Department for Environment Food & Rural Affairs | Animal & Plant Health Agency | Llywodraeth Cymru Welsh Government | Scottish Government Riaghaltas na h-Alba gov.scot | Department of Agriculture, Environment and Rural Affairs

Egg quality standards guidance

FEBRUARY 2026

Scope of guidance

The Eggs and Chicks (England) Regulations 2009 and the Eggs and Chicks (Wales) Regulations 2010, the Eggs and Chicks (Scotland) Regulations 2010 and The Eggs and Chicks Regulations (Northern Ireland) 2010 were introduced to enforce compliance with EU marketing standards for eggs, particularly under assimilated Regulation (EC) No 589/2008, which outlines detailed rules for egg quality, grading, marking, and packaging.

Key points from the regulations

Egg quality standards: Eggs must meet specific criteria for cleanliness, shell integrity, and freshness.

Grading and marking: Eggs are graded into Class A or B:

- Class A eggs are the highest quality eggs sold to consumers. They have clean uncracked shells, a firm yolk, and thick egg white, indicating freshness. They are the only permitted class of eggs for use in supermarkets, catering and retail outlets.
- Class B eggs are lower grade eggs that don't meet the quality standards for retail sale due to issues such as shell damage or external soiling. They are not sold directly to consumers but are commonly used in approved food manufacturing. These eggs are often pasteurised and processed into products like liquid or powdered eggs for use in baked goods, pasta, ready meals or cooked egg products.
- Shell marking must indicate farming method (0=Organic, 1=Free Range, 2=Barn, 3=Eggs from caged hens), country of origin, and producer code, printed at the farm or at the packing centre and, on at least 80% of the eggs, must be legible (England and Wales = 1UK99999, Scotland = 1UK999-SCO or 1UK4000-7, NI=1UK9-999).

Packaging and labelling: Clear labelling is required, including best-before dates and storage instructions.

Visual guidance for compliance

While the legislation itself is text-based, visual guides are available in this document to help egg packers and marketers understand and comply with these standards.

These do not replace the statutory textual information.

They typically include photographic examples of eggs that do not meet the quality characteristics for Class A eggs.

Definitions

‘Air space’: The space which forms between the inner and outer shell membranes as a result of air movement through the eggshell pores. The size of the air space increases during storage.

‘Albumen’: Also known as ‘egg white’. It is rich in protein and vitamins and provides support and protection for the yolk.

‘Batch’: The eggs in packs or loose from one and the same production site or packing centre, situated in one place, with one and the same laying date or date of minimum durability or packing date, the same farming method and, in case of graded eggs, the same quality and weight grading

‘Broken eggs’: eggs showing breaks of both the shell and the membranes, resulting in the exposure of their contents.

‘Candling’: A quality control procedure which allows assessment of internal egg quality and easier identification of certain other faults, particularly hairline shell cracks.

‘Chalazae’: Twisted, fibrous structures which extend outwards through the albumen and hold the yolk in place in the centre of the egg.

‘Clutch’: A sequence of daily egg laying by an individual bird which is separated from other sequences by one or more ‘pause days’ on which no eggs are laid.

‘Cuticle’: The outer coating of the eggshell which gives the egg its characteristic bloom or shine.

‘Germ cell’ (‘germinal disc’): Sometimes identified on the surface of the yolk as a disc of slightly different colour; the germ cell is the site of cell division if the egg has been fertilised.

‘Grading’: The classification of eggs by quality (Classes A and B) and into weight bands as defined by assimilated EU Egg Marketing Regulations.

‘Haugh Unit’: A measurement made to determine albumen quality. The Haugh Unit is calculated from the height of the thick albumen and the weight of the intact egg.

‘Incubated eggs’: Eggs from the time of insertion in the incubator onwards.

‘Industrial eggs’: Eggs not intended for human consumption.

‘Ovary’: The reproductive organ of the laying hen in which the egg yolks develop.

‘Oviduct’: A long tube-like organ in the laying hen which accepts the yolk after ovulation and is responsible for the remainder of the egg formation process.

‘Oviposition’: The name for the process of laying an egg.

‘Ovulation’: The release of the yolk from the ovary into the oviduct.

‘Ovum’ (plural: ova): Commonly known as the yolk, the ovum consists of the vitelline membrane, the germ cell and the yolk material.

‘Pores’: Tiny holes in the eggshell which permit movement of air and moisture between the egg and its surroundings.

‘Shell’: The outer covering of the egg which is largely composed of calcium carbonate.

‘Shell gland’: The part of the oviduct which is responsible for shell formation.

‘Shell membranes’: The innermost part of the eggshell (visible in so-called ‘shell-less eggs’) which acts as the foundation upon which the true shell is built.

‘Vitelline membrane’: A see-through barrier which surrounds and contains the yolk.

'Yolk’: Consists of fats, vitamins and minerals and about half of the egg’s total protein content.

Egg information

Eggs face challenges in the modern food market, including fragility, declining quality over time, and natural variability in their components (shell, white, and yolk), which can conflict with consumer expectations for uniformity.

To address these issues, consistent production methods and strict quality control are essential. Everyone involved in egg production and packaging must understand common defects and how to detect and remove substandard eggs.

This guidance document aims to support stakeholders in egg production and marketing and to benchmark achievable quality standards.

Section 1 covers egg structure, formation, nutrition, and common quality issues, with definitions of technical terms.

Section 2 outlines relevant legislation and quality control procedures, including visual inspection techniques.

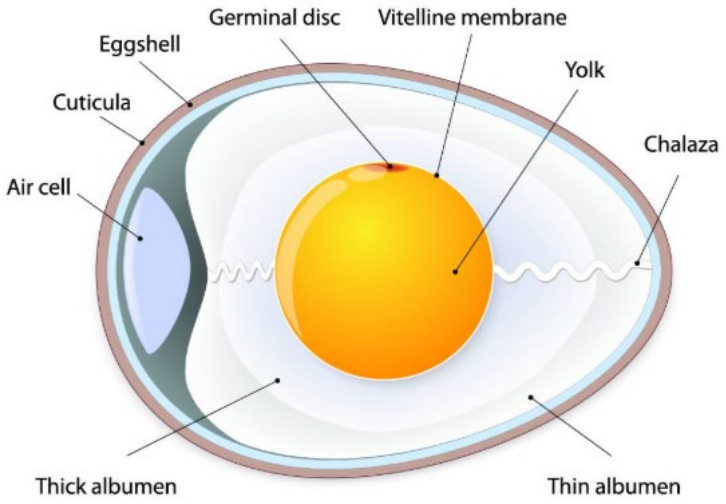
Section 1

The structure of the egg

An egg consists of a yolk at the centre, surrounded by albumen (white), both of which are enclosed within the shell. However, the detailed structure of an egg is more complex than it first appears.

Figure 1: Structure of an egg.
This diagram shows the composition of an egg is made up of:

- the yolk in the centre (containing a germinal disc and vitelline membrane)
- the albumin surrounding the yolk (with thin and thick layers and chalaza)
- an air cell at the wide base of the egg
- the egg shell with cuticula



The yolk

The yolk consists of fats, vitamins, and minerals, together with about half of the egg's total protein content. A transparent barrier called the vitelline membrane surrounds the yolk and prevents the yolk contents leaking into the albumen. Inside the yolk is the germ cell (or germinal disc). This is the site of cell division if the egg is fertile. The colour of the yolk varies, and it is influenced by the laying hen's diet. The colour of the yolk has no connection with food value.

The albumen

Egg albumen is rich in protein and vitamins, and it contains substances which protect the egg from micro-organisms which may have entered through the shell. In a freshly laid, good quality egg, alternating layers of thick and thin albumen are clearly visible.

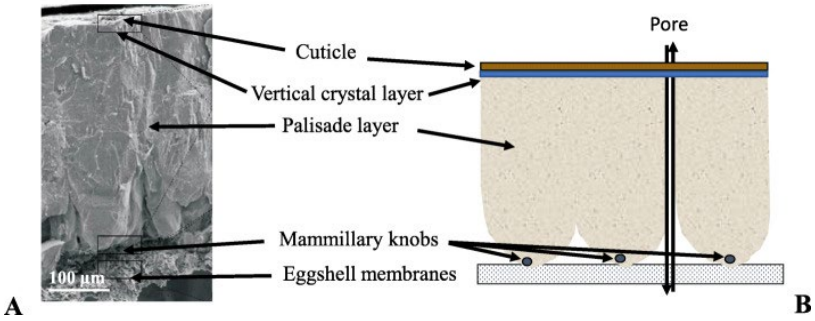
The innermost layer of the thick albumen in an egg extends at two points to form the chalazae, white fibrous structures composed of twisted strands of albumen. These chalazae serve to anchor the yolk centrally within the egg, providing both support and protection during handling and development.

The egg shell

The eggshell consists of the inner and outer shell membranes, the true shell and the cuticle. In total it is approximately one third of a millimetre thick and over 90% of it is made of calcium carbonate. There are also small quantities of proteins and other minerals.

Several thousand tiny pores permeate the shell, the majority of them are usually at the broad end of the egg. The pores allow gases to move between the contents of the egg and the surroundings.

