ISSUED FOR COMMENTS ONLY	CROSQ FINAL Draft

FINAL DRAFT

CARICOM STANDARD

FOR

Grading and Quality
Requirements for Table Eggs

This is a draft and should not be regarded
or used as a CARICOM Standard

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6 August 2004

Robert Best
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23 Farrell Flats
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Trinidad and Tobago

Dear Mr Best:

Attached is the Final DRAFT CARICOM Standard for Table Eggs that was submitted to COTED 17 for approval.

The COTED agreed that member states needed more time to review the standard, and that the standard would be tabled for approval at the next COTED meeting in November 2004.

Mr Ken Mullins asked me to forward it to you.

Sincerely,

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0. FOREWORD

0.1 This standard was developed as an initiative of the Caribbean Poultry Association in response to the need to harmonise standards governing egg production and marketing within CARICOM. Representatives of several national associations and standards bureaus were involved in the discussions leading to the elaboration of the standard.

0.2 In the development of the standard, assistance was obtained from representatives of regulatory agencies of the USA and Canada as well as through reference to the following documents:

- USDA Egg-Grading Manual
- Regulations Governing the Voluntary Grading of Shell Eggs (7 CFR PART 56)
- United States Standards, Grades, and Weight Classes for Shell Eggs (AMS 56)
- Canadian Egg Regulations
- Trinidad and Tobago Standards for the Production and Safe Handling of Table Eggs
- Jamaican Standard Specification for Grading and Labelling of Table Eggs; JS 177:1989
- Jamaican Standard Specification for Table Eggs: Quality requirements: JS 246: 1992.

1. SCOPE

1.1 This standard establishes specifications for:

- Grading criteria and grades;
- Weight classification;
- Labelling requirements; and
- Sampling protocols and methods of test

Applicable to table eggs which are prepackaged, distributed and offered for sale in the retail trade in CARICOM.

1.2 This standard also establishes labelling requirements for processed egg products, which are prepackaged, distributed and offered for sale in CARICOM.

2. DEFINITIONS

For the purposes of this standard, the following definitions shall apply:

2.1 Grading - means the classification of individual eggs on the basis of quality assessment according to established standards.

2.2 Grade mark - means the mark or letter used in describing the grade of eggs.

2.3 Prepackaged - means packaged in advance of sale in the final pack in which the table eggs are intended for retail sale.

2.4 Table eggs – means unfertilised eggs laid by the domestic chicken, *Gallus domesticus,* which are intended to be used as food.

2.5 Air cell - means the air space between shell membranes.

2.6 Albumen - means the white of the egg.

2.7 Candling - means the process of examining the interior condition of an egg by rotating or causing the egg to rotate in front of or over a light source that illuminates the contents of the egg.

2.8 Egg case - means a shipping container for egg cartons or egg flats normally holding 30 dozens shell eggs.

2.9 Egg carton - means a container that is capable of being closed and that is made to contain not more than 30 eggs in separate compartments.

2.10 Egg flat - means an open commercial container normally holding two and a half dozen eggs.

2.11 Haugh unit - means the relationship between the albumen height and the weight of the egg, after correcting for difference in egg size.

2.12 Inedible eggs - means eggs, which are deemed unfit for human consumption. Conditions, which lead to this designation, are described in Appendix A.

2.13 Leaker - means an individual egg, which has a crack or break in the shell and shell membranes, with the result that the egg contents are exuding or are free to exude through the shell.

2.14 Loss - means an egg, which is inedible, cooked, frozen, contaminated, or one which contains bloody whites, large blood spots, large unsightly meat spots or other foreign material.

2.15 Quality - means the inherent properties of any product, which determines its relative degree of excellence.

2.16 Shell - means the hard outer calcareous envelope of the egg.

2.17 Yolk - means the yellow, oval internal part of the egg surrounded by the albumen white.

3. GRADE REQUIREMENTS

3.1 An egg may be graded A if, in addition to meeting relevant national regulatory requirements for the production of table eggs,

(a) the egg shows, on candling

(i) a reasonably firm albumen,

(ii) an indistinct yolk outline,

(iii) a round yolk that is reasonably well centred, and

(iv) an air cell that is not in excess of 5 mm in depth; and

(b) the shell

(i) has not more than three stain spots, the aggregate area of which does not exceed an area equivalent to 25 mm^2 and the shell is otherwise free of dirt and stain;

(ii) is normal or nearly normal in shape, but may have rough areas and ridges other than heavy ridges; and

(iii) is not cracked.

