



CD/K/607:2010
ICS 67.120.20

EAST AFRICAN STANDARD

Egg powder — Specification

EAST AFRICAN COMMUNITY

Draft for comments only — Not to be cited as East African Standard

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in East Africa. It is envisaged that through harmonized standardization, trade barriers which are encountered when goods and services are exchanged within the Community will be removed.

In order to meet the above objectives, the EAC Partner States have enacted an East African Standardization, Quality Assurance, Metrology and Test Act, 2006 (EAC SQMT Act, 2006) to make provisions for ensuring standardization, quality assurance, metrology and testing of products produced or originating in a third country and traded in the Community in order to facilitate industrial development and trade as well as helping to protect the health and safety of society and the environment in the Community.

East African Standards are formulated in accordance with the procedures established by the East African Standards Committee. The East African Standards Committee is established under the provisions of Article 4 of the EAC SQMT Act, 2006. The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the procedures of the Community.

Article 15(1) of the EAC SQMT Act, 2006 provides that "Within six months of the declaration of an East African Standard, the Partner States shall adopt, without deviation from the approved text of the standard, the East African Standard as a national standard and withdraw any existing national standard with similar scope and purpose".

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

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East African Community

P O Box 1096

Arusha

Tanzania

Tel: 255 27 2504253/8

Fax: 255-27-2504481/2504255

E-Mail: eac@eachq.org

Web: www.each.int

Introduction

In the preparation of this East African Standard, the following sources were consulted extensively:

Regulations Governing the Voluntary Grading of Shell Eggs, 7 CFR Part 56, Effective March 30, 2008

United States Standards, Grades, and Weight Classes for Shell Eggs, AMS 56, Effective July 20, 2000

IS 4723:1978(R2000), *Specification for Egg Powder*

Codex Alimentarius website: http://www.codexalimentarius.net/mrls/vetdrugs/jsp/vetd_q-e.jsp

USDA Foreign Agricultural Service website: <http://www.mrldatabase.com>

USDA Agricultural Marketing Service website: <http://www.ams.usda.gov/AMSV1.0/Standards>

European Union: http://ec.europa.eu/enterprise/sectors/pharmaceuticals/veterinary-use/maximum-residue-limits/index_en.htm

Assistance derived from these sources is hereby acknowledged.

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Egg powder — Specification

1 Scope

This East African Standard specifies the requirements and the methods of sampling and test for egg powder.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

AOAC Official Method 931.06:1931, *Phosphorus (Total) (P_2O_5) in Eggs*

CAC/RCP 1, *Recommended international code of practice — General principles of food hygiene*

EAS 35, *Edible salt — Specification*

EAS 12, *Drinking (potable water) — Specification*

EAS 38, *Labelling of prepackaged foods — Specification*

EAS 39, *Hygiene in the food and drink manufacturing industry — Code of practice*

EAS 41, *Fruits, vegetables and derived products — Sampling and methods of test*

EAS 103, *Schedule for permitted food additives*

EAS 123, *Distilled water — Specification*

ISO 936:1998, *Meat and meat products — Determination of total ash*

ISO 1736:2008, *Dried milk and dried milk products — Determination of fat content — Gravimetric method (Reference method)*

ISO 1737:2008, *Evaporated milk and sweetened condensed milk — Determination of fat content — Gravimetric method (Reference method)*

ISO 4831:2006, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of coliforms — Most probable number technique*

ISO 4832:2006, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique*

ISO 4833:2003, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of microorganisms — Colony-count technique at 30 degrees C*

ISO 5537:2004, *Dried milk — Determination of moisture content (Reference method)*

ISO 5985:2002, *Animal feeding stuffs — Determination of ash insoluble in hydrochloric acid*

ISO 6491, *Animal feeding stuffs — Determination of phosphorus content — Spectrometric method*

ISO 6579:2002, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of *Salmonella* spp.*

ISO 8156:2005, *Dried milk and dried milk products — Determination of insolubility index*

ISO 9390, *Water quality — Determination of borate — Spectrometric method using azomethine-H*

ISO 13730:1996, *Meat and meat products — Determination of total phosphorus content — Spectrometric method*

ISO 21527-1:2008, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 1: Colony count technique in products with water activity greater than 0.95*

ISO 21527-2:2008, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

3 Definitions

For the purpose of this standard the following definition shall apply:

egg powder

The product prepared under hygienic conditions from the liquid contents of sound, wholesome, hens' eggs by any recognized method of spray drying.