Figure 2: A transverse section through an eggshell.



The 2 shell membranes have a dense structure which inhibits the movement of micro-organisms into the egg. They also act as a foundation, providing a solid base upon which the true shell is built.

The true shell is built in columns of calcium carbonate from individual ‘seeding sites’ on the membranes. When completed, the shell is rigid but brittle. Shell strength is determined not only by shell thickness but also by shape and structure.

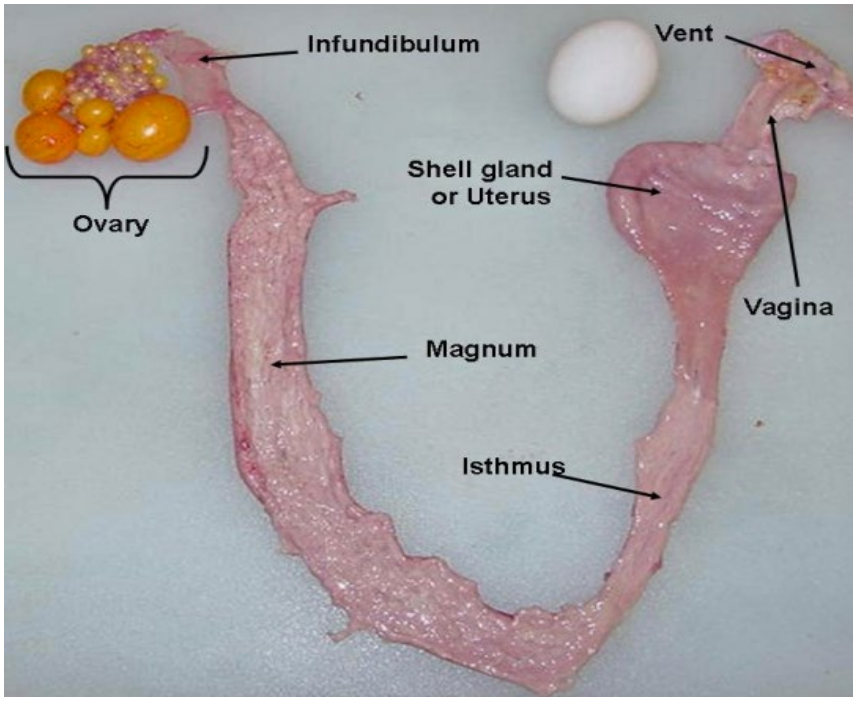
The outermost part of the shell is the cuticle, which gives the egg its characteristic bloom or shine. When the egg is laid, the cuticle is still moist although it will dry within a minute or two. The cuticle normally covers the pores, and this provides extra microbiological protection, especially when the egg is fresh.

Egg formation

The formation of an egg can be compared to an assembly line in a factory. Several component parts are needed, and these must be assembled in the correct order and quantity. If the process is disturbed or becomes de-synchronised, faults will occur.

Egg formation and development start in the ovary (where the yolk develops) and the tube-like oviduct which acts as the assembly line. Most female animals have two active ovaries and oviducts but, in the hen, only the left ovary and oviduct is functional. The right ovary and oviduct remain dormant.

Figure 3: A representation of a mature ovary and oviduct from a laying hen.
The image shows the reproductive tract of a female bird, laid out on a flat surface.
On the left side is the ovary, which appears as a cluster of round, yellow to orange yolk-filled follicles of different sizes. Attached to the ovary is the infundibulum, a pale pink, tube-like structure.
Following the tract downward is a long, curved, fleshy tube labelled magnum, which gradually narrows into a section called the isthmus.
To the right, the tube widens into a larger, rounded area labelled shell gland or uterus, where the eggshell forms. Slightly above this region lies a single formed egg.
Continuing upward on the right is the vagina, another tubular segment, which leads to the vent, the external opening of the reproductive tract.



Yolk development

In the ovary, the yolk develops from a minute ovum. A female chick hatches with a miniature version of the fully formed ovary, but this hardly changes in size during the growing stage.

When the hen reaches maturity, the ovary begins to increase in size. Each ovum (the future yolk) begins to develop during an active growth stage, a process which takes 7 to 10 days in all.

The developing yolks are enclosed in a sac or follicle. They are spherical in shape and each one is attached by a stem to the ovary wall, so that the whole structure looks like a bunch of grapes. The sacs have an excellent blood supply which delivers essential nutrients. As each yolk grows, its colour changes from pale grey to a characteristic yellow.

Ovulation and egg laying

When the yolk reaches its final size, it breaks away from the ovary. This process is called ovulation. The yolk enters the oviduct (see figure 3) where the albumen and the shell are added. The process from ovulation to egg laying takes around 24 to 26 hours.

Shortly after an egg is laid, ovulation takes place again. Another yolk is released into the oviduct and the process which will lead to the next day's egg begins again. The interval between the laying of one egg and the ovulation of the next is approximately 30 minutes. The timing of egg laying gets gradually later each day. Hens in full production will lay an egg each day for several days and this group of eggs is known as a clutch. Each clutch is followed by a sequence of one or more days when the bird does not produce an egg.

Parts of the oviduct

The oviduct is like a coiled tube which, if straightened, would be 60-80cm in length. It extends from the ovary to the cloaca and varies in diameter along its length. It can be divided into 5 distinct parts.

The infundibulum (funnel)

The infundibulum is the entrance to the oviduct, where the yolk is captured after ovulation. It begins in a funnel shape, some 9cm in diameter but narrows quickly. In a hatching egg, it is the site where fertilisation takes place. The yolk takes around 15 minutes to pass through this area.

The magnum

The magnum is the longest section of the oviduct, and the egg takes some 3 hours to pass through. It is here that the albumen is added. The egg rotates, so producing and stretching the chalazae. The albumen is laid down in circles around the yolk.

The isthmus

The addition of albumen is completed, and the shell membranes are formed in the isthmus, a process taking approximately 1 to 1.25 hours.

The shell gland

The shell gland area consists of the tubular shell gland and the shell gland pouch. As the egg moves through, a watery secretion is added to the albumen. Gradually, this plumps up

the egg until the shell membranes become stretched. This provides a firm base on which the true shell can form. The shell formation process takes just over 20 hours and finishes with the addition of pigment and cuticle which give the shell its colour and bloom.

The cloaca

The egg is released through the cloaca or vent. The muscles in the uterus contract and invert. The egg is pushed out, usually broad end first.

Composition and nutrient content of eggs

Composition

On a weight basis, the egg consists of around 11% shell, 58% albumen and 31% yolk. Minor variations do occur due to factors such as breed, age of bird, nutrition and disease.

Tables 1.1 to 1.3 give the approximate physical composition of a newly laid egg.

The proportion of the thick to thin albumen varies greatly, even in newly laid eggs due to factors such as bird age and health. Sometimes, even newly laid eggs contain little or no thick albumen.

Table 1.1: Physical composition of an egg

Part of egg	Percentage of total egg
Shell	11%
Albumen	58%
Yolk	31%

Table 1.2: Composition of an egg's shell

Part of shell	Percentage of total shell
True shell	97%
Membranes	3%

Table 1.3: Composition of an egg's albumen

Part of albumen	Percentage of total albumen
Chalazae	3%
Inner thin	17%
Outer thick	57%
Outer thin	23%

Nutrient content

The typical gross chemical composition of the edible part of an egg is summarised in Table 2. It is possible to change the quantity of certain nutrients in eggs by changing the diet of the laying hen. For example, the amount of polyunsaturated fatty acids can be increased

at the expense of saturated fat. Similarly, it is also possible to enrich eggs with additional vitamins and minerals if required.

Table 2: Composition of eggs per 100 grams (excluding shell).

(Source McCance and Widdowson's The Composition of Foods Seventh Summary Edition and updated Composition of Foods Integrated Dataset)

Component	Whole egg	Albumen	Yolk
Water	75.1g	88g	48g
Protein	12.6g	10g	16g
Fat	9.0g	0.2g	32.5g
Carbohydrate	Trace	Trace	Trace
Energy value	547kJ	153kJ	1402kJ

Effects of storage upon egg quality

Immediately after the egg is laid, the internal contents and structure begin to change. This is a continual, irreversible process and even the most carefully controlled storage conditions can do no more than slow down the rate of deterioration. The main changes which occur are outlined below.

The air space

When the egg is laid, it is warmer than its surroundings. As it cools, the contents contract and a small air space is formed between the inner and the outer shell membrane. The air space normally (but not always) forms at the broad end of the egg because there are more pores in this part of the shell.

As the egg ages, moisture and carbon dioxide continue to be lost through the pores. Air moves in and the air space increases in size at a rate which is determined by the temperature and the relative humidity of the surrounding air. The warmer and drier the air, the quicker the moisture loss from the egg. The size (height) of the air space is used as an approximate guide to the quality and age of an egg.

Albumen quality

In a very fresh, good quality egg, the albumen is jelly-like and may have a cloudy appearance. As the egg ages and carbon dioxide is lost through the shell, the contents become more alkaline, and this causes the albumen to become transparent and

increasingly watery. At higher temperatures, the rate of carbon dioxide loss is higher, and the visible signs of ageing occur quicker.

