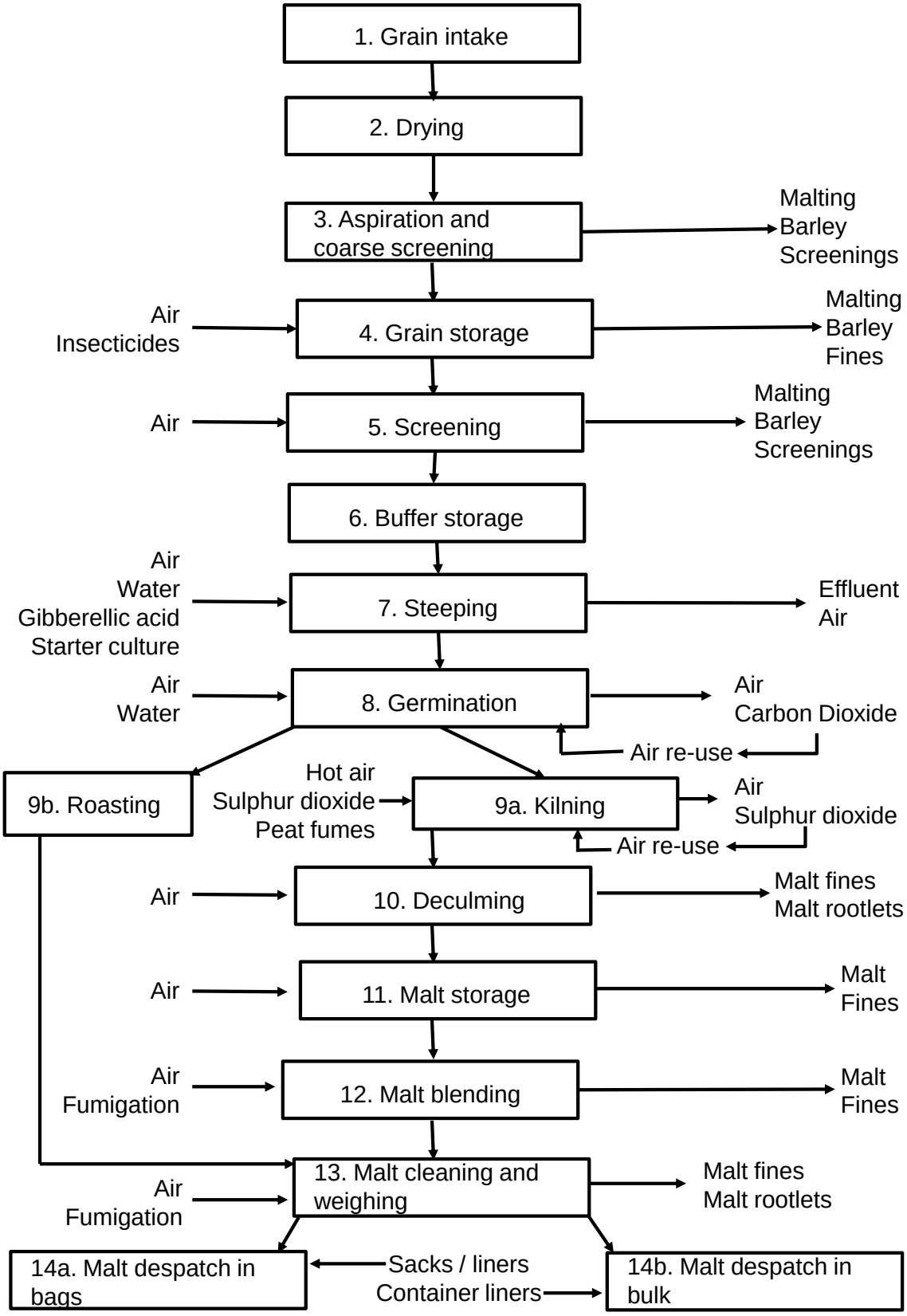
Malt is used predominantly as the basic raw material for beer and malt whisky. Some malt is also used in the manufacture of grain whisky. Brewing and distilling operations involve further processing, both of which include heating (which will sterilise the process stream) and filtration steps (which will remove solid materials). There is also a significant dilution effect.

The co-products of the malting process are widely used in the animal feed industry. They comprise blends of (definitions from the EU Catalogue):

- Malting barley screenings
- Malting barley and malt fines
- Malt rootlets ("culms")
- Malting barley husks
- There are equivalent terms if other cereals are employed

Malting is considered a low risk process, involving grain, water, heat and airflow. Malt has a long history as a product that has not caused harm to the end consumer. However, malt is not a sterile commodity. Potential hazards, which could affect consumer health, have been identified. These include product contamination, mycotoxins in raw grain, pesticides, nitrosamines and chloropropanols in highly coloured malts.