4 Requirements

4.1 Hygienic requirements of processing unit

The material shall be prepared and handled under strict hygienic conditions by persons free from contagious and infectious diseases and only in premises maintained in a thoroughly clean and hygienic condition and having adequate and safe water supply (see EAS 39/CAC/RCP 1), and duly approved and licensed by the public health authorities concerned. All workers shall use clean and washed clothings. Necessary precautions shall be taken to prevent incidental contamination of the product from soiled equipment or from personnel suffering from injuries.

4.1.1 All equipment coming in contact with raw materials or products in the course of manufacture shall be kept clean. An ample supply of steam and water, hoses, brushes and other equipment necessary for proper cleaning of machinery and equipment shall be available. The equipment may be sterilized by immersion in or swabbing with hypochlorite solution or other suitable chlorine solution.

4.2 Processing requirements

4.2.1 The eggs, before breaking, shall be properly washed, dried and cooled, if necessary.

4.2.2 Glucose present in the liquid contents of original eggs shall be removed before drying.

4.2.3 The liquid contents of the eggs shall be pasteurized by heating for 5 minutes at 61 to 62 °C in a plate type pasteurizer or by any other suitable method.

4.3 Requirements of the finished product

4.3.1 The egg powder shall have a uniform yellow or orange-yellow colour and a smooth and uniform texture, and shall be free from lumps and gritty material.

4.3.2 Egg powder shall retain the original properties of fresh egg, like solubility of protein, aerating capacity, binding power and palatability. Egg powder shall reconstitute readily and quickly when it is mixed with three times its mass of lukewarm water (about 40 °C), after a preliminary mixing to form a smooth paste. On reconstitution, the egg powder shall be free from unpleasant off-flavours.

4.3.3 Egg powder may contain added carotene and riboflavin.

4.3.4 Egg powder shall be free from discoloration, added preservatives, artificial colouring matter and pathogenic micro-organisms, and other extraneous matter.

4.3.5 The product shall also comply with the chemical and microbiological requirements given in Table 1.

Table 1 — Requirements for egg powder

S/No.	Characteristic	Requirement	Method of test
(1)	(2)	(3)	(4)
i)	Moisture content, % by mass, Max	2.0	Annex A
ii)	Protein (N × 6.68), % by mass, Min	45.0	ISO 9390
iii)	Lecithin and fat, % by mass, Min	40.0	Annex B ISO 1736/1737
iv)	Solubility	85.0	Annex C ISO 8156
v)	Boric acid	Absent	
vi)	Organic phosphorus pentoxide (P ₂ O ₅), % by mass, Min	1.25	ISO 13730
vii)	Total ash, % by mass, Max	3.6	ISO 936
viii)	Ash insoluble in hydrochloric acid, % by mass, Max	0.1	ISO 5985
ix)	Oxygen content, % by mass, Max	2.0	Annex D
x)	Total plate count, per gram, Max	75 000	ISO 4832
xi)	Yeast and mould count, per gram, Max	50	ISO 21527-2
xii)	Coliform count, per gram, Max	100	ISO 4833
xiii)	Salmonella	Absent	ISO 6579

5 Packing and marking

5.1 Packing

5.1.1 Egg powder shall be gas packed in nitrogen (or nitrogen and carbon dioxide) in suitable tinplate or flexible containers.

5.1.2 Packing in cases

The containers shall be packed in suitable cases. The number of containers in each case shall be subject to agreement between the purchaser and the packer.

5.2 Marking

The containers shall be marked either by printing or lithographing on the containers themselves or by attaching labels printed on paper as agreed between the purchaser and the vendor. The marking or the label shall give the following information:

- a) Name of the material along with brand name, if any;
- b) Name and address of the manufacturer;
- c) Net mass of the contents;
- d) Batch number or code number;
- e) Names of the ingredients;
- f) Licence number given by the health authorities; and

g) Any other requirement as given OIML R87, *Quantity of product in prepackages*.

