MARKET EGGS - EXTERIOR QUALITY

Evaluating eggs for exterior quality reduces the number of eggs with defects that detract from the eggs' appearance or that would have a low probability of surviving the rigors of handling in normal market channels. In other words, we want the consumer to have clean, unbroken eggs with practically normal shape and texture. Contestants should not be too harsh in assigning a grade to eggs that may have minor defects. This is especially important when judges have gained experience in evaluating eggs with various degrees of abnormalities. Shell color does not affect the quality of the egg and is not a factor in the U.S. standards and grades. Eggs are usually sorted for color and sold as either "whites" or "browns." For the 4-H poultry judging contest exterior egg classes, all chicken eggshell colors can be used.

Table 1 summarizes the descriptive terminology used in the USDA Egg Grading Manual to help determine an egg's grade by exterior quality. Grades AA and A have identical standards for exterior quality. For 4-H poultry judging contests, therefore, eggs will be assigned the grades of A, B, Dirty, or Loss. The factors that affect exterior quality are discussed below. Eggs graded for exterior quality cannot be handled during the contest. Since contestants are not able to handle the eggs, the eggs are placed sideways on egg cartons and contestants must assume the unseen side is free of any stains, adhering material, cracks, or defects.

Table 1. USDA standards for grading grading exterior quality of market eggs

FACTOR	GRADE			
	AA/A	B	DIRTY	LOSS
STAIN	Clean - may show small specks, stains, or cage marks that do not detract from general clean appearance of the egg; may show traces of processing oil	Slight to moderate localized stain covering less than 1/32 of shell or scattered stains covering less than 1/16 of shell	Prominent stains or Slight to moderate localized stain covering more than 1/32 of shell or scattered stains cover more than 1/16 of shell surface	N/A
ADHERING DIRT OR FOREIGN MATERIAL	N/A	N/A	Any adhering dirt or foreign material	N/A
EGG SHAPE	Approximately the usual egg shape	Unusual or decidely misshapened (long, round, or distorted)	N/A	N/A
SHELL TEXTURE	May have rough areas and small calcium deposits that do not materially affect shape or strength	Extremely rough area that may be faulty in soundness or strength May have large calcium deposits	N/A	Checked: Broken or cracked shell, but membranes intact, no leaking Leaker: Has broken or cracked shell with membranes broken and contents leaking or free to leak
RIDGES	Slight ridges that do not materially affect shape or strength	May have pronounced ridges	N/A	N/A
SHELL THICKNESS	Free of thin spots	May show pronounced thin spots	N/A	N/A
BODY CHECKS	Absence of body checks	May show pronounced body checks	N/A	N/A

CLEANLINESS

Grade A eggs must be clean (see Figure 1). Grade A eggs may show small specks, stains, or cage marks that do not detract from the general clean appearance of the egg. Grade A eggs can also show traces of processing oil (used to preserve freshness). The processing oil may create a shiny or opaque appearance.

'Cage marks' is the term used to refer to dirty marks, dirty lines, or translucent lines on the shell when eggs are collected (see Figure 2). Dirty marks or lines are due to rusty or dirty wires in the cage floor or egg roll-out trays. Translucent lines result when the shell fails to dry out quickly after laying. Grade A eggs may show small cage marks that do not detract from the general appearance of the egg. Darker cage marks that do detract from the appearance of the egg would be Grade B. Eggs with large cage marks having a 3-dimensional appearance would be considered dirty eggs.

Figure 1. Clean, normal shaped white and brown shelled eggs. Photo credit: USDA

Small cage marks not affecting the appearance: Grade A

Small, translucent cage mark not affecting appearance: Grade A

Small cage marks with a clear 3D appearance: Dirty egg

Figure 1. Examples of eggs with cage marks
Photo credit: Dr. Jacqueline Jacob, University of Kentucky

Any eggs with slight to moderate stains can be Grade B or dirty depending on the number and size of the stains. If there is a single stain, it is referred to as a localized stain. A Grade B egg can have a slight to moderate stain that covers less than 1/32nd of the entire shell (see Figure 3 for relative sizes). If there are two or more stains, these are referred to as scattered stains. The amount of stain is added up, and if the total covers less than 1/16th of the entire shell, it is a Grade B egg. Any eggs with slight to moderate stains covering an area larger than these allowed amounts are classified as dirty eggs. All prominent stains are considered dirty eggs. See Figure 4 for eggs with various levels of stain(s) on the eggshells.