5.1 Flow Diagram for malt manufacture



5.2 MANUFACTURING OF MALT

1. Grain intake

The grains are brought in the malting facilities. First visual and analytical quality checks are performed to safeguard quality and food safety. Unloading facilities can be designed to handle boats, trucks or trains. Both pneumatic and mechanical unloading systems are in use.

2. Drying

The grains are dried to safe storage moisture, of below 14,5%.
Drying can be done by direct or indirect heating. Depending with the technique used specific process controls are in place.

3. Aspiration and coarse screening

Dust and foreign material removal. Aspiration is on transport systems and over the screening machines. Screening is on mechanical sieves with adapted coarse sizes to remove coarse contaminations (corn, stones, peas, …). The fractions can be collected together or separated.

4. Grain storage

The grains are stored, for at least a sufficient length of time to allow it to overcome, after drying, the natural condition of germ dormancy.

5. Screening

The grains are screened to produce an even size corn, and to remove dust.
Malting barley screening will reduce the risk for many contaminants as mycotoxins, pesticides, heavy metals, etc.

6. Buffer Storage

Intermediate storage in silo bins.

7. Steeping

The grains are immersed under water (or 'steeped') of the evenly sized grain, followed by drainage of the water, and a rest in air, to take place over a period of two to three days. This simple process is where the Maltster's skill comes into play. The correct combinations of water/air/water/etc must be given to result in the moisture content of the grain being raised to the required level of around 46%, and without 'drowning' it. At around 35% moisture content the embryo within each kernel of barley will start to germinate, but this is insufficient moisture to allow the complete modification of the starchy endosperm that the maltster desires. The starch content of the original dry grain is about 80% of its weight.

8. Germination

The germination process commences during the air rests towards the end of the steeping stage, and when the moisture is raised to the figure the maltster has predetermined, the steeped grain is transferred to a germination vessel. In traditional maltings this was the 'germination floor', where the grain was turned by shovel to prevent heat build-up. Modern maltings use a range of vessel designs, which allow air to be blown through the grain bed from the underside. Often the air is humidified to help with temperature control, and to ensure that the grain does not dry out. The modern vessels will also incorporate a gentle mechanical turner, to

keep the germinating grain loose, which at this point is called 'green malt'. This stage of the process can last between four to six days, depending on the final malt type. Once sufficient enzymes have been produced within the grain to allow breakdown of the cell walls of the starch and its modification, but before the endosperm can be converted into a food source for the awakening roots and shoot that will form the new barley plant, the maltster stops the modification by applying heat.

9. A – Kilning

The Kiln is where the modified green malt is transferred to, when the maltster considers the process of germination should be terminated. In the past this decision would have been taken whenever the malt was ready, but in modern malting regimes these cycles are predetermined, and the great skill of the maltster is correctly steeping the barley, so that it always is ready to load to kiln at the correct cycle time. On the kiln the malt is first dried, and then 'cured', the latter taking place at a higher temperature, which stops all changes within the grain. Kilning is a complex procedure, which only uses variable combinations of air-flow and heat, but under very tight control. The temperature/air flow profile varies depending on the malt being made, and would be quite different, for example, for a lager malt compared to an ale malt. Kilning is still a high energy user. The maltster's kilning expertise produces the final components that have been specified by the customer, the simplest of which is the colour of the malt. The kilned product is now called malt, and is now in a stable form, with a moisture content of between 3% to 6.5%, dependent on its use.

B – Roasting

The heat is applied only to the drum and hot air is not passed through the malt allowing for nearly complete retention of the moisture liberated during heating – only enough saturated air is allowed to escape to prevent excessive pressure buildup. During the drying phase, dampers are reversed, allowing air and moisture to escape from the drum through a fan and cyclone system.

10. Deculming

Malt from the kiln is put through a machine known as a deculmer, to remove the 'culm' or small rootlets that have emerged from each kernel during germination. Malt culm is a co-product for the maltster, which can be sold as an animal feed, as it has a higher protein content by weight than the original barley.

11. Malt storage

The malt is stored in the malting facilities.

12. Malt blending

The malt is blended.

13. Malt cleaning and weighing

The malt is cleaned and weighted. The cleaning systems are based on a mechanical screening were coarse and fine material are separated from the malt.

14. A - Malt despatch in bags

B – Malt despatch in bulk

The malt is bagged and despatch or the malt is despatch in bulk.

6.0 Methodology of the Euromalt feed ingredients safety chain risk assessment

The following tables present the characterization of hazards (made by Euromalt) applicable to products, coming from malting processing, sold as feed materials[2]. For more understanding of the following risk assessment tables please see EFISC-GTP main text, chapter 6 HACCP system.
Euromalt made the malt subject to a food and feed safety chain risk assessment for: Biological, Chemical and Physical Hazards.