The quality of albumen can be assessed by measuring the height in millimetres of the outer thick albumen. The height of the albumen and the weight of the intact egg is used to calculate the Haugh Unit value. The Haugh Unit is a measure used to determine the quality and freshness of eggs, particularly the albumen (egg white). It's widely used in the egg industry and food science to assess egg quality objectively.

It is the proteins in the thick albumen which begin to break down during storage as the egg becomes more alkaline. At the same time, water slowly migrates into the yolk and the shell from the albumen so that both may develop a mottled appearance and the yolk becomes enlarged and flattened on breakout. The yolk moves away from the centre of the egg and may eventually rest against the shell itself. This breakdown of the albumen makes the egg extremely vulnerable to microbial invasion.

Storing eggs on their sides is detrimental to them keeping their qualities as the yolk will naturally sink closer to the shell. Storing eggs with their pointed end down allows the chalazae and albumen to support the yolk in the centre of the egg thus helping to extend quality and freshness.

Grading of eggs for human consumption

Eggs are food and like all foods they must be assessed for quality to ensure that they meet the required regulatory standards for the UK. It is the responsibility of food businesses to ensure that all food placed on the market meets these required regulatory standards. Failure to remove defective eggs can lead to complaint, loss of business and may result in prosecution.

Successful quality control requires a combination of skill, concentration and practice. Automatic and mechanical developments have emerged which have reduced reliance on the human eye. With the development of automated egg grading machines and the latest technology they can now detect cracks in shells, take photographic images to determine if the egg is soiled regardless of the egg’s shell colour and electronically grade egg by weight. However, this does not remove the need for supporting visual quality assurance checks, before and after grading

Section 2

Quality standards – egg marketing standards and other controls

Each egg must be inspected so that it can be allocated to a particular Quality Class A or B. These Classes are defined in the Egg Marketing Standards which are enforced throughout all European Union (EU) countries, NI and GB. There are two quality classes for eggs intended for human consumption, as outlined in UNECE standard eggs in shell:

- **Class A** or “fresh” eggs are for direct human consumption and for use in food or non-food industries.
- **Class B** eggs are for use in food or non-food industries.

Further details of the minimum permissible standards for Class A eggs can be found in the table on page 24.

All eggs sold in UK supermarkets and retail shops must be Class A. Class B eggs are normally sent to processing plants for pasteurisation. Any egg which fails to meet the criteria for Classes A or B are considered unfit for human consumption and classed as ‘Industrial Eggs’ (CAT 3 waste). Typically, eggs where the shell membranes have been broken fall into this category. Industrial eggs can be used for non-food uses if suitable markets can be found, for example pet food manufacturers.

In some cases, certain customers may impose their own buying requirements which exceed the minimum Class A standards. Where this is the case, it is up to packing centres to incorporate these requirements into their normal inspection procedures.

Quality control methods for eggs

In the UK, formal egg marketing efforts, particularly by the government, began in December 1956 with the establishment of the Egg Marketing Board. This board was created to stabilise the egg market after a drop in sales and to promote eggs as a nutritious food. The board's role included purchasing all UK-produced eggs, grading them, and marketing them to retailers.

A number of common quality faults can be seen by close inspection of eggs under normal lighting conditions. However, candling can reveal many other defects which may otherwise not be visible.

Since 1956, egg candling has played a fundamental role in the marketing of eating eggs in the UK. The technique takes its name from the original source of light used – the candle. A beam of light is shone through the shell so that the contents become visible.

The limitations of candling have long been recognised but, for many years, it provided the best way of identifying hairline cracks in shells and the only way of identifying internal faults without breaking the shell. More recently, automatic in-line detection equipment for cracked eggs and other faults has been developed and is now in use in larger packing centres to assist quality control staff.

Inspection of eggs in commercial packing centres can be divided into individual egg and mass egg systems. The objectives and methods used are summarised below.

Individual egg quality control systems (best practice)

In many packing centres, eggs are graded from a large number of different flocks and it is important to get an overall assessment of the quality of each consignment before grading. The results obtained from testing a small sample of eggs can be used to determine the order of grading, the customer, the grading speed and the number of inspection staff needed. Assessments can be made by Individual (or Hand) Candling or by Break Out and related Laboratory Tests. In many cases, both tests will be undertaken.

Individual (hand) candling

In very small enterprises, hand candling may be the most cost-effective way of assessing the quality of all eggs. In larger businesses, it is used to identify levels and types of faults in representative samples of ungraded and graded eggs. It is a condition of the assimilated EU regulations regarding marketing standards for eggs that non automated grading equipment should include candling equipment.

Candling lamp design

Figure 4: A typical design of candling lamp.

The key design features are that:

- the light should be focused onto the aperture
- cushioning material can be fitted around the aperture to minimise leakage of light when the egg is in place
- the aperture should not exceed 30mm in diameter

Hand candling techniques

- Direct the aperture away from the eye of the candler to avoid glare.
- Keep the background in the candling area as dark as possible.
- Hold the broad end of the egg to the aperture and then turn the egg so that all the surface area has been seen.
- The visibility and movement of the yolk and any internal faults should be observed as the egg is turned.
- A standard record sheet should be used to enter the number and type of faults. For maximum speed of candling, the operator should aim to hold two eggs in each hand at a time.

Break-out and laboratory tests

In order to provide more detailed information on aspects of quality and consumer preference, additional break-out and other laboratory tests may be undertaken on representative samples of eggs.

Detailed break-out tests take time to complete and because the tested eggs are unsaleable, only small numbers can be used. Eggs from a single flock of a given age are reasonably consistent and so a fairly small sample can provide a useful indication to the average quality of eggs from the whole flock.

Bespoke Equipment for measuring shell and yolk colour and albumen quality is available and used widely within UK packing centres. All measurements can be automatically recorded and compared with standard and target figures.

Mass egg inspection

As the scale of individual businesses has increased and technology has advanced, so the methods used have changed which may include visual egg inspection equipment, automatic crack and blood detection, and should be supplemented by pre-candling where necessary.

Traditionally, commercial egg grading machines could grade approximately 3,000 eggs per hour. Developments in detecting egg faults on or in the shell by the latest technology, including visual systems, means it is possible for grading machines to pack around 250,000 eggs per hour.

Pre-candling procedures

The aim of pre-candling is to remove eggs with visible faults. In particular, it should succeed in removing gross faults such as eggs with dirty, glazed (wet), weak, coated, badly cracked or misshaped shells. A particular priority is to remove eggs which may contaminate other eggs. The main requirements for successful pre-candling are as follows:

- it should take place shortly after the eggs have been loaded
- eggs should be viewed under normal but high intensity light
- it should be possible for the pre-candler to see the majority if not all of the surface of the egg
- the number of pre-selection staff needed, and the throughput speed should be determined by the expected quality of the incoming eggs
- a comfortable working environment and regular breaks are needed if high standards are to be maintained
- pre-candling staff should be suitably trained and their performance regularly assessed

Mass egg candling

The aim is to remove faults which cannot be seen under normal light such as hairline cracks and internal faults

Egg candling is an immensely difficult task which requires skill, practice and concentration. Eggs pass through the booth in parallel rows on rollers. A single candler working on a 100 cases per hour grading machine has to inspect 10 eggs per second and remove perhaps one of them. More modern automated equipment may remove the need for manual visual candling.

Candling should be seen as one part of a larger inspection process at the packing centre. The starting point is pre-candling. If effective, this allows more attention to be placed on faults which cannot be seen under normal light, such as ‘hairline cracks and internal faults.

Manual candling facilities

Successful candling requires an enclosed booth, free from external light.

Eggs should be illuminated from beneath using high intensity lighting.

A mirror should be incorporated and so positioned as to enable the candler to see both ‘poles’ of each egg.

Both the mirrors and the covers over the lights must be kept clean and dust-free to ensure good visibility.

The candler should be able to work (whether standing or sitting) in surroundings which are comfortable, and the height of the platform or seat should be adjustable according to the height of the candler.

Candling personnel

Candlers should have good eyesight and should be encouraged to have regular eye examinations.
Regular breaks from candling are essential.
Candlers should not be expected to perform any other tasks whilst in the booth.

Candling procedures (non-automated systems)

To reduce glare from the lights, a throughput of eggs should be maintained which ensures that the rollers are as full as possible.

The throughput speed of the grader must be geared to the quality of eggs being assessed and the parameter speeds for correct ink-jetting onto eggshells where fitted.

If the rollers become wet due to broken eggs, the grader should be stopped so that cleaning can take place.

The candler should concentrate on the eggs within a particular small zone within the booth and eggs within that zone should be examined in a logical sequence, with the mirrors being used as necessary.

If in doubt, an individual egg should be removed from the rollers and examined more closely at a convenient moment.

In addition to shell faults, the experienced candler should be able to assess:

- the size and position of the air space
- the appearance and movement of the yolk (which provides an indication of albumen quality)
- whether the egg contains inclusions such as blood or meat spots

Eggs with faults must be removed by hand and put onto conveniently placed Keyes trays (Class B) or into buckets (Category 3 Animal By Product Waste).

