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EAS 173 (2000) (English): Pasta products - Specification

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# EAST AFRICAN STANDARD

Pasta products — Specification

EAST AFRICAN COMMUNITY

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# Foreword

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

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

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.

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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# Introduction

Macaroni, Spaghetti, Vermicelli etc. belong to a class of products generally known as pasta products. These products have gained a fast popularity in catering and home uses. The manufacturing process for macaroni or spaghetti consists of the dough preparation from durum wheat (hard wheat) and cold or lukewarm water, kneading process and extrusion through the extrusion press fitted with a die for the desired shape. The extruded products are cut to a given length and then dried to definite moisture content under controlled conditions of temperature and humidity.

During the preparation of this East African Standard, reference was made to the following document:

KS 524:2000, Specification for pasta products

The assistance received from this source is acknowledged with thanks.

# Pasta products — Specification

#### 1 Scope

This East African Standard prescribes the requirements and methods of test for pasta products.

## 2 Types

Pasta products covered in this East African Standard shall be of the following types:

- (a) macaroni;
- (b) spaghetti;
- (c) vermicelli;
- (d) noodles;
- (e) short-cut pasta and
- (f) lasagne.

#### 3 Requirements

#### 3.1 Basic ingredients

The dough for the manufacture of pasta products shall either be prepared from semolina derived from durum grains, hard wheat varieties or any combination of two or more to the specific wheat flour.

#### 3.2 Fortified pasta

Pasta products may be fortified with one or more of the following minerals: phosphorus, calcium and iron and also vitamins in accordance with the provisions of the relevant laws governing Food, Drugs and Chemical Substances in the Partner States. The declaration of the amounts of minerals and vitamins applied in fortification, shall be done in units stipulated in 6.3.4 of KS 05-40: Part 2: Section 2, *Guidelines for nutritional labelling*.

The following vitamins shall be added in the ratios indicated per kilogram of the pasta products:

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Vita	min/Mineral	Amount (mg)
(i)	Thiamine	4.5 - 5.5
(ii)	Riboflavin	2.7 - 44.4
(iii)	Niacin or Niacinamide	35.3 - 44.4
(iv)	Iron	28.5 - 36.5

#### 3.3 Description

#### 3.3.1 Macaroni

It shall be in the form of tubes of a minimum length of 250 mm. Outer diameter of the tube shall range from 2.5 mm to 7 mm and the wall thickness shall be 1.0 mm with tolerance of  $\pm$  0.1 mm.

#### 3.3.2 Spaghetti

It shall be in the form of solid rods of a minimum length of 250 mm and minimum diameter of 1.6 mm with tolerance of  $\pm$  0.1 mm.

#### 3.3.3 Vermicelli

It shall be in the form of solid rods of diameter between 250 mm and of diameter between 0.5 mm to 1.25 mm.

#### 3.3.4 Folded vermicelli

They shall be in the form of folded rods of diameter between 0.5 mm to 1.25 mm.

#### 3.3.5 Noodles

They shall be in the form of solid rods of minimum length 250 mm and diameter between 1.25 mm and 2.0 mm or ribbons of width from 1.5 mm to 15 mm and thickness ranging from 1.25 mm to 1.0 mm.

#### 3.3.6 Folded noodles

These shall be in the form of folded ribbons of thickness ranging from 1.25 mm to 2.0 mm.

#### 3.3.7 Short-cut pasta

These shall be products of various defined forms such as shells, stars, squares etc.

#### 3.3.8 Lasagne

These shall be square or rectangular shaped pasta products.

#### 3.3.9 Special type pasta

These may contain eggs vegetable products and the final products shall have the appearance of the characteristic added material such as yellow for egg pasta and green for spinach pasta.

#### 3.3.10 Egg pasta

The egg macaroni, egg spaghetti, egg noodles or egg alimentary pasta shall contain not less than 4 % egg yolk solids when tested in accordance with Annex H.