- Biological Hazards (B)
- Chemical Hazards (C)
- Physical Hazards (P)

Euromalt conducted the chain risk assessments according to the requirements as described in chapter 6 of the European Guide to good practice for the industrial manufacture of safe feed materials. **Those risks cannot be considered as complete and may differ among malt producers based on individual and specific manufacturer's processing conditions**. Malt manufacturers have to refine the risks to a level appropriate to their specific operating conditions.

Euromalt will evaluate the food and feed safety assessments of the chains of starch products on a two years basis.

[2] As described in the introduction, the purpose of the risk assessment provided in this Protocol is to assist the manufacturers in the identification of biological, chemical, physical and allergenic hazards that could occur in malting raw materials, malting processes and environments, which may cause the end product to be unsafe for human or animal consumption, as appropriate.

7.0 Hazard Analysis Tables

Scores (1,2,3,4) are indicative of the assessment of risk, but CCPs, PRPs and OPRPs are identified by reference to the Decision Tree (2.5). See the EFISC-GTP Code chapter 6 HACCP

Note that hazards are considered at each process step at which they may be introduced from the process, environment or raw materials, or at which growth or an increase in severity may occur or at which the step would be expected to process the hazard to a safe level. Many hazards could conceptually be present at a process step that were introduced or were present from an earlier step; in this case the hazard need not be re-considered to avoid repetition.

Hazards considered in Process Step 9 (kilning or roasting) are very product-specific and the risk assessment will be expanded with identification of Control Measures (Annex 2).

7 Risk based approach for Malting				**General risk: Malt Processing**				
HAZARD	**CAT.**	**CHANCE**	**SERIOUSNESS**	**RISK CLASS.**	**JUSTIFICATION**	**LEGISLATION, INDUSTRY STANDARDS**	**CONTROL MEASURE**	**REMARKS**
Quality of water	C/B/ P	Low	High	3	Water is used for the production process and cleaning	According to Regulation 183/2005/EC water used during the manufacture of feed shall be of suitable quality EFISC-GTP Code section 4.2.9 Water, steam and air supply	Apply suitable water quality Water used, and re-used, in feed materials manufacture shall be of suitable quality at all stages. The management must be sure that the water which is used in the production of the feed materials is safe for animals. Dedicate water circuits in order to avoid the risk of contamination.	Boiler chemicals used for water conditioning needs to be evaluated and risk assessed
Cleaning agents	C	Low	Medium	2	Cleaning agents may come into contact with the product	EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation	Cleaning agents used in the production system should be flushed. Evaluated and appropriate measures taken to bring risk to acceptable levels. Cleaning agents and disinfection agents used shall	Not a common risk as most productions facilities are continuous and processes

							be suitable for its purpose, food grade when needed and authorised in the country of use.	
Flying in birds	B	Low	Medium	2	Risk of bird drops/ microbiological contamination	EFISC-GTP Code 4.2.3.2. Requirements for loading, storage, production areas and other feed material related facilities	Building maintenance/ closed windows and doors when applicable. Bird control.	
Toxins from pest control materials	C	Very low	High	2	Poison bait from open boxes could cause cross contamination	EFISC-GTP Code 4.2.7 Pest control	A pest control programme must be applied. Appropriate measures should be taken to minimise risk	
Contamination by lubricants	C	Low	High	3	Contamination of lubricant with the rohmaterial/ feed ingredient due to leakage	EFISC-GTP Code 4.2.5 Maintenance	Use of lubricant should be evaluated before use and appropriate measures be taken to bring risk to acceptable levels. Use of food/feed grade where applicable. Monitoring of the use of lubricants. Maintenance procedures in place	Purchasing specifications food/ feed grade.
Insects and rodents	B	Medium	Low	2	Possible contamination of the incoming material/feed ingredient with insects or rodents/ faeces.	EFISC-GTP Code 4.2.3.2. Requirements for loading, storage, production areas and other feed material related facilities EFISC-GTP Code 4.2.7 Pest control	Building proofing, cleaning programs and pest control system as part of the pre requisite programme. Biodiesel production is a closed process.	
Boiler water treatment chemical contamination	C	medium	medium	3	Contamination of the product by chemicals containing in steam and/ or water	EFISC-GTP Code 4.2.9 Water steam and air supply	Water, steam and air used and re- used, in feed materials manufacture shall be of suitable quality at all stages.	Used boiler water treatment chemicals do not move into steam phase.