5.2.1 Each container may also be marked with a Certification Mark.

6 Sampling

6.1 The method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in Annex E.

7 Tests

7.1 Tests shall be carried out as prescribed in the appropriate appendices given under col 4 of Table 1.

7.2 Quality of reagents

Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (see EAS 123) shall be used where the use of water as a reagent is intended.

NOTE Pure chemicals shall mean chemicals that do not contain impurities which affect the results of analysis.

7.3 Preparation of sample for microbiological tests

Weigh 11 g of the material from the individual sample using a sterile spatula and suspend in 99 ml of dilution water at 45 °C. Agitate mildly, soak for 1 to 3 minutes and then agitate vigorously to avoid churning out the fat.

Prepare dilutions of this and add 1 ml of suitable dilutions in triplicate to the sterile petri dishes.

Annex A (normative)

Determination of moisture content

A.1 Apparatus

A.1.1 Flat-bottom dishes — of glass or aluminium and with cover. Dishes should not be affected by boiling water. They may be 7 to 8 cm in diameter and not more than 2.5 cm deep. They should be provided with short glass stirring rods having a widening flat end.

A.1.2 Well-ventilated oven — maintained at 100 ± 2 °C.

A.2 Procedure

A.2.1 Weigh accurately about 5 g of the sample, into a flat-bottom glass or aluminium dish (with a cover) previously dried and weighed. Heat the dish containing the material after uncovering in an oven maintained at 100 ± 2 °C for about 5 hours. Cool in a desiccator and weigh with the cover on. Repeat the process of drying, cooling and weighing at half hourly intervals, until the difference between two consecutive weighings is less than 2 mg. Record the lowest mass.

A.3 Calculation

$$\text{Moisture content, percent by mass} = \frac{100(M_1 - M_2)}{(M_1 - M)}$$

where

M_1 = mass in g of sample with the dish,

M_2 = mass in g of dried sample with the dish, and

M = mass in g of empty dish.

Annex B
(normative)

Determination of lecithin and fat

B.1 Apparatus

B.1.1 Soxhlet extractor

B.2 Reagent

B.2.1 Chloroform

B.3 Procedure

B.3.1 Weigh accurately about 2 g of the sample into the folds of a filter paper (Whatman No. 4 or equivalent) and extract with chloroform for 16 hours in a Soxhlet extractor. Disconnect the tared Soxhlet flask, distil off the chloroform completely and weigh the flask with the residue (lecithin and fat).

B.4 Calculation

$$\text{Lecithin and fat, percent by mass} = \frac{100(M_2 - M)}{M_1}$$

where

M_2 = mass in g of the residue with Soxhlet flask

M = mass in g of empty Soxhlet flask, and

M_1 = mass in g of sample.

Annex C (normative)

Determination of solubility

C.1 Procedure

C.1.1 Weigh accurately 1.0 ± 0.1 g of the sample in an ordinary test tube and add exactly 5 ml of 5 percent (*m/v*) sodium chloride. Close the tube with a rubber stopper and shake gently for 1 minute to dispense the powder. Set aside for 15 minutes and invert ten times. After 5 minutes, close with the index finger, the top of the convenient length of glass tubing (approx 2 mm bore) and invert the tubing under the top of the liquid rotated thoroughly. Open the top of the tube momentarily, close again and remove the tube from solution and wipe the outside of the tube. Transfer a drop of the liquid to the refractometer and read off the refractive index.

C.1.2 Determine the solubility index of the egg powder by refractometer (Haenni value) as follows:

$$\text{Haenni value} = (X - \gamma) \times 1000$$

where

X = refractive index of the sample solution, and

γ = refractive index of the solvent.

Calculate the solubility percentage from the Haenni value as follows:

$$\text{Log}_{10} y = 0.445 + 0.01x$$

where

y = Haenni value, and

x = percentage solubility in sodium chloride.

C.1.3 For the sake of convenience, the following table may be referred to for conversion of Haenni value to the solubility percentage

Haenni Value	Solubility Percentage
17	78.55
18	81.03
19	83.36
20	85.60
21	87.72
22	90.00
23	91.67
24	93.52
25	95.29
26	97.00
27	98.64
28	100.00

Annex D (normative)

Determination of oxygen content of containers

D.1 Apparatus

D.1.1 A diagrammatic sketch of the recommended apparatus, as assembled, is shown in Figure 1.