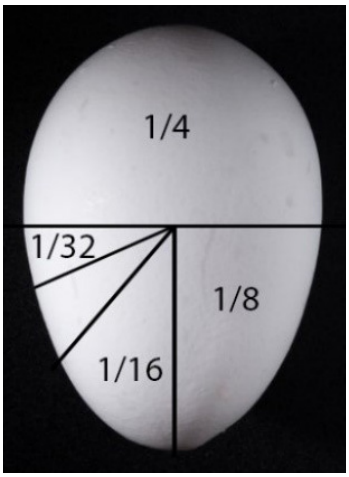

Figure 2. Marked egg showing the amount of shell for 1/16 and 1/32 Image credit: Developed by Dr. Jacqueline Jacob, University of Kentucky from image supplied by USDA

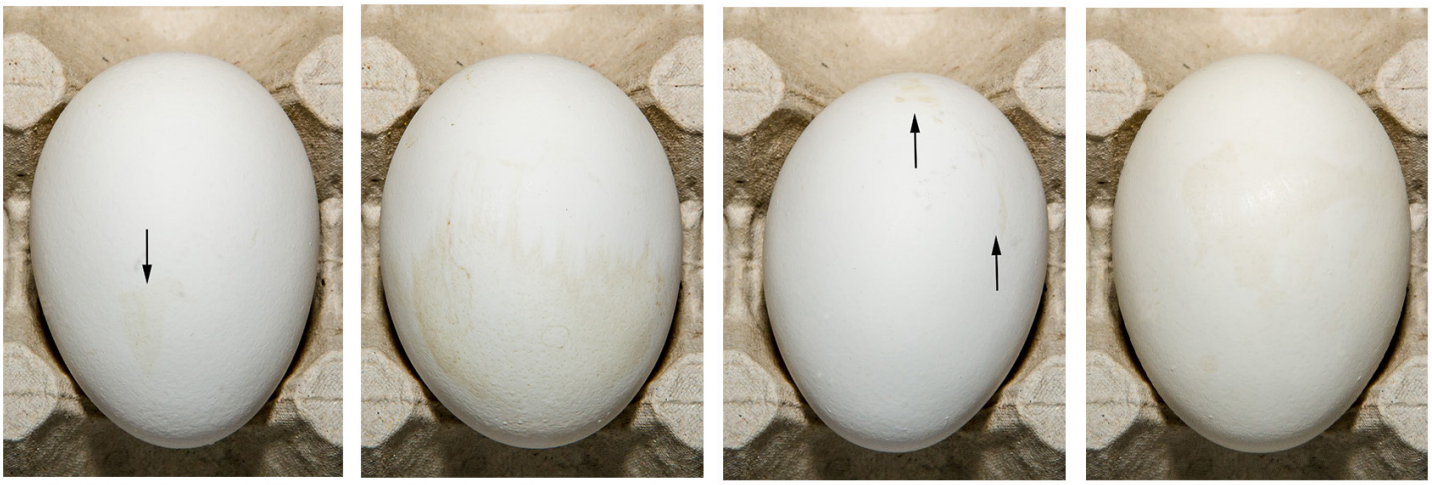

Figure 4. Examples of eggs with various numbers (localized and scattered) and sizes of stains resutling in different egg grades. Photo credit: Dr. Jacqueline Jacob, University of Kentucky

Eggs with adhering material (3-dimensional) larger than a speck (approximately 1.0 mm) should be classified as dirty. Small specks of dust, eyelashes, pencil marks, or lint that may have settled out of the air should not be considered. An attached feather, however, would be considered adhering material. See Figure 5 for examples of eggs with adhering material.

Figure 4. Examples of eggs with adhering material (left to right: manure, feather, and egg yolk) Photo credit: Dr. Jacqueline Jacob, University of Kentucky

SHAPE

A considerable range of egg shapes may be considered “approximately the usual shape” or Grade A (see Figure 1). Eggs that are spherical (round) or too long to fit in the egg carton should be graded B quality (see Figure 6). B quality grade for egg included eggs that are clearly misshapen or that have definite flat areas.

Figure 6. Examples of Grade B eggs for being too round or too long.
Photo credit: Dr. Jacqueline Jacob, University of Kentucky

TEXTURE

Eggs with faulty texture are much weaker in shell strength and maybe broken during distribution. Occasionally calcium deposits will appear on eggshells. Unlike stains, however, the calcium deposits are not added together. If the calcium deposits on an egg are less than 1/8th inch in diameter the egg is Grade A. There is no standard for the number of calcium deposits allowed on an egg, which means that an egg with small calcium deposits over the entire shall be classified as Grade A, as long as all the calcium deposits are each less than 1/8th inch in diameter (see Figure 7).