Foreign materials	P	Low	Medium	2	Foreign materials may be present.	EFISC-GTP Code 4.3.2 Incoming materials requirements	Dedicated buildings and circuits filters, staff hygiene, glass and hard plastics procedure, good maintenance practices, closed process	
Microbiological contamination	B	Medium	Medium	3	Control of grow conditions during manufacturing	EFISC-GTP Code 4.3.2 Incoming materials requirements EFISC-GTP Code 4.4.3 Inspection, sampling and analysis	Monitoring plan Defined monitoring frequency	

7. Risk based approach for malting			1. Cultivation grain/ Purchase from farmer					
Hazard	**Category**	**Chance**	**Severity**	**Risk Class.**	**JUSTIFICATION**	**Legislation and Industry standard**	**Control Measure**	**Remarks**
Toxigenic field fungi	C				Due to the wetter or bad agricultural practices toxigenic field fungi can be present	Dir. 2002/32/EC Rec. 2006/576/EC Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Compliance with the good practice guide for field crops Participation in a surveillance monitoring system Product specifications Supplier contract	
Toxigenic storage fungi	C				Due to bad storage practices and/ or insufficient drying new or existing toxigenic fungi can develop (further) during storage	Dir. 2002/32/EC Rec. 2006/576/EC Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Compliance with the good practice guide for field crops Define storage conditions Participation in a surveillance monitoring system Product specifications Supplier contract	
Ergot in barley and wheat	C				Due to the wetter or bad agricultural practices ergot fungi can be present	Reg. (EU)742/2010 Dir. 2002/32/EC Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Compliance with the good practice guide for field crops Participation in a surveillance monitoring system Product specifications Supplier contract	
Viruses	C				Due to bad agricultural practices viruses can be present	Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1	Compliance with the good practice guide for field crops Use of resistant varieties	

						Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Participation in a surveillance monitoring system Product specifications Supplier contract	
Toxic weed seeds, botanicals	C				Plants producing toxic seeds can be present in the primary procution	Dir. 2002/32/EC Rec. 2015/976/EU (Tropanes Alcaloids) Reg. 687/2008/EC (intervention grain) Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Compliance with the good practice guide for field crops Participation in a surveillance monitoring system Incoming material control Product specification Supplier contract	Advisory approach with farmers (compliance with the good practice guide for field crops, seed variety, drying, transport). Special attention for the geographical origin. Use of certified seeds or graded farm seeds Good cleaning of products
Insects and mites	C				Possible contamination of the incoming material/feed ingredient with insects and mites	EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Copa Cogeca Guide Good Agricultural Practices Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Compliance with the good practice guide for field crops Participation in a surveillance monitoring system Defined PRP program Product specifications Supplier contract	
Pesticides (unauthorised) residues above the MRL, i.e. residues of unauthorised herbicides, insecticides, fungicides or rodenticides above the MRL	C				Some of the unauthorised pesticides are used in third countries or are present in the environment	Reg. 396/2005/EC Dir.2002/32/EC Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Active participation in surveillance schemes Define handling, transport and storage procedures to avoid cross contamination Product specifications Supplier contract	Advisory approach with farmers. See page 23 "*Guidance to farmers*" Compliance with the good practice guide for field crops Attention for the use of post-harvest pesticides. Special attention for the geographical origin Some of the banned pesticides may be present in the environment. Ensure correct implementation of additional National legislation

Pesticide residues (authorised) above the MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the MRL	C				Residues of authorised pesticides can be found due to bad agricultural practices or storage keeping	Reg. 396/2005/EC Dir.2002/32/EC Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Active participation in surveillance schemes Define handling, transport and storage procedures to avoid cross contamination Product specifications Supplier contract	Advisory approach with farmers. See page 23 "*Guidance to farmers*" Compliance with the good practice guide for field crops Attention for the use of post-harvest pesticides. Special attention for the geographical origin Ensure correct implementation of additional National legislation
Mycotoxins above the specified limit(DON, ZEA,FUM, OTA, AFLA, T2&HT2, Ergot)	C				Mycotoxins can be found due to wetter conditions, bad agricultural practices or storage keeping	Dir. 2002/32/EC Rec. 2006/576/EC Rec. 2013/165/EU Dir. 202/32/EC (Ergot Feed) Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Compliance with the good practice guide for field crops Participation in a surveillance monitoring system Product specifications Supplier contract	Advisory approach with farmers (crib drying, ripeness, previous crop, cultivation, irrigation, phytosanitary protection) Good storage practices at farmers level Farmers participation in crop protection network/advisory
Heavy metals above the specified limit	C				Heavy metals can be present in the environment	Dir. 2002/32/EC Rec. 2006/576/EC Copa Cogeca Guide Good Agricultural Practices EFISC-GTP.GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract	Advisory approach with farmers (compliance with the good practice guide for field crops, seed variety, drying, transport). Special attention for the geographical origin and for some more sensitive species (cf Cadmium in Sun or Durum) Good fertilizing practices Avoid the use of polluted areas
Microbiological contamination above the specified limit Enterobacteriaceae Salmonella Moulds	M				Microbiological contamination can be present due to dad agricultural practices or storage keeping	EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Copa Cogeca Guide Good Agricultural PracticesRequirements for purchasing EFISC-GTP Code § 6.4	Product specifications Supplier contract	Advisory approach with farmers (compliance with the good practice guide for field crops, seed variety, drying, transport). See page 23 "*Guidance to farmers*"