Automated systems

In automated, higher throughput systems, eggs identified as seconds may be electronically marked so that they are automatically diverted to the seconds lane.

In any system utilising automatic fault detection it is essential to carry out regular post-grading candling and quality checks on representative samples of eggs to ensure that automated equipment is functioning correctly and is properly calibrated. These verifications should form an integral component of every effective HACCP plan.

Egg hygiene

In accordance with food safety and hygiene standards, eggs and egg products must be demonstrably safe and suitable for human consumption. Class A eggs shall be clean, intact, and free from contamination, including but not limited to faecal matter, microbial rot, or physical damage. Eggs deemed unsafe or unsuitable, such as incubated eggs, broken or leaking eggs, and those stored under conditions compromising their integrity, must not be used for direct human consumption.

Cracked or dirty eggs not meeting the criteria for Class A eggs may be directed to processing, provided such processing includes appropriate cleaning and microbiocidal treatment in compliance with national regulatory requirements. Broken or leaking eggs are not to be processed and must be disposed of in a safe and controlled manner.

The Eggs and Chicks Regulations form a key part of the UK's implementation of the National Control Programme (NCP) for salmonella in laying flocks. Their purpose is to reduce the prevalence of salmonella in eggs and, in turn, strengthen food safety. Under these regulations and associated marketing standards, all flocks producing eggs intended to be graded and sold as Class A must participate in the NCP and meet its testing and control requirements. Producers comply with regular, scheduled flock testing and other control measures to enable early detection and effective management of salmonella, thereby minimising the risk of contamination in eggs supplied for human consumption. Read further guidance on testing for salmonella in laying flocks.

Sorting, grading, and packing operations must ensure the effective segregation of Class A and B eggs.

Eggs designated for processing or disposal must be clearly identified and handled in a manner that prevents their inadvertent entry into the food supply chain. These measures are essential to mitigate the risk of contamination and ensure public health protection.

Egg quality assessments

Egg Quality Standards in accordance with assimilated EU Egg Marketing Regulations (EC) No 589/2008 (applicable in Great Britain) and (EU) No. 2465/2023 (applicable in Northern Ireland (NI) (and in other EU member states importing eggs into the UK)).

Cleanliness requirement

As stipulated in Article 2 (and Article 3 for EU and NI) Quality Characteristics of Eggs, eggs classified as Class A must adhere to the following standard:

"A shell and cuticle that are of normal shape, clean, and undamaged."

This requirement ensures that only eggs with visual and structural integrity are marketed as Class A. See figure 5.

Visual standards

Photographic examples included in this document serve to illustrate the expected appearance of Class A and Class B eggs but do not replace the statutory textual requirements. These visual references reflect the standards commonly applied by inspection authorities throughout the United Kingdom.

Tolerance for quality defects

In accordance with Article 26 (and 18 for EU and NI) of the same regulations, the following tolerances for quality defects in Class A eggs are permitted:

- at the packing centre, immediately prior to dispatch: a maximum of 5% of eggs may exhibit quality defects
- at other stages of marketing: a maximum of 7% of eggs may exhibit quality defects

These thresholds are designed to maintain consumer confidence while allowing for minor, controlled deviations.

Compliance and downgrading risk

Any batch of eggs exceeding the permitted defect tolerances may be subject to reclassification from Class A to Class B. Such reclassification can significantly affect the marketability and commercial value of the product.

Quality characteristics of eggs

Class A eggs shall have the following quality characteristics:

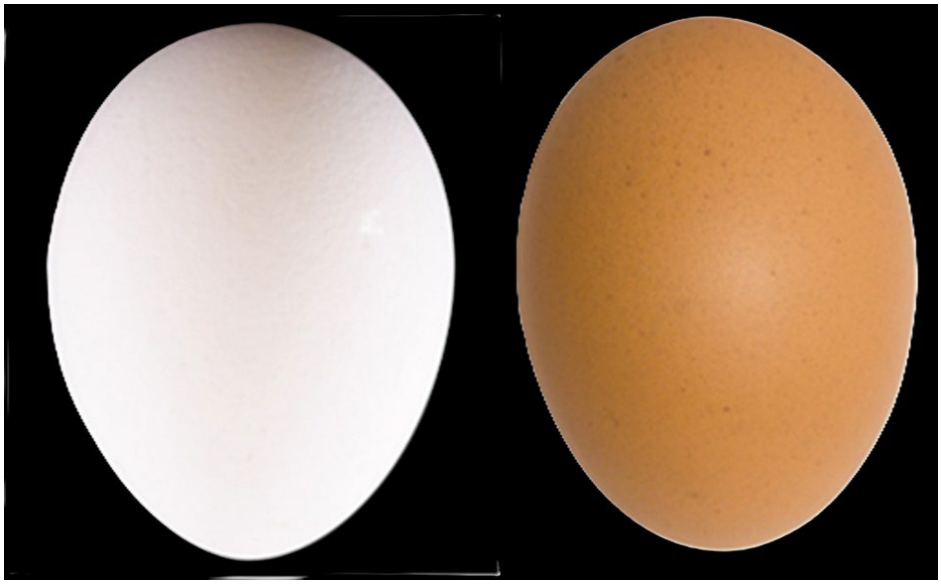
- **shell and cuticle**: normal shape, clean and undamaged
- **air space**: height not exceeding 6mm, stationary; however, for eggs to be marketed as ‘extra fresh’, it may not exceed 4mm
- **yolk**: visible on candling as a shadow only, without clearly discernible outline, slightly mobile upon turning the egg, and returning to a central position
- **white**: clear, translucent
- **germ**: imperceptible development
- **foreign matter**: not permissible
- **(unintended (in EU and NI)) foreign smell**: not permissible

Additionally:

- Class A eggs shall not be washed or cleaned, before or after grading
- The inclusion of washed eggs in consignments of eggs marketed or intended for marketing as Class A constitutes a specific offence in the Regulations. Please refer to page 48 Washed and Cleaned Eggs, Figures 38 and 39

- Class A eggs shall not be treated for preservation or chilled in premises or plants where the temperature is artificially maintained at less than 5 °C. However, eggs which have been kept at a temperature below 5 °C during transport for not more than 24 hours or on retail premises or in annexes thereto for not more than 72 hours shall not be considered as chilled.
- Class B eggs shall be eggs which do not meet the quality characteristics provided for Class A eggs, detailed in this guidance document. Class A eggs which no longer have those characteristics may be downgraded to Class B. (Eggs not being marked within 10 days after laying shall be Class B eggs in EU and NI)

Figure 5 Class A egg – clean, normal shaped and undamaged



Common internal and external egg quality faults (Class B) including a pictorial guide to egg quality

Egg quality faults can occur during egg formation or after laying. These faults may result from various factors including cracking or contamination. Some typical internal and external faults and their likely causes are outlined below.

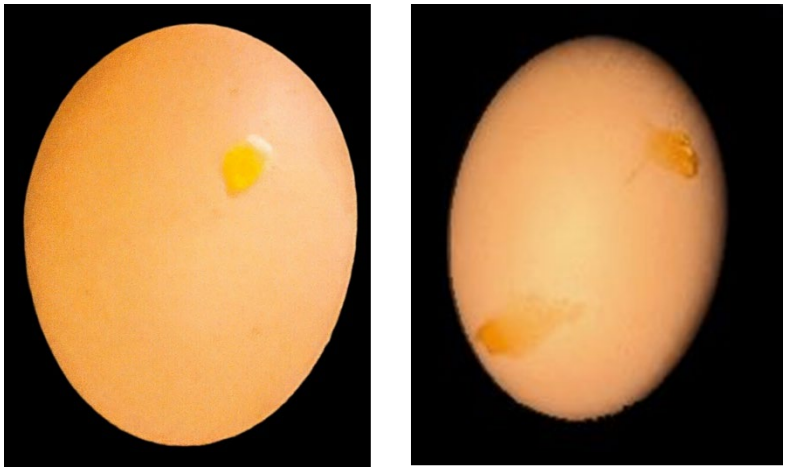
Note: Images of egg quality faults do not replace the statutory text outlined on pages 23 and 24. The pictures shown in this section are examples of the types of eggs that should be removed before or during grading for Class A. This is not an exhaustive library of pictures.

External egg quality faults

Yolk soiling

Any quantity of yolk soiling is not permissible in Class A, see figure 6.