D.2 Reagent

D.2.1 **Pyrogallol or 1,2,4-Triacetoxybenzene** — Either of these two absorption reagents may be used.

D.2.1.1 Alkaline pyrogallol is prepared by mixing equal volumes of solutions of 25 g of pyrogallol in water to 100 ml and 100 g of potassium hydroxide in water to 100 ml, and kept in a well-stoppered bottle.

D.2.1.2 Alkaline 1,2,4-triacetoxybenzene is prepared by dissolving 10 g of 1,2,4-triacetoxybenzene by gentle warming with a solution of 13.5 g of potassium hydroxide in 100 ml of water.

D.3 Procedure

D.3.1 With the sampling tool resting on but not piercing the can or container, and with stopcock *B* closed and stopcock *N* open, evaluate the sampling line to 5 mmHg or less, as indicated on the manometer; close stopcock *N*, and if there is no leak in the sampling line the manometer level does not change. (If the level changes, indicating a leak, this is rectified and the line is re-evacuated.) With *N* closed, pierce the can or container when the mercury in the manometer flows back with a click. Keeping stopcock *G* open and reservoir *H* on the lowest hook, turn stopcock *B* to allow gas from the sampling line and can or container to flow into *C* until one or both bulbs are full of gas. Close stopcock *B*, stir the water in the jacket and note its temperature (T °C). Bring the level of mercury in *C* to the appropriate index mark by closing *G* and operating the screw clip. Then take the manometer reading (S_1). Hang reservoir *H* on the topmost hook, open stopcock *G* and turn stopcock *B* to pass the gas into the absorption chamber. By raising and lowering *H*, the gas is passed to and fro the requisite number of times. When absorption is complete bring the reagent level to the mark, approximately by moving reservoir *H*, then exactly by closing *G* and operating the screw clip. Close stopcock *B*, open stopcock *G*, and adjust the mercury level in the measuring bulb to the appropriate mark as before. Note the manometer reading (S_2), and read the thermometer. (There shall be no temperature change during the estimation; any change will cause serious errors if not allowed for in the calculation.) Finally discharge the gas remaining in the measuring bulbs *C* by raising *H*, opening *G*, and turning *B* to allow the gas to flow out through the sampling line, following up with mercury until the upper bore of *B* is full.

D.4 Calculation

$$\text{Oxygen, percent by mass} = \frac{S_1 - S_2}{B - W - P + S_1} \times 100$$

where

S_1 = manometer reading with sample at index mark before absorption,

S_2 = manometer reading with sample at index mark after absorption,

B = barometric pressure,

W = aqueous vapour pressure at water jacket temperature (T °C), and

P = manometer reading corresponding to index mark at atmospheric pressure (P_1 or P_2 as appropriate).

NOTE If the oxygen content is low (under 5 percent), the barometric pressure may be assumed to be 76.0 cmHg and W to be 1.5 (corresponding to 18 °C). If in addition S_1 is about the same as $P + 0.2$ cmHg, the denominator may be assumed to be 75.0 in all cases without affecting the accuracy of the result to the first decimal place. Then the expression becomes:

$$\text{Oxygen, percent by mass} = \frac{(S_1 - S_2)}{75} \times 100 = 4/3(S_1 - S_2)$$

which gives sufficient accuracy for factory control purposes.