						Incoming material and feed/food ingredient specifications		Good transport and storage practices at farmers level
Foreign bodies like glass, wood, plastics, metals, etc.	P				Foreign material can be present	Reg. 183/2005/EC Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract	Advisory approach with farmers Compliance with the good practice guide for field crops
Dioxins and dioxin like PCBs, PAHs	C				Contamination from the environment in specific regions or as the result of bad direct drying practices	Dir. 2002/32/EC Reg. 183/2005/EC Rec. 2014/663/EU Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract	Advisory approach with farmers on drying practices See the guidance on drying in the module collection Depending of the geographical location Regular monitoring of the finished products Avoid the use of polluted areas
Storage insecticides	C				Residues of storage insecticides can be found due to bad storage keeping practices	Reg. 396/2005 Copa Cogeca Guide Good Agricultural Practices EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications The fumigation of silo's to be done by qualified persons, based on a risk assessment Defined working methods Sufficient time between fumigation and processing Regular monitoring of the product Contract with service provider	
Contamination with mineral oil	C				Contamination with lubricants due to bad practices or leakage	EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Use of food grade oil by the farmers when spraying equipment for storage of the equipment Inspection of the equipment, trucks, conveyors, silo's	Advisory approach with farmers

							Use of food grade lubricants based on a risk assessment	

7. Risk based approach for malting		1. Incoming materials/ Grain intake						
Hazard	**Cat.**	**Chance**	**Severity**	**Risk Class.**	**Justification**	**Legislation and Industry standard**	**Control Measure**	**Remarks**
Contamination by the previous cargo during the transport	C	Low	High	3	Transport of the grain takes place under controlled conditions	Reg. 852/2004/EC Reg. 183/2005/EC EFISC-GTP Code §4.3.1.3 Entry check program EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Risk must be evaluated and appropriate measures must be taken to bring this risk to acceptable levels Defined transport requirements Contract service provider Check IDTF database Defined procedure incoming materials	
Foreign materials	P	Medium	Medium	3	Foreign material can be present in the incoming material	Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Dedicated process filters/ seeve Foreign material procedure Good maintenance practices Training of staff incoming materials Defined procedure incoming materials Monitoring plan	
Viruses	C	Very low	Low	1	Due to bad agricultural practices viruses can be present	Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined procedure incoming materials Monitoring plan	Potential hazard unlikely to reach consumer.
Toxic weed seeds, botanicals	C	Medium	Medium	3	Due to bad agricultural practices toxic weeds can be present	Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship	Product specification Defined procedure incoming materials Monitoring plan	Threat in worst case scenario Medium risk in specific regions

						EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications		
Insects and mites (living)	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined procedure incoming materials Monitoring plan Fumigation procedures in place	
Pesticides (unauthorised) residues above the MRL, i.e. residues of unauthorised herbicides, insecticides, fungicides or rodenticides above the MRL	C	Medium	Medium	3	Some of the unauthorised pesticides are used in third countries or are present in the environment	Reg. 396/2005/EC Dir.2002/32/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Active participation in surveillance schemes Define handling, transport and storage procedures to avoid cross contamination Product specification Defined procedure incoming materials Monitoring plan Fumigation procedures in place	Advisory approach with farmers. See page 23 "*Guidance to farmers*" Compliance with the good practice guide for field crops Attention for the use of post-harvest pesticides. Special attention for the geographical origin Some of the banned pesticides may be present in the environment. Ensure correct implementation of additional National legislation
Pesticide residues (authorised) above the MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the MRL	C	Medium	Medium	3	Residues of authorised pesticides can be found due to bad agricultural practices or storage keeping	Reg. 396/2005/EC Dir.2002/32/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Active participation in surveillance schemes Define handling, transport and storage procedures to avoid cross contamination Product specification Defined procedure incoming materials Monitoring plan Fumigation procedures in place	Advisory approach with farmers. See page 23 "*Guidance to farmers*" Compliance with the good practice guide for field crops Attention for the use of post-harvest pesticides. Special attention for the geographical origin Ensure correct implementation of additional National legislation

Genetically Modified Organisms	C	Low	Low	1		Reg. EC/ 1829/2003 Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined procedure incoming materials Monitoring plan	
Growth Regulators	C	Low	Low	1		Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined procedure incoming materials Monitoring plan	
Fungal Prions	C	Very Low	Low	1		Dir. 2002/32/EC Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined procedure incoming materials Monitoring plan	There is no history (at time of writing) of cereal intake being a source of prions that are a food or feed safety issue.
Dioxins and Polychlorinated Biphenyls (PCBs), Polyaromatic Hydrocarbons (PAH)	C	Low	High	3		Reg. EC 1881/200 Dir. 2002/32 Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined procedure incoming materials Monitoring plan	Serious health risk in worst case. Good drying practices at farmers or collector level
Nitrosamines	C	VERY LOW	MEDIUM	1			Product specification	Potential long term health effects