The egg yolk solids shall be derived from whole egg, frozen egg yolk.

#### 3.4 Other physical characteristics

Pasta products shall be smooth, translucent, hard brittle and up to a point elastic and when broken the fracture shall appear glassy.

**3.4.1** The product shall not contain any added colouring matter.

**3.4.2** Pasta products shall retain their shapes and show no sign of disintegration and shall swell appreciably when plunged into vigorously boiling water and boiled in accordance with the time declared by the manufacture for each variety of the product.

**3.4.3** When cooked, pasta product shall retain its shape and a certain firmness and develop a clear characteristic odour of hard wheat and shall not become pasty.

#### 3.5 Chemical requirements

**3.5.1 Moisture content** — Moisture content of macaroni, spaghetti, vermicelli, folded vermicelli noodles and folded noodles shall not be more than 10 % m/m when tested in accordance with Annex A.

**3.5.2** The moisture content for short-cut pasta shall not be more than 12 % m/m when tested in accordance with Annex A.

**3.5.3** Pasta products shall also comply with the compositional requirements given in Table 1.

S/No	Characteristics	Requirements	Methods of test
			(Annex)
1	Total ash (on dry basis) % by mass, <i>max</i> .	1.0	В
2	Acid insoluble ash (on dry basis) % by mass, <i>max</i> .	0.05	С
3	Total protein (N x 5.7) on dry basis) % by mass, <i>max</i> .	10.5	D
4	Cooking test: Total solids in gruel, % by mass, <i>max</i> .	10	E
5	Free fatty acids as oleic acid of extracted oil, % by mass, max.	0.8	F
6	Crude fibre content % by mass, max	0.45	G

Table 1 — Compositional requirements for pasta products

## 4 Hygiene

**4.1** Pasta products covered by this standard shall be prepared in accordance with EAS 39, *Hygiene in the food and drink manufacturing industry* — *Code of practice*, Relevant Public Health Acts in the Partner States and any other Government Regulations applicable to good manufacturing and handling practices.

**4.2** The finished products shall be free from cracks, off-flavour, insect infestation, foreign matter and adulterants.

**4.3** When tested by the appropriate method the total aflatoxin level in pasta products shall not exceed 5 ppb.

**4.4** When tested in accordance with the methods stipulated in all the parts of EAS 217, *Methods for the microbiological examination of foods*, pasta products shall be free from pathogenic organisms and shall comply with microbiological limits stipulated in Table 2.

S/No	Type of micro-organism	Maximum limit of counts
1	Total viable counts	10 <sup>4</sup> per g
2	E. Coli	Shall be absent
3	Salmonella in 30 g	Shall be absent
4	Yeasts and moulds	10 <sup>2</sup> per g
5	Staphylococcus aureus	Shall be absent

 Table 2 — Microbiological limits for pasta products

## 5 Sampling

Any package of pasta products randomly taken for inspection and laboratory testing shall be taken as representative of the concerned consignment or batch.

## 6 Packaging and labelling

#### 6.1 Packaging

Pasta products shall be packaged in moisture-proof and well-sealed containers.

#### 6.2 Labelling

Labelling of containers for pasta products shall be done in accordance with the requirements of EAS 38, *Labelling of prepackaged foods (First Revision)* and shall include the following:

- a) name of product;
- b) name, physical location and address of manufacturer;
- c) list of ingredients;
- d) net content in g or kg;
- e) date of manufacture;
- f) batch number;
- g) expiry date;
- h) country of origin and
- i) the recommended cooking time for the pasta products.

#### Annex A

(normative)

# **Determination of moisture**

#### A.1 Procedure

**A.1.1 Preparation of sample** — Grind in pestle and mortar about 30 g of the material so that at least 90 % passes through 425 micro sieve. Transfer this prepared sample to a well-stoppered glass bottle for use as indicated in A.1.2 and D.3.1.