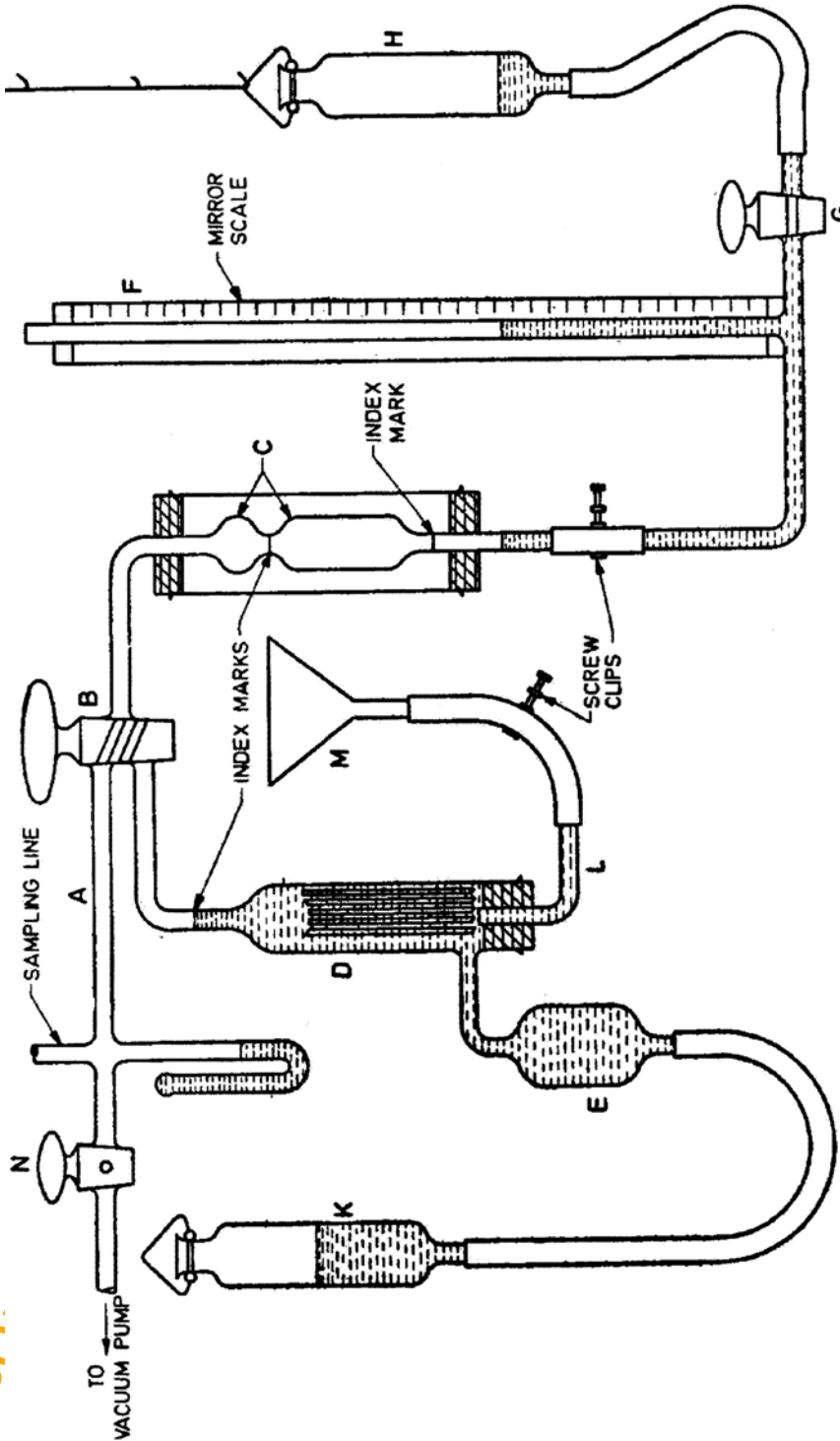


Figure D.1 — Diagrammatic sketch of oxygen analysis apparatus

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Annex E
(normative)

Sampling of egg powder

E.1 General requirements

In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed.

E.1.1 Samples shall be taken in a protected place not exposed to damp air, dust, or soot.

E.1.2 The sampling instrument shall be clean and dry when used. When taking samples for bacteriological examination it shall be sterile.

E.1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument, and the containers for sample from adventitious contamination.

E.1.4 The samples shall be placed in clean and dry glass containers. The sample containers shall be of such a size that they are almost completely filled by the sample. The sample containers shall, in addition, be sterile when they are used for samples for bacteriological examination.

E.1.5 Each container shall be sealed airtight after filling and marked with full details of sampling, batch or code number, name of the manufacturer and other important particulars of the consignment.

E.1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

E.2 Scale of sampling

E.2.1 Lot — All the containers in a single consignment of one type of material drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the group of containers in each batch shall constitute separate lots.