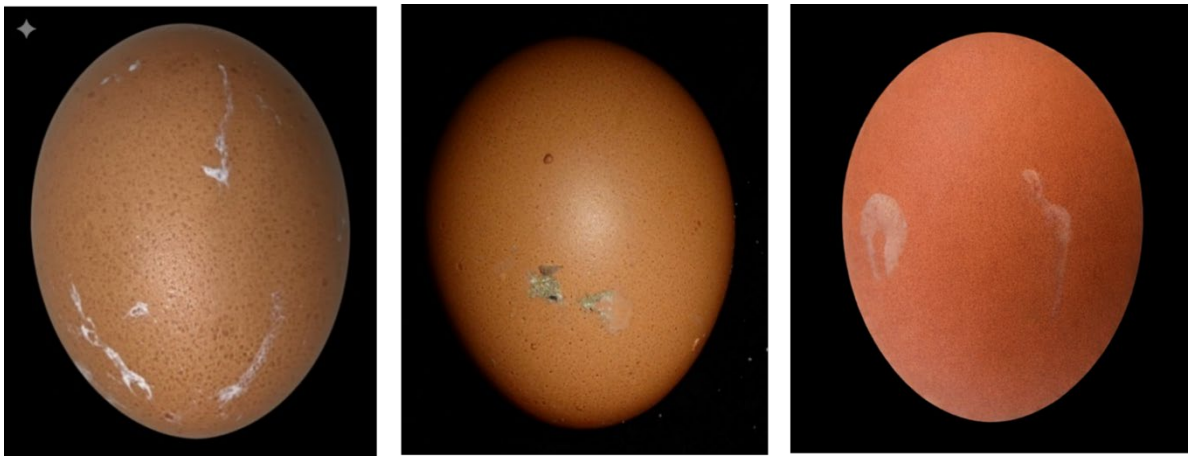
Figure 6: Eggs with yolk soiling are classified as Class B eggs.



Excreta soiling

Excreta soiling on eggs, also known as ‘dirty eggs’, occurs when faeces, urates or other waste matter from birds adheres to the eggshells. Examples shown below in figure 7.

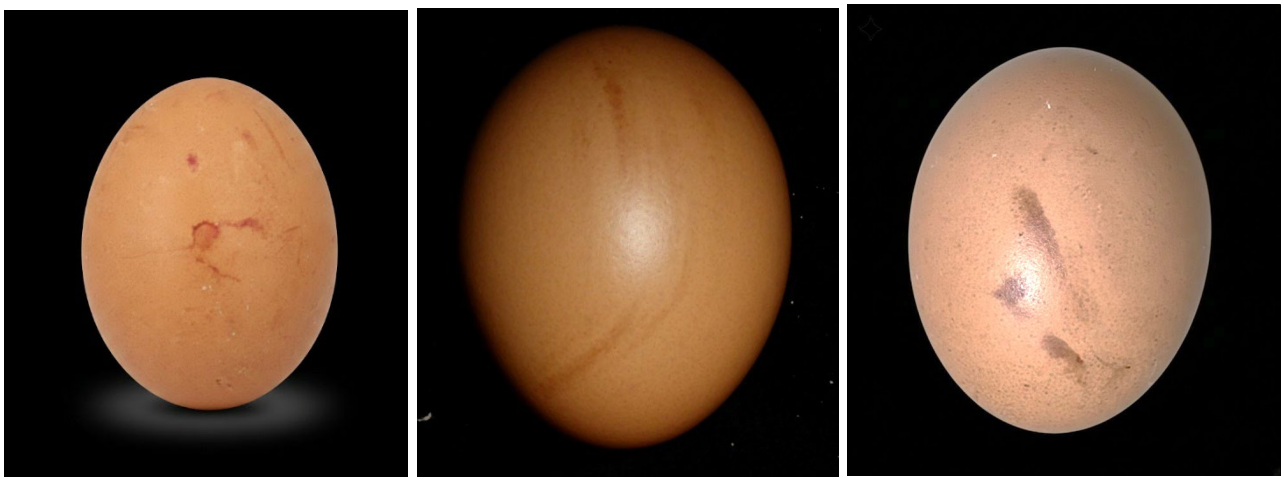
Figure 7: Eggs with excreta soiling are classified as Class B eggs.



Blood soiling

Any quantity of blood soiling is not permissible in Class A, see figure 8.

Figure 8: Eggs with blood soiling are classified as Class B eggs.



Dust soiling

Figure 9: Eggs with dust soiling are classified as Class B eggs.

Albumen soiling

Albumen soiled eggs occurs when shells have been contaminated with albumen from other broken or cracked eggs. This can be caused at either the primary producer or at time of grading or packing. These are classed as dirty. See figure 10.

Figure 10: Eggs with albumen soiling are classified as Class B eggs.

Fly dirt soiling

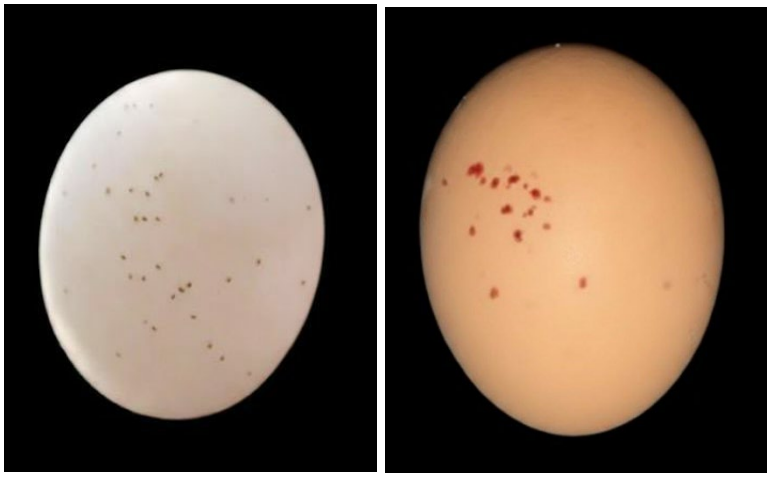
Fly dirt soiling on an egg typically refers to small dark specks or spots left by flies, often seen on the surface of eggshells. These marks are usually fly faeces and present on the eggshell as small black or brown dots that flies leave behind after landing on the egg: see a Class B examples in figure 11. Flies are attracted to organic matter and may carry bacteria from unsanitary surfaces.

Figure 11: Eggs with fly dirt soiling are classified as Class B eggs.

Red mite *s*oiling

Red mite soiling on an eggshell is a sign of a red mite infestation in the hen house. Red mites, while primarily found in crevices and on perches, can sometimes be seen crawling on eggs, especially if the mites are in the nest box. A severe infestation can even cause blood spots to appear on the eggshell.

Figure 12: Eggs with red mite are classified as Class B eggs.

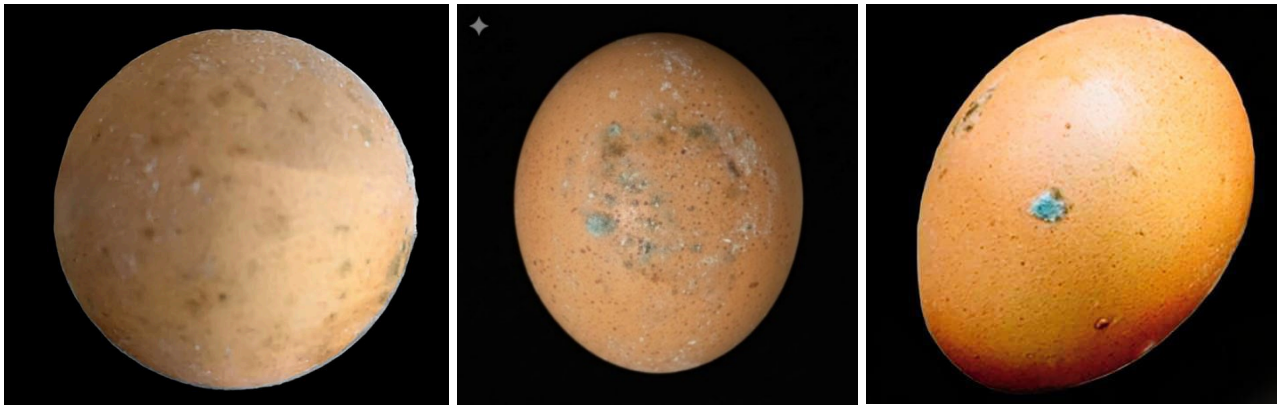


External mould

Egg mould and bacterial growth can be caused by different factors. One of the major reasons for mould growth in eggs is due to a lack of air circulation.

Humidity plays a significant role in the preservation of eggs as high levels of humidity promote the growth of mould on their surface. Eggs that are stored in damp or humid areas tend to have more mould growth than those kept in a dry environment. When the moisture in the air encounters the porous eggshell, it provides an ideal environment for mould spores to flourish. See figure 13 for examples of external mould.

Figure 13: Eggs with external mould are classified as industrial eggs.



Shell faults

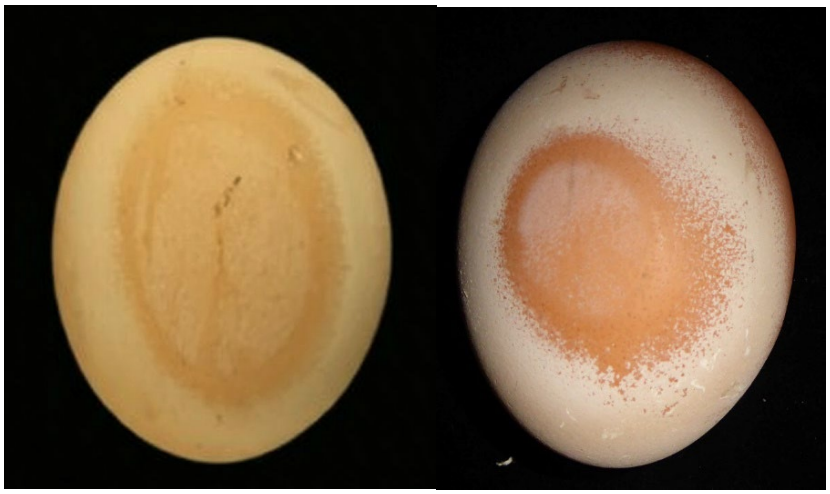
The term shell faults, including ‘rough shells’, refer to eggs with abnormal shell or calcium deposition.