3.2 Notwithstanding the requirements set out in section 3.1, where an inspector at a grading station inspects a sample from a lot which is presented for the purpose of being graded, the eggs in that lot shall not be graded as A unless the sample meets the following specifications:

(a) the quality factor of albumen firmness of the eggs in the sample averages 67 Haugh units or higher;

(b) the sample does not contain more than

(i) 10% of eggs with cracked shells,

(ii) 5% of eggs with dirt on the shells where the dirt on the shell is more than 160 mm^2 in size but covers less than 33% of the area of the shell,

(iii) 2.5% of eggs with dirt on the shells where the dirt covers 33% or more of the area of the shell,

(iv) 5% of eggs with stains on the shells where the stains cover more than 50% of the area of the shell,

(v) 10% of eggs with rough, ridged or misshaped shells,

(vi) 5% of eggs with an air cell in excess of 5mm in depth, and

(vii) 2.5% of eggs that are leakers; and

(c) the sample does not contain more than a total of 15% of eggs described in (b)(i) to (b)(vii).

3.3 An egg may be graded as B if, in addition to meeting relevant national regulatory requirements for the production of table eggs,

(a) the egg

(i) does not meet the requirements for the grade A eggs, and
(ii) is not cracked; and

(b) (i) shows on candling a distinct yolk outline,

(ii) shows on candling a yolk that is moderately oblong in shape and that freely floats within the egg when whirled,

(iii) shows on candling a very slight degree of germ development,

(iv) shows, on candling , an air cell not in excess of 9mm in depth,

(v) shows spots of dirt on the shell, if the aggregate area of the dirt does not exceed 40mm^2 and stain spots, if the aggregate area of the stain does not exceed 320mm^2 , or

(vi) has a shell that is slightly abnormal in shape and has rough areas and definite ridges.

3.4 An egg may be graded as C if, in addition to meeting relevant national regulatory requirements for the production of table eggs,

(a) the egg is free from dirt

(b) the egg

(i) shows on candling a prominent yolk outline,

(ii) shows, on candling, a yolk that is definitely oblong in shape but does not adhere to the shell membrane,

(iii) shows, on candling, meat spots or blood spots not in excess of 3mm in diameter,

(iv) shows stain spots on the shell, the aggregate area of which does not exceed 33% of the shell surface, or

(v) has a shell that is cracked, if the internal contents are not leaking; and

(c) the egg is conveyed to a registered processed egg station

3.5 Subject to item 3.6, eggs may be graded Nest Run if the eggs

(a) meet the national regulatory requirements for the production of table eggs; and

(b) are conveyed to a registered egg station, at a separate location from the place of production, or a registered processed egg station.

3.6 Not withstanding item 3.5, eggs in a lot shall not be graded as Nest Run unless the lot meets the following specifications:

(a) the lot does not contain more than

(i) 10% of eggs with cracked shells,

(ii) 5% of eggs with dirt on the shells where the dirt is more than 160mm^2 in size, and

(iii) 3% of eggs that are leakers or rejects; and

(b) the lot does not contain more than a combined total of 15% of eggs described in paragraph (a).

(c) A minimum of 85% of the lot are A quality eggs; and

(d) No individual case contains less than 75% A quality.

3.7 Egg quality parameters applicable to eggs, which are subjected to grading, are described in Appendix B.

4. Weight Designation Requirements

4.1 Weight Classification

4.1.1 Table 1 sets out the weight classification to be used.

Table 1. Weight classification of table eggs

Classification	Label representation	Minimum net weight per dozen eggs g (oz)	Minimum net weight per half-dozen eggs g (oz)
Jumbo	J	850 (30)	425 (15)
Extra Large	XL	766 (27)	383 (13.5)
Large	L	680 (24)	340 (12)
Medium	M	596 (21)	298 (10.5)
Small	S	510 (18)	255 (9)
Extra Small	XS	426 (15)	213 (7.5)

Note: A lot-average tolerance of 3.3% for individual eggs in the next lower weight class is permitted as long as no individual case within the lot exceeds 5%.