E.2.1.1 Sample shall be tested from each lot for ascertaining its conformity to the requirements of this standard.

E.2.2 The number of containers to be selected from the lot shall depend on the size of the lot and shall be as given in Table E.1.

E.2.3 The containers shall be chosen at random from the lot and for this purpose a random number table as agreed between the purchaser and the supplier shall be used. If such table is not available, the following procedure shall be adopted.

Starting from any container, in the lot, count them as 1, 2, 3, ..., up to r in a systematic manner, where r is equal to the integral part of N/n , N being the total number of containers in the lot, and n the number of containers to be chosen (see Table E.1). Every r th container thus counted shall be separated until the requisite number of containers is obtained from the lot to give samples for test.

Table E.1 — Number of containers to be selected for sampling

Lot size	Sample size (for tests other than microbiological)	Sub-sample size (for microbiological tests)
(1)	(2)	(3)
2 to 25	2	1
26 to 100	3	1
101 to 300	5	2
301 to 500	7	3
501 and above	9	4

E.3 Test samples and referee samples

E.3.1 Preparation of individual sample

Draw with a suitable sampling instrument approximately equal quantities of the material from different parts of the container till the quantity collected is about 500 g and divide it into three equal parts. Each part so obtained shall constitute a sample representing the container and shall be transferred immediately to thoroughly clean and dry containers sealed airtight with particulars given under E.1.5. The individual sample so obtained shall be divided into three sets in such a way that each set has a sample, representing each selected container. One of these shall be marked for the purchaser, another for the vendor and the third for the referee.

E.3.2 Preparation of composite sample

From the material from each selected container, remaining after the individual sample has been taken, approximately equal quantities of the material shall be taken and mixed together so as to form a composite sample weighing about 600 g. This composite sample shall be divided into three equal parts and transferred to clean and dry containers sealed airtight and labelled with the particulars given in E.1.5. One of these composite samples shall be for the purchaser, another for the vendor and the third for the referee.

E.3.3 Preparation of Samples for microbiological examination

From the selected container select a sub-sample according to col 3 of Table 2. Draw with a suitable sampling instrument, which is sterile, at least 100 g of the material and mix thoroughly under aseptic conditions to form a sample for microbiological examination. Divide the sample (taking care not to bring in microbiological contamination in the material) into three equal parts. Each part so obtained shall constitute a sample representing the parts. Each part so obtained shall constitute a sample representing the container and shall be transferred to sterile glass containers sealed, airtight and labelled with particulars given in E.1.5. They shall be marked, in addition, with the words 'For Microbiological Examination'. The samples so obtained shall be divided into three sets in such a way that each set has a sample representing each selected container. One of these sets shall be marked for the purchaser, another for the vendor and the third for the reference.

E.3.4 Referee samples

Referee samples shall consist of a set of individual samples (E.3.1) and a composite sample (E.3.2) and set of samples for microbiological examination (E.3.3) marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place as agreed between the two.

E.4 Number of tests

E.4.1 Tests for description, moisture, protein, lecithin and fat, boric acid, organic P_2O_5 , ash insoluble in hydrochloric acid, total ash and shall be conducted on each of the samples constituting a set of individual samples.

E.4.2 Tests for bacterial count, yeast and mould count, coliform count and *Salmonella* shall be conducted on each of the samples meant for 'microbiological examination'.

E.4.3 Test for oxygen content shall be conducted on the composite sample.

E.5 Criteria for conformity

E.5.1 The lot shall be declared as conforming to all the requirements of this specification when E.5.1.1 to E.5.1.3 are satisfied.

E.5.1.1 The test results on each of the individual samples for description, moisture, protein, lecithin and fat, boric acid, organic P₂O₅, ash insoluble in hydrochloric acid total ash, and solubility shall satisfy the corresponding requirement given in 4.3.1 to 4.3.4 and in Table 1.

E.5.1.2 The test results for bacterial count, yeast and mould count, coliform count and *Salmonella* shall satisfy the corresponding requirement as given in Table 1.

E.5.1.3 The test results on the composite sample for the characteristic mentioned in E.4.3 shall satisfy the corresponding requirement as specified in Table 1.

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