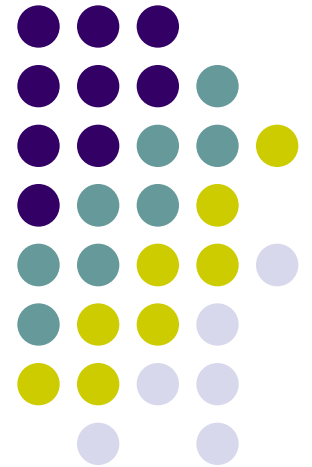


Egg Processing



Egg Processing Systems

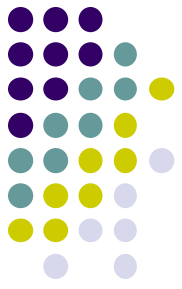


- In-Line Processing
 - Egg processing occurs at the same location as the egg production facility.
 - This processing method is the most efficient egg collection and processing of eggs available. Eggs are delivered from the egg production facility to the egg processing facility by an enclosed and refrigerated conveyor system.
- Egg handling and processing is performed with automated equipment.

Egg Processing Systems



- Off-Line Processing
 - Egg processing occurs separate from the egg production facility.
 - This processing method utilizes *satellite* farms. Satellite farms are egg production facilities that are located at a different location from the egg processing facility.
 - Eggs produced at satellite farms must be gathered and delivered to the egg processing facility.
 - Egg handling and gathering is performed with automated equipment.



Egg Processing

Conveyor

Egg Production



In-line egg processing

Off-line egg processing



Egg gathering

Egg Processing Systems



- Care of eggs on the farm
 - Regardless of on-line or off-line processing, steps are taken to maintain egg quality on the farm.
 - These include, but are not limited to, egg collection occurring several times daily, careful egg handling procedures, egg cooling, egg cleaning, and use of clean packaging materials.

Processing Functions



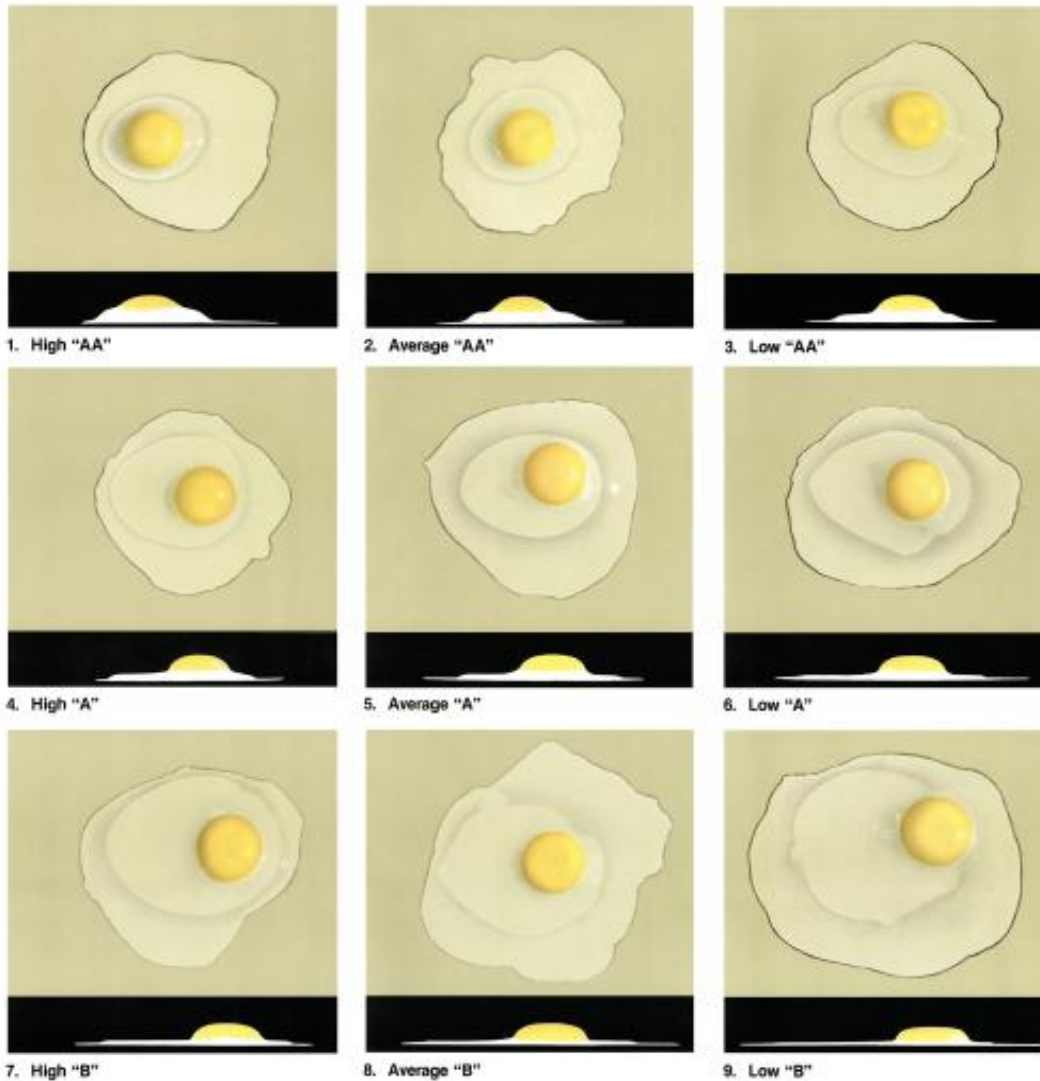
- **Cleaning the Eggs**
 - All eggs in the United States are washed in warm water with a mild detergent in order to remove any contaminants (manure, grease, blood, yolk, etc.) before they are sold for human consumption.
 - Eggs are dried to remove an excess moisture prior to packaging.
 - Removal of contaminants prevents egg spoilage by bacteria.
 - Eggs that are not cleaned or contain defects are removed from the processing line and are not packaged for human consumption.