Target egg

If eggs encounter each other in the shell gland pouch, normal calcification is interrupted. The first egg retained in the pouch will have an extra layer of calcium seen as the white band marking which can result in a shell fault weakness and shell deformity.

A target egg occurs when a second egg enters the shell gland before the first egg leaves. Because the second egg is not yet completely calcified, the side that touches the first egg is flattened. See figure 14.

Figure 14: Brown target eggs are classified as Class B eggs



Soft shell

Eggs with faulty texture are much weaker in shell strength and may be broken during distribution.

Soft shelled eggs, sometimes referred to as jelly eggs or rubber eggs, are eggs that are laid with no outer shell or with only a thin layer of calcification. This results in an egg with a soft or tough membrane but with no outer shell. See figure 15.

Figure 15: Eggs with soft shells are classified as Class B eggs.

Ridges

Ridges can result in weakened shells. Eggs with ridges are not permissible as Class A. See figure 16.

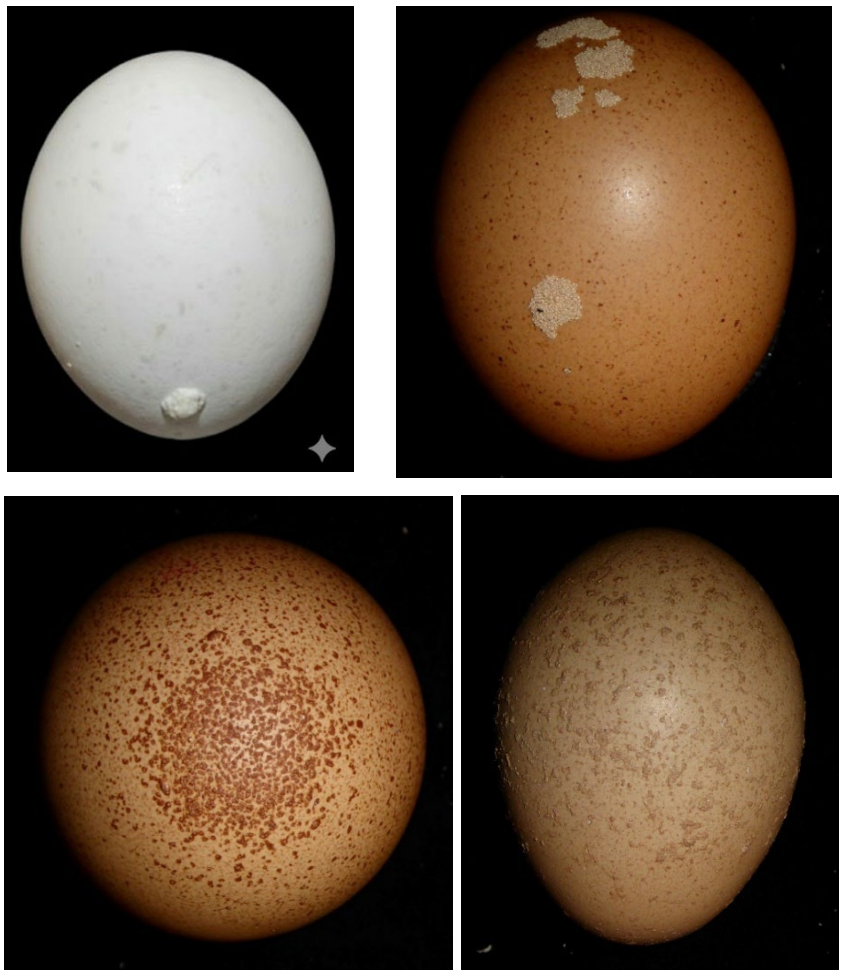
Figure 16: Egg with ridges, classified as a Class B egg.

Calcium deposits and rough shells

Calcium deposits can take the form of hardened masses or fine, sand-like particles that can easily be brushed off exposing the membrane. Calcium deposits can often be attributed to a disturbance during the shell calcification while in the oviduct. Classified by small lumps of calcified material on the eggshell, the severity of abnormalities depends on the foreign material present during the calcification process. As with many other shell abnormalities the causes could be a defective shell gland (uterus), overcrowding, stress, bullying, predators or a disease or health challenge.

Rough shelled eggs have small, raised lumps of calcium on the shell and feel rough and sandpaper like to the touch. Eggs with rough areas may be faulty in soundness or strength are not permissible as Class A. See examples in figures 17 and 18.

Figure 17: Eggs with calcium deposits are classified as Class B eggs



Egg shape

Normal shaped eggs

Class A eggs (commercial chicken eggs) fall into the ovoid category of egg shapes. They are symmetric around their long (major) axis but asymmetric end-to-end, with the broad end more rounded (blunt) and one end more tapered (pointed).

Abnormally shaped eggs

The shells highlighted in Figure 18 have a corrugated appearance and are typically caused by stress or disease, which affects normal shell formation.

Figure 18: Eggs with abnormal shells, classified as Class B eggs

The misshapen eggs shown in figures 19 to 21 are those whose shells differ obviously from the smooth, ‘normal’ shape and may negatively impact upon shell integrity. They include eggs with shells marred by flat sides and eggs that are too round, pointed, elongated or have ridges, wrinkles and bulges An equatorial bulge is an misshaped egg that has resulted during the formation process and the damage partially repaired resulting a bulge forming around the centre of the egg which may cause a weakness in the shell. Misshapen eggs are Class B**,** examples are shown below in figures 19 to 21.

Figure 19: A selection of abnormally shaped eggs classified as Class B eggs

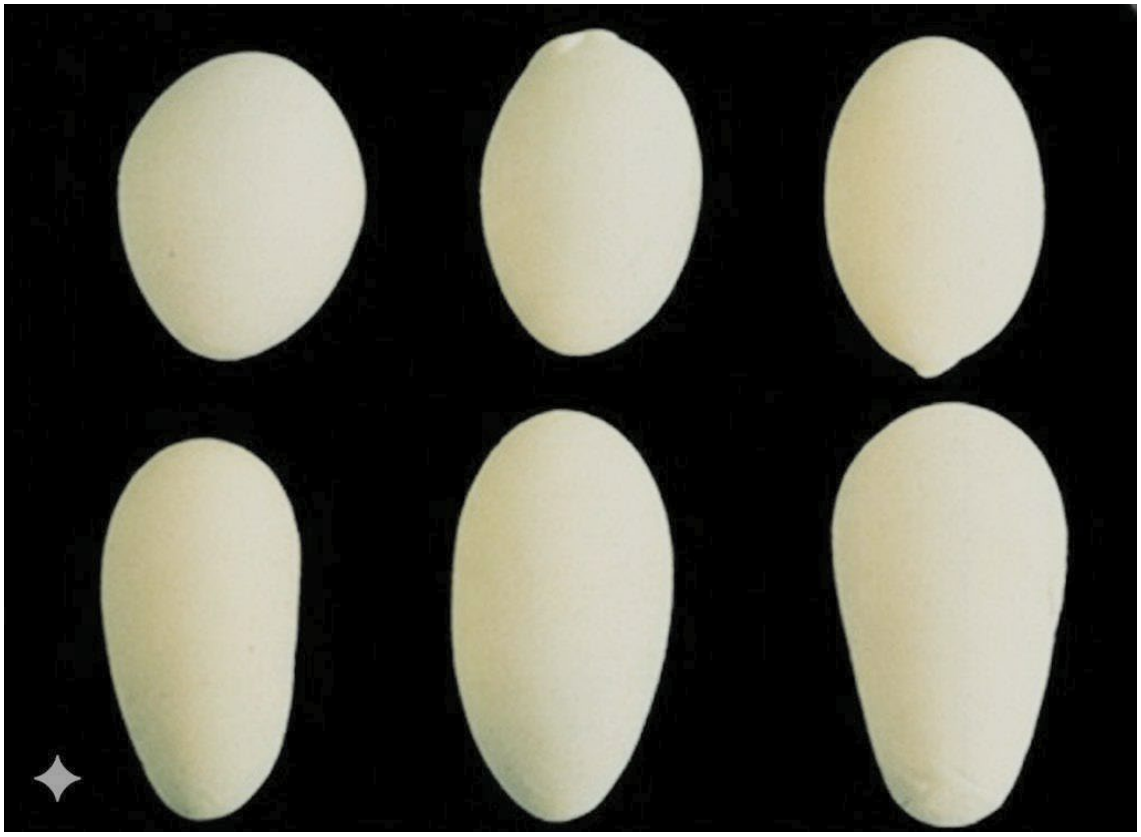
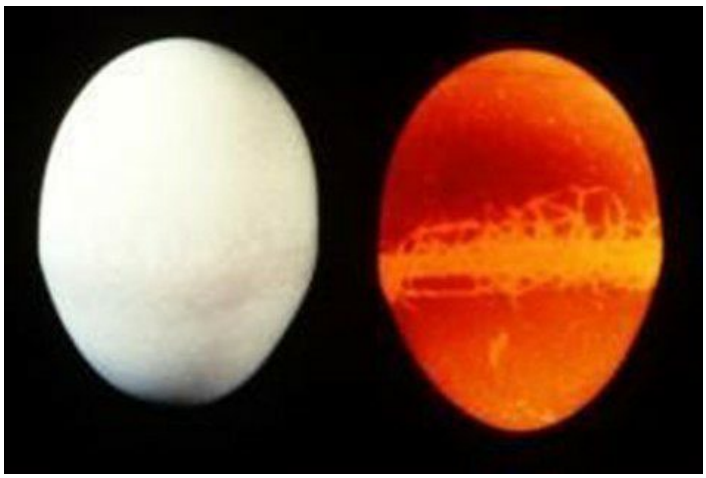


Figure 20: Abnormally shaped egg displaying an ‘equatorial bulge’, classified as Class B eggs.