5. PACKAGING

5.1 Table eggs may be packaged in various formats up to a maximum of 30 per container.

5.2 Table eggs shall be packed with their small ends facing downwards, either in egg cartons, moulded trays or other appropriate containers approved by the competent authority.

5.3 Packing material shall be shock resistant, dry, clean and in good condition. It shall be made of materials, which protect the eggs from extraneous odour(s) and undue risk of quality deterioration.

5.4 Large packs, used for transporting and dispatching eggs, including inner packing materials, shall not be re-used unless they are as new and meet the requirements of the preceding paragraph. Re-used large packs shall not bear any visible markings from their previous use, which may confuse or mislead consumers.

5.5 Small packs shall not be re-used.

6. LABELLING

6.1 Each package of table eggs shall bear the following label declarations in addition to the requirements of the Codex Alimentarius and CARICOM General Standards for the Labelling of Prepackaged Foods:

(i) The brand or trade name;

(ii) The name of the product, **Table Eggs,** preceded where appropriate, by one of the descriptive terms listed in Appendix B-5;

(iii) An accurate statement of minimum net weight, in metric units, and number of eggs;

(iv) The name and business address of the packer or distributor;

(v) The "Best Before" date and the required storage instructions;

(vi) The following statement in bold type of not less than 3mm in height: "It is recommended that all table eggs should be kept properly refrigerated until used".

6.1.1 The following additional information is required for all prepackaged eggs:

(a) At least one exposed surface of every pack for retail sale shall bear one of the weight classifications listed in Table1.

(b) Where two letters are used to designate the weight classification, there shall be no letter space between them.

(C) Each package shall bear an appropriate grade designation.

6.2 Labelling of Containers of Shell Eggs for Importation

6.2.1 Immediate containers of product offered for importation shall bear a label, printed in the official language of the country of importation, showing:

(i) The name of the product, **Table Eggs,** preceded where appropriate, by one of the descriptive terms listed in Appendix B-5;

(ii) The name of the country of origin of the product, preceded by the words "Product of", which statement shall appear immediately under the name of the product;

(iii) The Grade and Weight designation;

(iv) The date of pack;

(v) The "Best before" date;

(vi) The expression "Keep Properly Refrigerated" or words of similar meaning;

(vii) The name of the packer and the place at which the packing is done, in the country of origin, as well as the local distributor; qualified by a phrase which reveals the connection, which the person(s) has with the product;

(viii) An accurate statement of the quantity.

6.3 Where either nutrition or health claims are made with respect to table eggs, the retail package shall provide a complete nutrition labelling declaration. Only claims, which satisfy the Codex Alimentarius Guidelines on Claims shall be permitted.

6.4 Labelling of Processed Eggs and Egg Products

6.4.1 Consumer packages of processed egg products shall comply with the requirements of relevant Standards for the Labelling of Prepackaged Foods as adopted by the Codex Alimentarius Commission and CROSQ.

6.4.2 Where either nutrition or health claims are made with respect to these products, the package containing the product shall provide a complete nutrition labelling declaration. Only claims, which satisfy the Codex Alimentarius Guidelines on Claims shall be permitted.

6.5 Grade Marking

6.5.1 The Grade A distinguishing mark shall be a circle of at least 12 mm in diameter, with the letter A in the center in Roman font and having a minimum height of 10mm.

6.5.2 The Grade B distinguishing mark shall be a circle of at least 12mm in diameter, with the letter B in the center in Roman font and having a minimum height of 10mm.

6.5.3 No grade designations other than those specified in this standard shall be used.

6.6 Each package shall bear a producer registration number, issued by the competent authority, consisting of 3 digits and with a height of at least 5mm.