If any of the calcium deposits are larger than 1/8th inch in diameter, the egg is classified as Grade B. A good rule of thumb is that if you were to run your fingernail across a calcium deposit and a good size hole would be created if it came off, then the egg would be classified as Grade B. Eggs with any calcium deposit greater than 1/8th inch are Grade B.

Figure 6. Examples of eggs with various numbers and sizes of calcium deposits
Photo credit: Dr. Jacqueline Jacob, University of Kentucky

Grade A eggs may have slight rough areas to the shell that do not materially affect egg shape or the strength of the shell. Eggs with extremely rough areas that may be faulty in soundness or strength are Grade B (see Figure 8).

An egg that has a broken shell or a crack in the shell, but its shell membranes are intact, and egg contents do not leak, is considered checked and should be classified as a Loss. An egg that has a crack or break in the shell and the egg contents are exuding or free to exude through the shell, are considered as leakers and should be classified as a Loss. **The national 4-H poultry judging contest does not use leakers.**

Figure 6. Grade B eggs because of extreme roughness of shell
Photo credit: Dr. Jacqueline Jacob, University of Kentucky

RIDGES

Ridges can result in weakened shells. Many eggs show small ridges, and most of these should be classified as Grade A. Those eggs with large ridges are Grade B (see Figure 9).

Figure 9. Examples of Grade B eggs because of shell ridges.
Photo credit: Dr. Jacqueline Jacob, University of Kentucky

SHELL THICKNESS

The shell should appear thick enough to withstand reasonable handling without breaking. Grade A eggs must have thick shells with no thin spots. Thin shells or thin spots would place an egg in Grade B. In all cases, the shell must not be broken. The thin spots can be large or small as in Figure 10. Small thin spots are referred to as 'windows.' To be considered a window, the thin spot must be three dimensional. It is important that cage marks (see Figure 2) not be confused for windows.

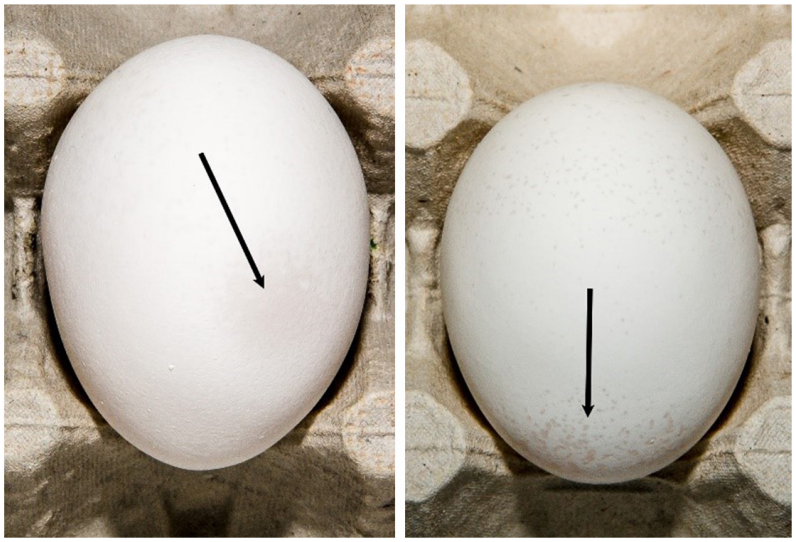

Figure 10. Examples of Grade B eggs for shell thickness.
Photo credit: Dr. Jacqueline Jacob, University of Kentucky

BODY CHECKS

Body checks can cause weakened shells. This is a condition in which the eggshell looks like it is cracked but the shell is intact. Body check occurs during shell formation when the shell is cracked and then partially calcified before being laid. An egg with body check is classified as Grade B. When candled (see Figure 11), the shell can be seen to be intact, but weak.

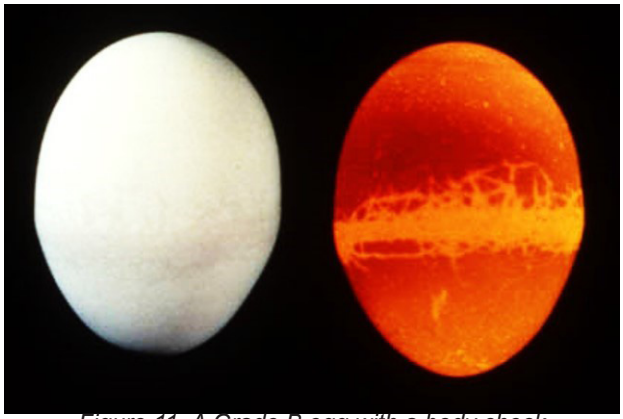

Figure 11. A Grade B egg with a body check
and what it looks like when candled
Photo credit: USDA