**A.1.2** Weigh accurately about 5 g of the prepared sample in a suitable moisture dish made of porcelain, silica or platinum, previously dried in an air-oven maintained and weighed. Place the dish in air-oven maintained at 105 °C  $\pm$  2 °C for five hours. Cool the dish in a desiccator and weigh the dish with the lid on. Heat again at 105 °C  $\pm$  2 °C in the air-oven for 30 min cooling and weighing till the difference between two successive weighings is less than one milligram. Note the lowest mass.

NOTE The dish containing the dried material for the determination of ash should be preserved (see B.1).

## A.2 Calculation

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

where

- $M_1$  is the mass in g of the dish with the material before drying,
- *M* is the mass in g of the empty dish, and
- $M_2$  is the mass in g of the dish with the material after drying.

## Annex B

(normative)

# Determination of total ash

## **B.1** Procedure

Ignite the dried material (see A.1.2) in the dish with flame of suitable burner for about one hour till the material is completely charred. Complete the ashing by keeping in muffle furnace at 600 °C  $\pm$  20 °C until grey ash results. Cool in desiccator and weigh. Repeat the process of heating for 30 min cooling and weighing till the difference in mass between the two successive weighings is less than one milligram. Note the lowest mass.

NOTE The dish containing this ash for the determination of acid insoluble ash should be preserved (see C.2).

## **B.2 Calculation**

Total ash (on dry basis), % by mass =  $\frac{100(M_1 - M_2)}{M_1 - M}$ 

where

- $M_2$  is the mass in g of the dish with the ash,
- *M* is the mass in g of the empty dish, and
- $M_1$  is the mass in g of the dish with the dried material (see  $M_2$  in A.2).

## Annex C

(normative)

# Determination of acid insoluble ash

#### C.1 Reagents

**Dilute hydrochloric acid** — approximately 5 N prepared by diluting concentrated hydrochloric acid with distilled water

#### C.2 Procedure

To the ash contained in the dish (see B.1.1) add 25 ml of dilute hydrochloric acid, cover with watchglass and heat on water-bath for 10 min. Allow to cool, filter the contents for the dish through Whatman filter paper No 42 or its equivalent. Wash the filter paper until the washings are free from the acid and return it to the dish. Keep it in an air-oven maintained at 105 °C  $\pm$  2°C for about three hours. With the flame of a suitable burner complete the ashing in a muffle furnace at 600 °C  $\pm$  20 °C for one hour. Cool the dish in a desiccator and weigh. Heat again at 600°C  $\pm$  20°C in the muffle furnace for 30 min. Cool the dish in the desiccator and weigh. Repeat the process of heating for 30 min, cooling and weighing till the difference in mass between the successive weighings is less than one milligram. Note the lowest mass.

#### **C.3 Calculation**

Acid insoluble ash (on dry basis), % by mass =  $\frac{100(M_2 - M_1)}{M_1 - M}$ 

where,

- $M_2$  is the mass in g of the dish with acid insoluble ash,
- *M* is the mass in g of the empty dish, and
- $M_1$  is the mass in g of the dish with the dried material (see  $M_2$  in A.2).

# Annex D

(normative)

# **Determination of total protein**

## **D.1.** Apparatus

A recommended apparatus is as assembled in Figure D.1.



Figure D.1 – Apparatus for determination of protein

**D.1.1** The assembly consists of a round bottomed flask A of 100 mL capacity fitted with a rubber stopper through which passes one end of the connecting bulb tube B. The other end of the bulb is connected to the condenser C that is attached by means of a rubber tube to a dip tube D that dips into a known quantity of standard sulphuric acid contained in beaker E of 250 mL capacity.