7. Hygiene Requirements

7.1 Table eggs should be handled in accordance with the requirements of the Codex General Principles of Food Hygiene, the Caribbean Poultry Association 'On-Farm Food Safety Program', and other relevant Codes of Practice specified by the competent authority .

APPENDIX A

INEDIBLE EGGS

A-1 Eggs are deemed to be inedible if any of the following conditions exist:

- Black rots
- Yellow rots
- White rots
- Mixed rots (addled eggs)
- Sour eggs
- Eggs with green whites
- Eggs with stuck yolks
- Mouldy eggs
- Eggs showing blood rings
- Eggs containing embryo chicks (at or beyond the blood ring stage)
- Adulterated eggs

APPENDIX B

EGG QUALITY PARAMETERS

B-1 AIR CELL

B-1.1 *Depth of air cell* is the distance from the top of the air cell to its bottom when the egg is held with the air cell upward.

B-1.2 *Free air cell* is an air cell, which moves freely towards the uppermost point in the egg as the egg is rotated slowly.

B-1.3 *Bubbly air cell* is the condition, which develops when the air cell becomes ruptured, resulting in one or more small separate air bubbles usually floating beneath the main air cell.

B- 2 ALBUMEN

B-2.1 *Clear* means free from discolourations or from any foreign bodies floating in it.

B-2.2 *Reasonably firm to firm to* (A Quality). This refers to situations where the albumen ranges in thickness from being sufficiently thick or viscous, to prevent the yolk from being more than slightly defined or distinctly indicated when the egg is twirled, to a degree of thickness which allows the yolk to approach the shell more closely, resulting in a fairly well defined yolk outline.

B-2.3 *Weak and watery* (B & C Quality). This refers to a condition where the albumen is weak, thin and generally lacking in viscosity. It allows the yolk to approach the shell closely, thus causing the yolk outline to appear plainly visible and dark.

B-2.4 *Bloody white.* This is a condition where the egg has blood diffused throughout the white. These are classed as “loss”. Eggs with blood spots, which show a slight diffusion into the white around the localized spot are not to be classed as bloody whites.

B-2.5 *Blood spots or meat spots.* Small blood spots or meat spots aggregating not more than 3mm in diameter may be classified as B or C quality. If larger, or showing diffusion of blood into the white surrounding a blood spot, the egg may be classified as “loss”. Blood spots shall not be due to germ development. They may be on the yolk or in the white. Meat

spots may be blood spots, which have lost their characteristic red colour or tissue from the reproductive organs.

B- 3 YOLK

B- 3.1 *Outline slightly to fairly well defined* (A Quality). This is a yolk outline that ranges from being indistinctly indicated, appearing to blend into the surrounding white, to being discernible but not clearly defined, as the egg is twirled.

B- 3.2 *Outline plainly visible* (B & C Quality). This refers to a yolk outline, which is clearly visible as a dark shadow when the egg is twirled.

B- 3.3 *Enlarged and flattened.* This is a condition of the yolk in which its membranes and tissues have weakened and/or moisture has been absorbed from the white to such an extent that the yolk appears definitely enlarged and flat.

B- 3.4 *Practically free from defects* (A Quality). This refers to a yolk, which shows no germ development but which may show other very slight defects on its surface.

B- 3.5 *Serious defects* (B & C Quality). This refers to a yolk, which shows well-developed spots or areas and other serious defects, such as olive yolks, which do not render the egg inedible.

B- 3.6 *Clearly visible germ development* (B & C Quality). This refers to the development of the germ spot on the yolk of a fertile egg, which has progressed to a point where it is plainly visible as a definite circular area or spot with no blood in evidence.

B- 3.7 *Blood due to germ development* is blood, which has been caused by development of the germ in a fertile egg to the point where it is visible as definite lines or as a blood ring. Such an egg is classified as inedible.

B- 4. SHELLS

B- 4.1 *Clean* means free from foreign materials and from stains or discolourations that are readily visible. An egg may be considered clean if it has only very small specks or stains, if such specks or stains are not in sufficient numbers or intensity to detract from the generally clean appearance of the egg.

B- 4.2 *Moderately-stained* means a shell, which is free from adhering dirt but which has stains of moderate degree covering not more than one quarter of the shell surface.