Mycotoxins above the specified limit (DON, ZEA, FUM, OTA, AFLA, T2&HT2, Ergot)	C-P	Medium	High	4		Dir. 2002/32 Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Active participation in surveillance schemes Product specification Defined procedure incoming materials Monitoring plan	Mycotoxins can be found due to wetter conditions, bad agricultural practices or storage keeping
Microbiological contamination above the specified limit Enterobacteriaceae Salmonella Moulds	M	Low	High	3	Microbiological contamination can be present due to dad agricultural practices or storage keeping	Reg. 183/2005/EC EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract Defined procedure incoming materials Monitoring plan	Good transport and storage practices at farmers level
Biogenic amines	C	Very Low	Low	1		Reg. 183/2005/EC EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract Defined procedure incoming materials Monitoring plan	
Heavy metals	C – P	Low	Medium	1		Dir. 2002/32/EC Reg. 183/2005/EC EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract Defined procedure incoming materials Monitoring plan	
Other elements or ions	C	Very Low	Low	1		Reg. 183/2005/EC EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract Defined procedure incoming materials Monitoring plan	

Radioactivity	C	Very Low	Medium	1		Reg. 183/2005/EC EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Supplier contract Defined procedure incoming materials Monitoring plan	

1.1 DRYING (PROCESS STEP 2)

Hazard	Cat.	Chance	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Foreign bodies like glass, wood, plastics, metals, etc.	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code §4.5.1 Supplier relationship EFISC-GTP Code §4.3.1.1 Requirements for purchasing EFISC-GTP Code § 6.4 Incoming material and feed/food ingredient specifications	Product specifications Working procedures Maintenance program Monitoring plan	
Dioxins and Polychlorinated Biphenyls (PCBs), Polyaromatic Hydrocarbons (PAH)	C	Low	High	3	Incorrect drying process can cause the development of dioxins	Dir. 2002/32 Reg. 183/2005/EC EFISC-GTP Code §4.3.7 production and handling of feed/food ingredients	Product specification Defined working methods Maintenance program Monitoring plan	Good drying practices Indirect drying if not dried by using gas Maintenance of the burners

1.2 ASPIRATION AND COARSE SCREENING (PROCESS STEP 3)

Hazard	Cat.	Chance	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Viruses	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined handling and working procedures Monitoring plan	
Toxic weed seeds / botanicals	C	Low	Medium	2		Reg. 183/2005/EC Reg?? EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined handling and working procedures Monitoring plan	Medium risk in specific regions
Insects and mites	B	Low	Medium	2		EFISC-GTP Code 4.3.3 Handling of incoming material EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code §6.4 Incoming material and feed/food ingredient specifications	Product specification Defined procedure incoming materials Defined handling and working procedures Fumigation procedure Monitoring plan	
Organics in aeration air	C	Low	Medium	2				Some organics are hazardous even at low levels
Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	Use of sieves and magnets

1.3 GRAIN STORAGE (PROCESS STEP 3)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Toxigenic storage fungi	C	Low	Medium	1		Dir. 2002/32 Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation	Product specification Defined handling and working procedures Monitoring plan	Control by maintaining suitable temperature difference with surroundings and limit time of storage
Mycotoxins above the specified limit (DON, ZEA, FUM, OTA, AFLA, T2&HT2, Ergot)	C-P	Low	High	3		Dir. 2002/32 Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation	Product specification Defined handling and working procedures Monitoring plan	
Viruses	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation	Product specification Defined handling and working procedures Monitoring plan	Control by maintaining suitable temperature difference with surroundings and limit time of storage
Insects and mites	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Product specification Defined handling and working procedures Fumigation procedure Monitoring plan	