An equatorial bulge is when an egg is slightly wider around the middle than at the top or bottom. This means the egg looks a little rounder or broader at its centre.

Figure 21: Eggs with "equatorial bulge" with and without candling lamp, classified as Class B eggs.



Egg damage

Cracks

Egg shells can easily be damaged after the egg is laid and cracking is one of the most common reasons for downgrading. It may be due either to an inadequate egg shell being laid or to poor handling which may occur during collection, grading or transportation. Three main types of cracks are identified:

- **Star cracks** - Star cracks are fine cracks radiating outwards from a central point of impact, which is often slightly indented, see figures 22 and 23.
- **Hairline cracks** - Very fine cracks, usually run lengthwise along the shell, but difficult to detect without the use of an egg candling lamp or similar, see figures 24 and 25.
- **Pinhole cracks** – Pinholes or very small holes in the egg shell, see figure 26.

Figure 22: Egg with star crack classified as a Class B egg

Figure 23: Egg with star crack under canding lamp, classified as a Class B egg

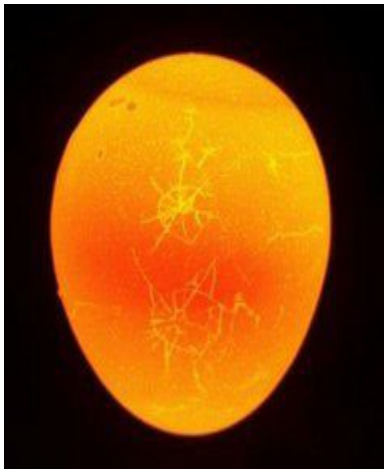


Figure 24: Egg with hairline crack under candling lamp, classified as a Class B egg.

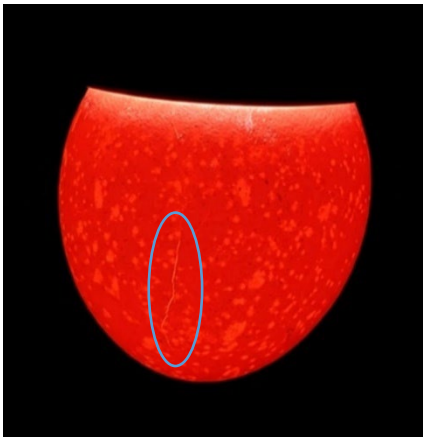
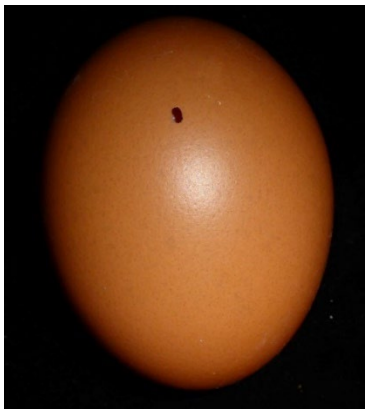


Figure 25: Egg with a crack under candling lamp, classified as a Class B egg.

Pinholes

Figure 26: Egg with a pinhole crack, classified as a Class B egg



Dented

Dented eggs present as large cracks or holes, which may result in a broken membrane. Eggs with a broken membrane cannot be used for human consumption.

See figure 27. Dents weaken the shell’s protective barrier, increasing the risk of bacterial ingress and spoilage.

Figure 27: Eggs with dents classified as Class B eggs.

Internal egg quality faults

Foreign matter

Internal egg quality faults – referred to as foreign matter in the legislation.

Foreign matter is defined as any substance within the egg's contents which is not a natural characteristic part of the egg. Its presence renders the egg as Class B or "unfit for human consumption" depending on the material.

Materials that can form during the egg's development within the hen's reproductive system:

- Blood spots: Caused by the rupture of small blood vessels at the time of ovulation. In some cases, bleeding may occur after the eggshell has begun forming. When this happens, blood can travel along with the yolk through the oviduct, potentially dispersing throughout the egg.
- Meat spots: Pieces of tissue from the hen's oviduct wall that break off and become encased in the egg white. These can be fatty, fleshy, or liver-like material and may turn reddish-brown. Their incidence varies according to bird age and health and due to strain (breed) differences.
- Parasites: In rare cases, adult worms (such as intestinal nematodes or tapeworms) from the hen's intestinal tract can travel up the cloaca into the oviduct and become encased in the egg.

Blood and meat spots in eggs

Eggs can be found that contain blood or meat spots, sometimes called inclusions. They can vary in size from small to sometimes large inclusions and should be removed at time of grading. They are often mistaken for containing an embryo.

High levels of activity or disturbance, underlying diseases, or stress events can cause a sudden increase in the incidence of blood and meat spots, particularly at the time of ovulation.

Meat spots

Most meat spots are pieces of tissue from body organs, but some may be partially broken-down blood spots. They are usually brown in colour, and found in the thick albumen, chalazae, or the yolk. They range in size from approximately 0.5 mm to more than 3 mm in diameter. See class B examples in figures 28 to 31.

Figure 28: Class B meat spot under candling lamp, shown as a small dark dot

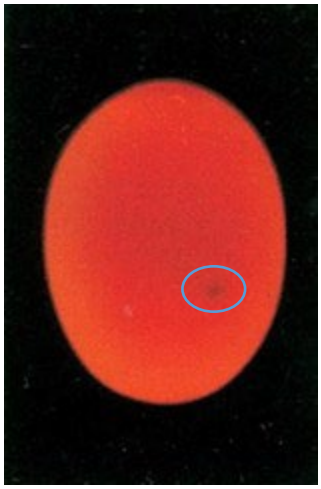


Figure 29: Class B meat spot in a broken out egg showing as a brownish red spot in the white

Figure 30: Class B meat spot in a broken out egg showing as a several brown spots in the white

Figure 31: Class B meat spot in a broken out egg showing as a pale, irregularly shaped mass

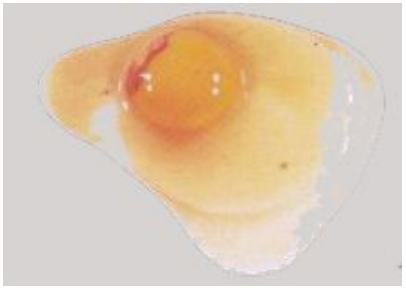
Blood spots

Blood spots vary from barely distinguishable spots on the surface of the yolk to heavy blood contamination throughout the yolk. Occasionally blood may be diffused through the albumen of the egg. See examples in figures 32 to 34 below.

Figure 32: Blood spot candled classified as Class B eggs, shown as a small dark dot

Figure 33: Blood spot candled, classified as Class B eggs, shown as a small dark dot.

Figure 34: Class B blood spot broken out showing blood within the yolk.

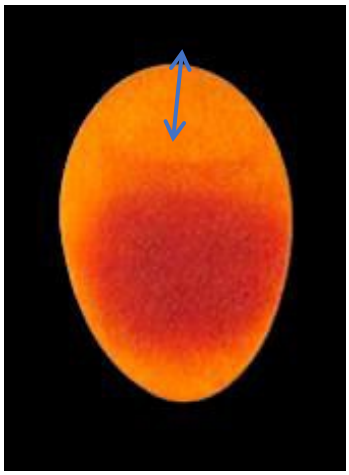


Eggs with large or mobile air spaces

An air space or air cell is a pocket of air usually found at the broad end of the egg interior between the outer membrane and the inner membrane. Although the airspace usually forms at the broad end of the egg, it can occasionally be found where there is a shell structure fault or abnormality. In other cases, a bubbly air space may be seen within the albumen, and this is usually caused by a ruptured inner membrane.

Eggs with mobile or large air spaces (greater than 6mm) are Class B. The air cell depth (AcD) is an indicator of the freshness of the egg. See figure 35.