B- 4.3 *Practically normal* (A Quality). This refers to a shell, which approximates the usual shape and is sound and free from thin spots. Ridges and rough areas, that do not materially affect the shape and strength of the shell, are permitted.

B- 4.4 *Abnormal* (B Quality). This refers to a shell, which may be somewhat unusual or decidedly misshaped or faulty in soundness or strength. It may show pronounced ridges and thin spots.

B- 4.5 *Dirty* (C Quality). This refers to an egg, which has an unbroken shell, with adhering dirt or foreign material, prominent stains or moderate stains covering more than 3% of the shell, if localized, or 6% of the shell if scattered.

B- 4.6 *Check* (C Quality). This refers to an egg, which has a broken shell or a crack in the shell but with its shell membranes and contents intact. A "check" is lower in quality than a "dirty".

B-5 SHELL EGGS

B- 5.1 *Sound eggs.* This refers to eggs with unbroken shells, whose internal qualities render them fit for human consumption.

B- 5.2 *Nest Run eggs.* These are eggs, which are packed as they come from the production facilities without having been washed, sized or candled for quality, with the exception of some checks, dirties and other obvious under-grades having been removed.

B- 5.3 *Refrigerated eggs.* These are eggs, which have been held continuously at temperatures lower than 7.2 C from the time of their initial cooling, which is done in conformance with the national regulations and relevant codes of practice.

B- 5.4 *Shell protected eggs.* This refers to eggs, which have had a protective covering such as mineral oil applied to the shell surface. The oil shall comply with the requirements set out in Appendix C.

B-5.5 *Specialty Eggs.* These are eggs, which may be slightly different in nutrient value from regular table eggs, or they may be obtained from hens housed or fed in a special way.

B-5.5.1 *Premium Quality Eggs.* These are eggs, which are specially selected from young hens at the peak of their laying cycle. These eggs exceed the requirements for Grade A eggs and are characterised by stronger shells and thicker whites.

B-5.5.2 *Free Run Eggs.* These are eggs, which are produced by hens that are able to move about the floor of the barn and have access to nesting boxes and perches.

B-5.5.3 *Free Range Eggs.* These are eggs, which are produced in a similar environment as free run eggs but hens have access to outdoor runs as well.

B-5.5.4 *Organic Eggs.* These are eggs produced in an organic production system, in which hens are fed certified organic feeds. Organic production systems are required to operate under the regulatory oversight of a competent authority and the eggs are required to bear an appropriate "certified organic" designation and the name of the certifying agency.

B-5.5.5 *Vegetarian Eggs.* These are eggs produced by hens, which are fed a diet containing only ingredients of plant origin.

B-5.5.6 *Omega-3 Enhanced Eggs.* These are eggs from hens, which are fed a diet containing 10% to 20% flaxseed. They contain 0.4 g omega-3 fatty acids, compared to 0.04 g in regular table eggs.

B-5.5.7 *Vitamin-Enhanced Eggs.* These are eggs from hens, which are fed a nutritionally-enhanced diet containing higher levels of certain nutrients (e.g., vitamin E, folate, vitamin B_6 and vitamin B_{12}). As a result, the eggs produced contain higher levels of these nutrients.

Table 2. Summary of Standards for Quality of Individual Shell Eggs

Quality factor	A Quality	B Quality	C Quality
Shell	Clean Unbroken Practically normal	Clean to slightly stained Unbroken Abnormal	Clean to moderately stained Unbroken Abnormal
Air Cell	4 mm or less in depth. Unlimited movement and free or bubbly	10 mm or less in depth. Unlimited movement and free or bubbly.	May be more than 10 mm in depth. Unlimited movement and free or bubbly.
Albumen	Clear Reasonably firm to firm. Haugh unit value of 60 or higher when measured at a temperature between 7.2C and 15.5C	Clear May be slightly weak and watery. Haugh unit value of 31 to 60 when measured at a temperature between 7.2C and 15.5C	Outline may be plainly visible. May be weak and watery. Small blood clots or spots may be present. Haugh unit value of less than 31 when measured at a temperature between 7.2C and 15.5C
Yolk	Outline slightly to fairly well defined. Practically free from defects.	Outline may be well defined, dark, enlarged and flattened. May show definite but not serious defects. Small blood spots or meat spots (aggregating not more than 3 mm in diameter) may be present.	Outline is plainly visible, enlarged and flattened. May show clearly visible germ development but no blood. May show other defects.