Vermin and birds	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Some vermin cause significant hazards
Storage Insecticides	C	Medium	Medium	3		EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Defined working instructions. Use of authorised insecticides	Can occur if Operating Procedures not followed Infrequent provided Operating Procedure allows sufficient time after fumigation and sub-contractor instructions are followed.
Foreign objects – nonmetallic	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.4 SCREENING (PROCESS STEP 5)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.5 BUFFER STORAGE (PROCESS STEP 6)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Other bacteria	C	Low	Low	1		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation	Infrequent due to low residence time	
Yeast	C	Low	Low	1		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation	Infrequent due to low residence time	
Viruses	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation	Defined handling and working procedures Monitoring plan Defined cleaning and disinfection	Control by maintaining suitable temperature difference with surroundings and limit time of storage
Insects and mites	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Product specification Defined handling and working procedures Fumigation procedure Monitoring plan	
Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.6 STEEPING (PROCESS STEP 7)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Viruses	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code Production of feed materials EFISC-GTP Code 4.2.6 Cleaning disinfection and sanitation	Defined handling and working procedures Monitoring plan Defined cleaning and disinfection	Control by maintaining suitable temperature difference with surroundings and limit time of storage
Insects and mites	B	low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Product specification Defined handling and working procedures Fumigation procedure Monitoring plan	Low level hazard
Vermin and birds	B	low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Some vermin cause significant hazards
Mycotoxins	C	Low	Medium	2				Iinfrequent with suitable control e.g. temperature
Foreign objects – metallic	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.7 GERMINATION (PROCESS STEP 8)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Viruses	C	Low	Mediuim	2		Reg. 183/2005/EC EFISC-GTP Code Production of feed materials EFISC-GTP Code 4.2.6 Cleaning disinfection and sanitation	Defined handling and working procedures Monitoring plan Defined cleaning and disinfection	Control by maintaining suitable temperature difference with surroundings and limit time of storage
Toxic weed seeds / botanicals	C	low	High	3				Low level hazard Managed with purchase contract and intake controls
Insects and mites	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Product specification Defined handling and working procedures Fumigation procedure Monitoring plan	Low level hazard
Vermin and birds	B	Medium	Medium	3		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Some vermin cause significant hazards

Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.8 KILNING (PROCESS STEP 9a)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Dioxins and Polychlorinated Biphenyls (PCBs), Polyaromatic Hydrocarbons (PAH)	C	Low	High	3	Incorrect drying process can cause the development of dioxins	Dir. 2002/32 Reg. 183/2005/EC EFISC-GTP Code §4.3.7 production and handling of feed/food ingredients	Product specification Defined working methods Maintenance program Monitoring plan	Good drying practices Indirect drying if not dried by using gas Maintenance of the burners
Sulphur dioxide	C	Low	Medium	2				Infrequent to unacceptable level
Nitrosamines	C	Medium	Medium	3				Significant risk that requires Due Diligence
Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.8.1 ROASTING (PROCESS STEP 9B)

Hazard	Category	Chance Frequency	Severity	Risk Class.		Legislation and Industry standard	Control Measure	Remarks
Acrylamide	C	Low	Medium	2				Infrequent except possibly with some "stewed" malts e.g. crystal
Chloropropanols	C	Low	Medium	2				Infrequent
Furans	C	Low	Low	1				Infrequent
Dioxins and Polychlorinated Biphenyls (PCBs), Polyaromatic Hydrocarbons (PAH)	C	Low	High	3	Incorrect drying process can cause the development of dioxins	Dir. 2002/32 Reg. 183/2005/EC EFISC-GTP Code §4.3.7 production and handling of feed/food ingredients	Product specification Defined working methods Maintenance program Monitoring plan	Good drying practices Indirect drying if not dried by using gas Maintenance of the burners
Nitrosamines	C	Medium	Medium	3				Significant risk that requires Due Diligence
Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.9 DECULMING (PROCESS STEP 10)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Insects and mites	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Product specification Defined handling and working procedures Fumigation procedure Monitoring plan	Low level hazard
Vermin and birds	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Some vermin cause significant hazards
Foreign material	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.10 MALT STORAGE (PROCESS STEP 8)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Toxigenic storage fungi Ochratoxin A	C	Low	High	3				Infrequent with Good Practice
Viruses	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code Production of feed materials EFISC-GTP Code 4.2.6 Cleaning disinfection and sanitation EFISC-GTP Code 4.3.10 Storage	Defined handling and working procedures Monitoring plan Defined cleaning and disinfection	Control by maintaining suitable temperature difference with surroundings and limit time of storage
Insects and mites	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Product specification Defined handling and working procedures Fumigation procedure Monitoring plan	Infrequent with Good Practice
Vermin and birds	B	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Some vermin cause significant hazards
Other mycotoxins	C	Low	High	3				Infrequent with Good Practice

Storage Insecticides	C	Low	Medium	2		EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Defined working instructions. Use of authorised insecticides	Infrequent provided Operating Procedure allows sufficient time after fumigation and sub-contractor instructions are followed.
Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.11 MALT BLENDING (PROCESS STEP 12)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Foreign objects	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.12 MALT CLEANING AND WEIGHING (PROCESS STEP 13)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks

Foreign objects – metallic	P	Low	Medium	2	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process	

1.13 MALT DESPACH IN BAGS OR BULK (PROCESS STEP 14)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Contamination by previous load	C	Low	High	3				
Insects and mites	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Product specification Defined handling and working procedures Fumigation procedure Monitoring plan	
Vermin and birds	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.10 Storage EFISC-GTP Code 4.2.6 Cleaning, disinfection and sanitation EFISC-GTP Code 4.2.7 Pest control EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Some vermin cause significant hazards