D.1.2 Kjeldahl flask, of capacity 500 mL

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**D.2 Reagents** 

D.2.1 Anhydrous sodium sulphate

D.2.2 Copper sulphate

D.2.3 Concentrated sulphuric acid

**D.2.4 Sodium hydroxide solution** — Dissolve about 225 g of sodium hydroxide in 500 mL of water.

**D.2.5** Standard sulphuric acid — 0.1 N

**D.2.6** Methyl red indicator solution — Dissolve one gram of methyl in 200 mL of rectified spirit (95 % y volume).

#### **D.2.7** Standard sodium hydroxide solution — 0.1 N

#### **D.3 Procedure**

**D.3.1** Transfer carefully about one gram of the prepared sample (see A.1.1) accurately weighed, to a Kjeldahl flask, taking precaution to see that particles of the material do not stick on to the neck of the flask. Add about 10 g of anhydrous sodium sulphate, about 0.2 g to 0.3 g of copper sulphate and 20 mL of concentrated sulphuric acid.

Add a few pieces of pumice stone to prevent bumping. Place the flask in an inclined position. Heat below the boiling point of the acid until frothing ceases. Increase heat until acid boils vigorously and digest for 30 min after the mixture becomes clear and pale green or colourless. Cool the content of the flask. Transfer quantitatively to a round-bottomed flask, with distilled water, the total quantity of distilled water used being about 200 mL. Add about 50 mL of the sodium hydroxide solution (which is sufficient to make solution alkaline) carefully through the side of the flask so that it does not mix at once with the acid solution but forms three layers below the acid solution.

Assemble the apparatus taking care that the dip tube extends below the surface of the standard sulphuric acid contained in the beaker. Mix the contents of the flask by shaking and distil until all ammonia has passed over into the standard sulphuric acid. Shut off the burner and immediately detach the flask from the condenser. Rinse the condenser thoroughly with water into the beaker. Wash the dip tube carefully so that all traces of the condensate are transferred to the beaker. When all the washings have drained into the solution, titrate with the standard sodium hydroxide solution.

**D.3.2** Carry out a blank determination using all reagents in the same quantities but without the material to be tested.

## **D.4 Calculation**

Total protein (on dry basis), % by mass =  $\frac{789(B - A)N}{M_1(100 - M)}$ 

where,

- *B* is the volume in ml of the standard sodium hydroxide solution used to neutralize the acid in the blank determination,
- *A* is the volume in ml of the standard sodium hydroxide solution used to neutralize the excess of acid in the test with the material,
- *N* is the normality of the standard sodium hydroxide solution,
- $M_1$  is the mass in g of the prepared material taken for the test, and
- M is the moisture, per cent by mass of the material (see A.2.1).

## Annex E

(normative)

# Determination of total solids in gruel

## **E.1** Apparatus

- E.1.1 Lipless beaker tall-form, of capacity 500 mL
- E.1.2 Oil bath
- E.1.3 Electric heater

## E.2 Procedure

Take 250 ml water in the lipless beaker and heat over an oil bath kept at about 102 °C by electric heating. Introduce exactly 25 g of the pasta product (previously) broken into 10 mm lengths in case of long pasta products and cook at a constant temperature of about 98 °C at sea level with occasional stirring.

NOTE The cooking time required by this apparatus is on an average two minutes more than that recommended on the package (i.e. more than that required with free boiling water). The cooked pasta should be allowed to drain for five minutes and the volume of gruel collected measured. Pipette out 20 ml of the gruel, after stirring well to a tarred petri dish and evaporate to dryness on a water-bath. Transfer the petri dish to a hot air-oven maintained at 105 °C  $\pm$  2 °C and dry to constant mass.

## E.3 Calculation

Total solids in gruel % by mass =  $\frac{(M_2 - M_1)V}{5}$ 

where,

- $M_2$  is the mass in g of petri dish with total solids per cent in 20 mL of gruel,
- $M_1$  is the mass in g of empty petri dish, and
- *V* is the volume of gruel in ml.