B-6. Tolerances Within Grades.

B-6.1 Consumer Grade A (at origin)

This shall consist of eggs that are at least 87% A quality. Within the maximum tolerance of 13% that may be below A quality, not more than 1% may be B quality due to air cells over 9.5 mm, blood spots aggregating not more than 3.2 mm in diameter, or serious yolk defects. Not more than 5% (7% for Jumbo size) checks are permitted and not more than 0.5% leakers, dirties, or loss (due to meat or blood spots) in any combination, except that such loss may not exceed 0.3%. Other types of loss are not permitted.

B-6.2 Consumer Grade A (at destination)

This shall consist of eggs that are at least 82% A quality. Within the maximum tolerance of 18% that may be below A quality, not more than 1% may be B quality due to air cells over 9.5 mm, blood spots aggregating not more than 3.2 mm in diameter, or serious yolk defects. Not more than 7% (9% for Jumbo size) checks are permitted and not more than 1% leakers, dirties, or loss (due to meat or blood spots) in any combination, except that such loss may not exceed 0.3%. Other types of loss are not permitted.

B-6.3 Consumer Grade B (at origin)

This shall consist of eggs that are at least 90% B quality, not more than 10% may be checks, and not more than 0.5% leakers, dirties, or loss (due to meat or blood spots) in any combination, except that such loss may not exceed 0.3%. Other types of loss are not permitted.

B-6.4 Consumer Grade B (at destination)

This shall consist of eggs that are at least 90% B quality, not more than 10% may be checks, and not more than 1% leakers, dirties or loss (due to meat or blood spots) in any combination, except that such loss may not exceed 0.3%. Other types of loss are not permitted.

Table 3. Summary of Tolerances within Consumer Grades for Shell Eggs.

Consumer Grade (Origin)	Quality required	Tolerance permitted %	Tolerance permitted Quality
Grade A	≥ 87% A	≤ 13..... ≤ 5.....	B Checks
Grade B	≥ 90% B	≤ 10…….	Checks
Consumer Grade (Destination)	Quality required	Tolerance permitted %	Tolerance permitted Quality
Grade A	≥ 82% A	≤ 18…… ≤ 7…….	B Checks
Grade B	≥ 90% B	≤ 10……	Checks

Table 4. Tolerance for Individual Case Within a Lot

Consumer Grade	Case quality	Origin (Percent)	Destination (Percent)
Grade A	A (minimum)	77	72
	B	13	18
	Check (maximum)	10	10
Grade B	B (minimum)	80	80
	Check (maximum)	20	20

B-6.5 Additional Tolerances.

In lots of two or more cases:

For grade A – No individual case may exceed 10% less A quality eggs than the minimum permitted for the lot average.

For grade B – No individual case may exceed 10% less B quality eggs than the minimum permitted for the lot average.

No lot shall be rejected or downgraded due to the quality of a single egg except for Loss other than blood or meat spots.

Appendix C – Shell Egg Protecting Operations

C-1. Shell egg protecting (oil processing) operations shall be conducted in a manner to avoid contamination of the product and maximize conservation of its quality.

C-1.1 Eggs with excess moisture on the shell not be shell protected.

C-1.2 Oil having any off-odour, or that is visibly contaminated, shall not be used in shell egg protection.

C-1.3 Processing oil, which has been previously used and which has become contaminated, shall be filtered and heat treated at 83 C for 3 minutes prior to use.

C-1.4 Shell egg processing equipment shall be washed, rinsed and treated with a bactericidal agent each time the oil is removed. It is recommended that operators filter and heat treat processing oil and clean processing equipment daily when in use.

C-1.5 Adequate coverage and protection against dust and dirt shall be provided when the equipment is not in use.