Foreign material	C	Low	High	3	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Working procedures Maintenance program Monitoring plan Use of sieves and magnets at defined points in the production process Visual control of the bags and loading compartments	

1.14 Transport (delivery to customer)

Hazard	Category	Chance Frequency	Severity	Risk Class.	Justification	Legislation and Industry standard	Control Measure	Remarks
Salmonella	C	Low	High	3		Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	The operator's prerequisite programme is to cover the following measures in order to control Salmonella contamination	Infrequent with Good Practice
Enterobacteriaceae	C	Low	High	3		Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Infrequent with Good Practice
Other bacteria	C	Low	Medium	2		Reg. 183/2005/EC EFISC-GTP Code 4.3.8 Production of feed materials EFISC-GTP Code 4.3.5 Measures for the prevention of contamination		Infrequent with Good Practice
Foreign material	C	Low	High	3	Foreign bodies can be present or introduced by machinery	Reg. 183/2005/EC EFISC-GTP Code 4.3.11 Transport EFISC-GTP Code 4.3.5 Measures for the prevention of contamination	Loading procedures Use of sieves and magnets at defined points in the production process Check three previous loads Visual control of the loading compartments	

Guidance minimum monitoring requirements

EFISC_GTP system participants shall implement a monitoring plan as described in the EFISC-GTP Code §4.4.3.
In case insufficient data is available for a risk assessment, the following minimum monitoring requirements shall apply. The total minimum number of analysis will depend on the volume of feed materials in tons manufactured in one location as shown in the tables below.

Number of analysis on malt or barley

Hazard/ Annual production in t	< 5,000 t	≥ 5,000t - <10,000	≥ 10,000
N-Nitrosodimethylamine (NDMA)	6	9	12
OTA	6	9	12
DON	6	9	12
ZEA	6	9	12
T2/HT2	6	9	12
Mycotoxins large*	6	9	12
Dioxin	1	1	2
Dioxinlike PCB	1	1	2
Aerobe, Coliformes (total and fecal), E coli, yeasts, moulds, Salmonella, Listeria.	2	4	6
Heavy metals (Pb, Cd, As, Hg)	1	2	3
Pesticides (Cl2-, P2- and pyrethrinoids, glyphosate)	12	18	24
Growth regulators	1	1	1
Total			

***Mycotoxins large**: Zearalenone 10 µg/kg, Cytochalasine E 5 µg/kg, Deoxynivalenol (DON) 100 µg/kg, Fumonisin B1 50 µg/kg, Fumonisin B1+B2 50 µg/kg, Fumonisin B2 50 µg/kg, HT2 Toxin 50 µg/kg, Nivalenol 100 µg/kg, Ochratoxine-A (OTA) 0,5 µg/kg, Aflatoxine G1 1 µg/kg, Aflatoxine G2 1 µg/kg Alfa-zearalenone 20 µg/kg, Beta-zearalenone 20 µg/kg, 3-Acetly-deoxynivalenol 100 µg/kg, Aflatoxine B1 1 µg/kg, Aflatoxine B1+B2+G1+G2 1 µg/kg Aflatoxine B2 1 µg/kg

Number of annual examinations of every location by annual production (t) of By-products from malt houses:

Parameter/ Annual production in t	**< 5,000 t**	**≥ 5,000t - <10,000**	**≥ 10,000**
OTA	6	9	12
DON	6	9	12
ZEA	6	9	12
T2/HT2	6	9	12
Mycotoxins large*	1	1	1
Dioxin	1	1	2
Dioxinlike PCB	1	1	2
Aerobe, Coliformes (total and fecal), E coli, yeasts, moulds, Salmonella, Listeria Salmonella	2	4	6
Heavy metals (Pb, Cd, As, Hg)	1	2	3
Pesticides (Cl2-, P2- and pyrethrinoids, glyphosate)	1	2	3

***Mycotoxins large**: Zearalenone 10 µg/kg, Cytochalasine E 5 µg/kg, Deoxynivalenol (DON) 100 µg/kg, Fumonisin B1 50 µg/kg, Fumonisin B1+B2 50 µg/kg, Fumonisin B2 50 µg/kg, HT2 Toxin 50 µg/kg, Nivalenol 100 µg/kg, Ochratoxine-A (OTA) 0,5 µg/kg, Aflatoxine G1 1 µg/kg, Aflatoxine G2 1 µg/kg Alfa-zearalenone 20 µg/kg, Beta-zearalenone 20 µg/kg, 3-Acetly-deoxynivalenol 100 µg/kg, Aflatoxine B1 1 µg/kg, Aflatoxine B1+B2+G1+G2 1 µg/kg Aflatoxine B2 1 µg/kg