Processing Functions



- Grading
 - Grading refers to the process of grouping eggs according to similar characteristics, such as quality and weight.
 - Egg grading is performed by trained professionals from the United States Department of Agriculture (U.S.D.A.).
 - The USDA has a stringent set of requirements for the grading of fresh shell eggs.
 - Egg grading is dependent upon examination of internal quality factors (e.g., condition of the egg white and yolk, air cell size).

U.S.D.A. Grading Diagram



Processing Functions



- Grading Continued
 - Internal quality factors can also be determined by candling.
 - Candling involves holding the egg to a concentrated light source for visual inspection of internal defects, such as blood spots or double yolks.

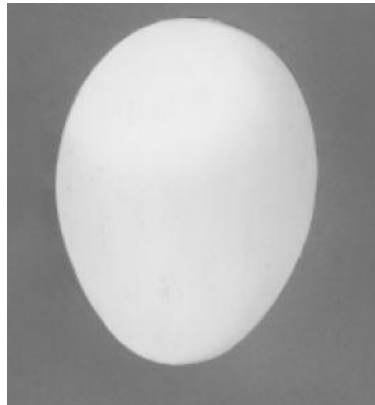
Processing Functions



- Grading Continued
 - Egg grading is also dependent upon external quality factors (e.g., shape, texture, cleanliness, and soundness of the shell).
 - An egg with a AA grade contains the most desirable characteristics while an egg with a B grade contains the least desirable characteristics.
 - External quality can be determined by candling for illumination and detection of egg shell cracks.



Candling



Ideal egg shape.



Abnormal egg shape.



U.S.D.A. Grading Factors

SPECIFICATIONS FOR EACH QUALITY FACTOR			
Quality Factor	AA Quality	A Quality	B Quality
Shell	Clean Unbroken. Practically Normal.	Clean Unbroken. Practically Normal.	Clean to slightly stained.* Unbroken. Abnormal.
Air Cell	1/8 inch or less in depth. Unlimited movement and free or bubbly.	3/16 inch or less in depth. Unlimited movement and free or bubbly.	Over 3/16 inch in depth. Unlimited movement and free or bubbly.
White	Clear. Firm.	Clear. Reasonably firm.	Weak and watery. Small blood and meat spots present.**
Yolk	Outline slightly defined. Practically free from defects.	Outline fairly well defined. Practically free from defects.	Outline plainly visible. Enlarged and flattened. Clearly visible germ development but no blood. Other serious defects.



Processing Functions

- Size Determination
- Sizes are determined by weight. There are six different weight categories: peewee, small, medium, large, extra large, and jumbo. Each size category receives a different price on the farm as well as at the retail level.
 - Minimum Average Weight for one dozen eggs
 - Peewee: 15 ounces
 - Small: 18 ounces
 - Medium: 21 ounces
 - Large: 24 ounces
 - Extra Large: 27 ounces
 - Jumbo: 30 ounces

Processing Functions



- Packaging
 - Eggs are packaged into a variety of containers designed for safe shipment and enhanced product appearance for the consumer.
 - *Loose packaging* is a simple way of moving large quantities of eggs in an efficient but also simple fashion. *Loose packaging* usually refers to either a thirty egg large or extra large *flat*, or a twenty egg jumbo *flat*. Loose sales mostly consist of sales to restaurants or other large quantity consumers.