Appendix D – Sampling Plan for Table Eggs

D-1. Whenever grading service is performed on a representative sampling basis, such sample shall be drawn from and consist of not less than the minimum number of cases as indicated in Table 5. A minimum of 100 eggs shall be examined per sample case. For lots, which consist of less than one case, a minimum of 50 eggs shall be examined. If the lot consists of less than 50 eggs, all eggs shall be examined.

Table 5. Minimum number of cases comprising a representative sample

Cases In Lot	Cases in Sample
1	1
2 to ≤ 10	2
11 to ≤ 25	3
26 to ≤ 50	4
51 to ≤ 100	5
101 to ≤ 200	8
201 to ≤ 300	11
301 to ≤ 400	13
401 to ≤ 500	14
501 to ≤ 600	16

For each additional 50 cases, or fraction thereof, in excess of 600 cases, one additional case shall be included in the sample.

Appendix E – Measuring albumen height

E-1 Equipment

For economy in time and preservation of the product, the following equipment is recommended:

A flat glass surface approximately 30.5 cm x 45.5 cm, or larger, in dimensions placed on a metal stand with adjustable legs for leveling, and a mirror for observing the underside of the egg;

A standard individual egg scale calibrated in grams;

A knife and breaking tray;

A micrometer mounted on a tripod graduated to read in 0.1 mm units.

A Haugh unit conversion chart;

A squeegee;

A liquid container.

E -2. Procedure

E -2.1 Reproducible results can be obtained only if uniform procedures are used. Since eggs for top quality must have practically normal shells, only such eggs are to be selected when obtaining the sample for examining the condition of the albumen and yolk. Prior to the measurement of albumen height, the eggs should be cooled to a temperature range of 10.0 C to 15.5 C.

- Weigh the pre-cooled egg on a standard egg scale.
- Break the egg with a breaking knife.
- Spread the egg over a clean glass surface.
- Measure the albumen height with a micrometer.
- Scrape broken-out egg from the glass surface into a liquid container by using a squeegee.
- Convert to Haugh value units by reference to a Haugh unit conversion chart.
- Repeat the procedure for the next measurement.

E -2.2 Notes

E -2.2.1 Care must be taken in using the breaking knife so that the thick white is not ruptured. Consistent results can best be obtained by using a breaking knife. Blunt edges, such as a table edge, may cause splintering of the shell with the possibility that the thick white may be punctured. The egg should

be held as near the glass as possible and the contents emptied very gently from the shell.

E -2.2.2 In some eggs, the envelope of thick white is rather firmly attached to the shell membrane in the small end of the egg. When this is noted, rupture of the thick white can generally be prevented by slowly raising the half-shell. Albumen heights should not be recorded of eggs when the thick white has been mechanically ruptured or when the yolk membrane is ruptured for any reason.

E -2.2.3 The surface on which the egg contents are placed must be level. One egg at a time should be broken since it is important to measure the albumen height immediately after breaking. A delay of a few minutes can make a difference in the Haugh reading.

E -2.2.4 The micrometer should be checked before being used. Set it on the glass and turn the measuring rod down until it touches the surface of the glass on which the broken-out egg will be placed. To be sure that the rod is actually touching the surface of the glass, push the edge of a thin sheet of paper against the intersection of the rod and the glass. The face of the micrometer is then turned so that the indicator reads zero. The procedure should be repeated occasionally during the breaking operation to be sure that the micrometer is properly adjusted.

E -2.2.5 When determining albumen quality with a micrometer, select a flat area in the surface of the widest expanse of the thick white for measurement. Eggs with very high albumen will not have a flat surface and in such cases, a point about half-way between the yolk and the edge of the widest expanse of thick white should be selected. Care should be taken to avoid measuring areas over an air bubble or chalaza. The measuring rod should roll down slowly until it makes contact with the surface of the albumen and should be raised and cleaned before being placed over the next egg to be measured.

E -2.2.6 After the egg weight is determined and the albumen is measured, locate the micrometer reading in the proper weight column. The Haugh unit reading is found directly above or below the properly located micrometer reading in the column marked ‘Haugh units’.