Figure 35: Candling lamp examples of air spaces greater than 6mm, classified as Class B eggs showing as a lighter shadow in the egg

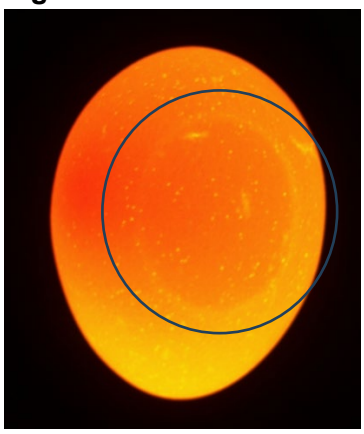


Mobile air space

A mobile air space in an egg refers to an air cell that has become detached from its usual position at the broad end of the egg. Normally, the air cell forms between the inner and outer membranes as the egg cools after being laid. It stays fixed at the broad end and gradually enlarges as the egg ages or loses moisture.

But if the membranes are damaged – due to rough handling, temperature fluctuations, or structural weakness – the air cell can shift or move around inside the egg. This is called a mobile air space. See figure 36, an example of a Class B egg.

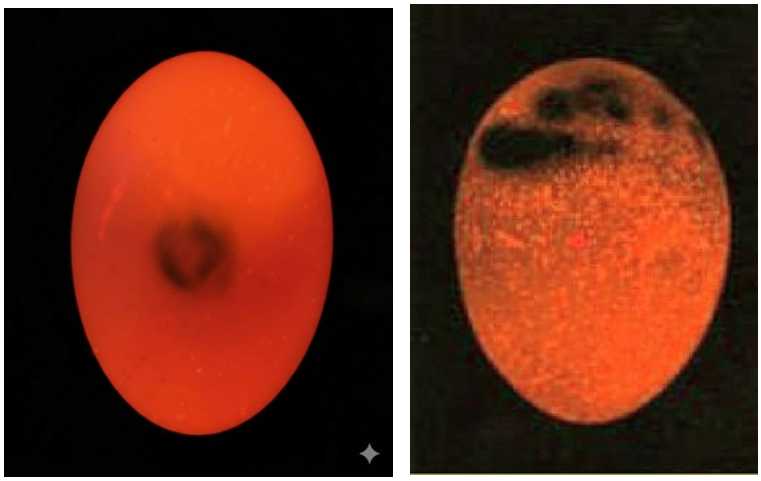
Figure 36: Class B candling lamp example of a mobile airspace, classified as a Class B egg.



Internal contamination

Bacteria and moulds may naturally be present on the surface of the eggshell. Under certain conditions, such as washing of eggs, these microorganisms can penetrate the shell and proliferate within the egg, leading to spoilage. This typically manifests as black, red, or green rots. When examined under a candling lamp, affected eggs display dark, irregular patches, indicating internal deterioration. See figure 37.

Figure 37: Eggs exhibiting internal contamination characteristics, classified as industrial eggs



Odours

Unintended (in EU and NI) foreign smells – Not permitted in Class A eggs.

Class A eggs must be free from any foreign smells. While some eggs may appear visually normal, they can still possess unusual or unacceptable odours that compromise their quality. These differ from rotten eggs, which are clearly defective and emit a putrid smell.

Flavour and aroma are critical components of overall food quality. Off-flavours, defined as unpleasant odours or tastes, often result from natural deterioration or contamination. An extraneous odour refers specifically to undesirable smells or tastes caused by the presence of foreign chemical substances. These odours can taint the eggs and render them unsuitable for consumption.

Such odours may originate from various sources during production, transportation, or storage. Common causes include inadequate cleaning, exposure to scented cleaning agents, or proximity to strong-smelling substances. Other contributing factors may include batch variation, microbial activity, or spoilage during storage.

To maintain the integrity of Class A eggs, it is essential to store them away from cleaning products, chemicals, and other food items that could impart unnatural odours. Proper handling and storage practices are crucial to preserving the eggs' freshness and ensuring compliance with quality standards.

Washed and cleaned eggs

Washing or cleaning of Class A eggs for direct human consumption is prohibited as these processes can damage the eggshell, which serves as a primary barrier against bacterial contamination due to its natural antimicrobial properties.

The cuticle, an important physical defence may be compromised during or after washing, further increasing vulnerability to contamination. Sanitising treatments such as ultraviolet light may be used but are not regarded as cleaning processes. Washing can impair the shell's protective barriers, promote moisture loss, and increase the likelihood of bacterial penetration. These effects collectively elevate the risk to consumers.

Eggs that have been washed or show any evidence of cleaning must not be graded or marketed as Class A. Evidence of washing, such as a dull and damaged cuticle and detergent residue marks, can often be seen with the unaided eye but are more easily detected under ultraviolet light.

When accompanied by cuticle damage, washed eggs may be included in the batch's quality fault tolerance, however, marketing of washed eggs as Class A is a separate offence from that related to quality breaches. See figures 38 to 39.

Figure 38: Washed eggs under UV light, classified as Class B eggs showing drip marks

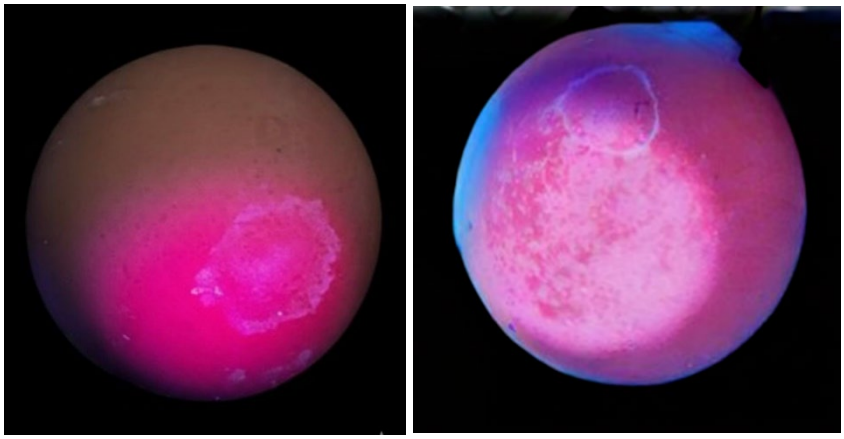
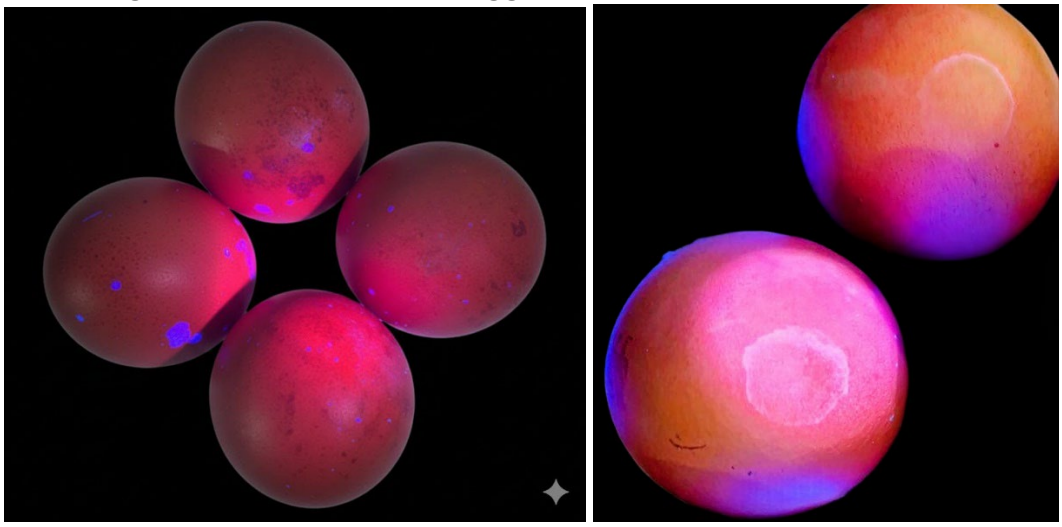


Figure 39: Multiple eggs under UV light (first image also shows residue of external staining remaining), classified as Class B eggs.



Egg marketing inspections, EMI training and quality assurance standards

The Scottish Government Poultry Unit (SGPU), the Northern Ireland Department of Agriculture, Environment and Rural Affairs (DAERA), and the Animal and Plant Health Agency (APHA) are committed to consistent, high-quality egg inspections. All egg marketing inspectors (EMIs) receive structured, regularly updated training aligned with current legislation and industry standards.

To maintain inspection quality, both in-person assessments and documentation undergo ongoing quality assurance. Reviews are selected using risk-based criteria and established protocols to ensure consistency and address discrepancies promptly.

Read more about APHA's EMI training and quality assurance procedures.

Appendices

For further information, you can read the full:

- Eggs and Chicks (England) Regulations 2009
- The Eggs and Chicks (Wales) Regulations 2010
- The Eggs and Chicks (Scotland) Amendment Regulations 2010
- Eggs and Chicks Regulations (Northern Ireland) 2010

Data Protection:
For information on how we handle personal data visit www.gov.uk and search Animal and Plant Health Agency Personal Information Charter.

This publication is available at www.gov.uk/government/publications

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