Processing Functions



- Packaging Continued
 - In retail settings, eggs are often packaged in cartons containing either one dozen or eighteen eggs.
 - This packaging method is designed to be handled by the final consumer and is therefore usually designed to be quite appealing.
 - There are several different varieties of eggs available to the consumer, called *designer eggs* by the industry.

Care and Handling



- Refrigeration
 - Eggs must be cooled to a *core temperature* of 45 °F.
 - Eggs held prior to processing must also be cooled.
 - All eggs being transported must be hauled in a refrigerated trailer so that the *core temperature* is held constant at 45 °F.

Care and Handling



- Mechanical Handling
 - Eggs are moved using conveyor systems between the production facility and the *processing plant*.
 - The processing machinery is fully mechanical and most of the equipment on commercial farms works to wash, dry, sort by weight and quality, and package the eggs into specified packaging.
 - Once eggs are consolidated to pallets, fork lifts are used to handle the product.



Labeling

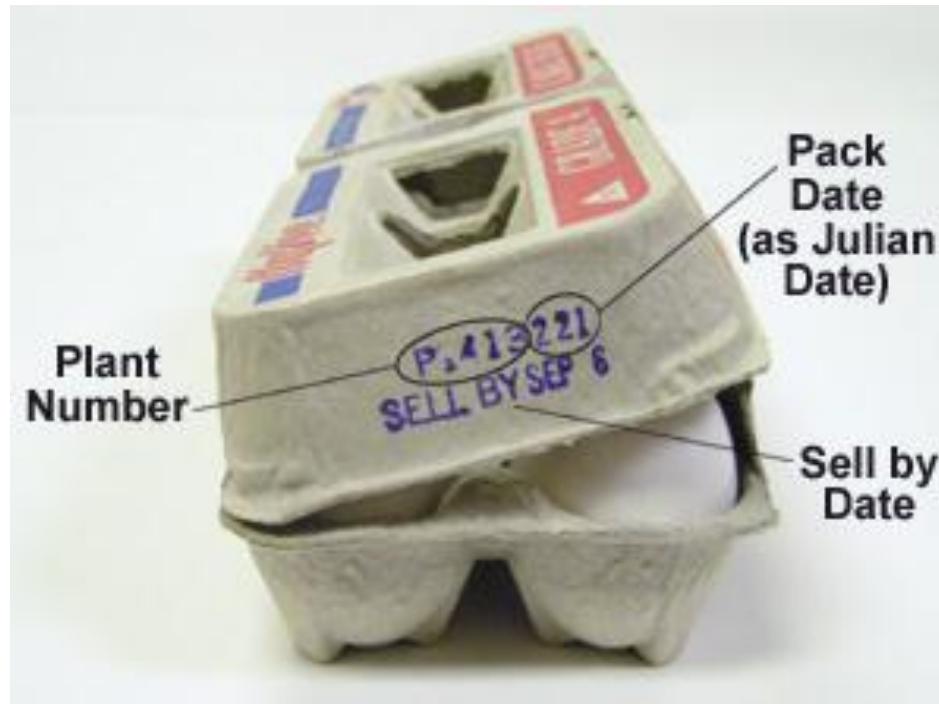
- **Sell by Date**
 - Every individual package of eggs processed must contain a sell by date that is set from the date of processing.
- **Julian Date**
 - This is the three digit day number relative to the day in the year the eggs were processed. This date is calculated with January 1 as 001 and December 31 as 365. This date is listed next to the plant code.

Labeling



- Grade
 - Both the size of the eggs and the level of quality are printed on the carton. Most fresh shell eggs are signified by an A or AA grade.
- Plant Code
 - A code is printed on every carton produced in a processing plant. Each plant has its own individual code so that if there is a need to find the origin of the finish product, it can be traced all the way back to the processing plant.

Carton Labeling



Labeling



- **Nutritional Facts**
 - Nutritional information is printed on every package for retail sale. This information varies slightly depending on the egg size and also the type of egg (designer eggs).
- **“Keep Refrigerated”**
 - All egg packages are labeled with a cautionary “keep refrigerated” label. Refrigeration helps reduce the growth of salmonella or other bacteria.

Labeling



- U.E.P. “Animal Care Certified”
 - Nationwide many egg farmers have voluntarily joined the United Egg Producers (U.E.P.), which develops regulations to ensure the overall welfare of chickens being used for egg production. When a farm becomes “Animal Care Certified”, this label informs the consumer that the product was produced in accordance with accepted animal welfare standards.