## Annex F

(normative)

# Determination of crude fibre content

## F.1 Preparation of sample

Break the pasta product into small fragments with hands or in mill, and mix well. Grind 300 g to 500 g in mill until all material passes through No 20 sieve. Keep ground sample in sealed container to prevent moisture changes.

## F.2 Reagents

**F.2.1** Sulphuric acid solution — 0.255 N  $\pm$  0.005 N 1.25 % H<sub>2</sub>SO<sub>4</sub>/100 ml. The concentration shall be checked by titration.

**F.2.2** Sodium hydroxide solution — 0.313 N  $\pm$  0.005 N 1.25 % NaOH/100 ml, free or nearly so from Na<sub>2</sub>CO<sub>3</sub>. The concentration shall be checked by titration.

**F.2.3 Prepared asbestos** — spread a thin layer of acid washed, medium or long fibre asbestos in evaporation dish and heat for 16 h at 600  $^{\circ}$ C in furnace. Boil 30 min with 1.25  $^{\circ}$  H<sub>2</sub>SO<sub>4</sub>, filter, wash thoroughly with water, and boil for 30 min with 1.25  $^{\circ}$  H<sub>2</sub>SO<sub>4</sub>, filter, wash thoroughly with water, and boil for 30 min with 1.25  $^{\circ}$  NaOH. Filter, wash once with 1.25  $^{\circ}$ , H<sub>2</sub>SO<sub>4</sub>, wash thoroughly with water, dry and ignite for 2 h at 600  $^{\circ}$ C.

Determine blank by treating 1.0 g prepared asbestos with acid and alkali. Correct crude fibre results of any blank, which should be negligible (about 1 g). Asbestos recovered from the determination may be used in subsequent determinations.

**F.2.4** Alcohol — 95 % or reagent MeOH or isopropanol

**F.2.5** Antifoam compound A — Dilute (1 + 4) with mineral spirits or pot ether, or water, dilute antifoam B emulsion (1 + 4). Do not use antifoam spray.

**F.2.6 Bumping ships or granules** — Broken alumdum crucibles or equivalent granule are satisfactory.

#### F.3 Apparatus

**F.3.1** Digestion apparatus — with condenser to fit 600 mL beaker, and hot plate adjustable to temperature so that it will bring 200 mL water at 25  $^{\circ}$ C to rolling boil 15 min ± 2 min

**F.3.2** Ashing dishes — silica, vireosil 70 mm x 15 mm; or porcelain, coors, No 450, size 1 or equivalent

**F.3.3** Desiccator — with efficient desiccator such as 4 to 5 mesh drierite (CaCl<sub>2</sub> is not satisfactory)

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**F.3.4** Filtering device — with No 200 type 304 or 316 stainless steel screen easily washed free of digested residue, use any suitable filter funnel. for example, Buchner filter funnel

**F.3.5** Suction filter — to accommodate filtering devices. Attach suction flask to trap in line with aspirator or other source of vacuum with valve to break vacuum.

**F.3.6** Liquid preheater — for preheating water,  $1.25 \% H_2SO_4$  and 1.25 % NaOH solution to boiling point of  $H_2O$ 

#### F.4 Procedure

Extra 2 g of ground material ether or pot ether. Transfer to 600 ml beaker avoiding fibre contamination from paper or brush. Add about 1 g of prepared asbestos, 200 ml boiling 1.25 %,  $H_2SO_4$  and 1 drop diluted antifoam. (Excess antifoam may give results, use only if necessary to control foaming.) Bumping chips of granules may also be added. Place beaker on digestion apparatus with pre-adjusted hot plate and boil exactly 30 min rotating the beaker periodically to keep solids from adhering to sides. Remove beaker and any suitable filter funnel.

In treating the residue, dry mat and residue for 2 h at 130 °C  $\pm$  2 °C, cool in desiccator and weigh. Ignite for 30 min at 600 °C  $\pm$  15 °C. Cool in desiccator and reweigh.

## F.5 Calculation

% crude fibre in ground sample  $-C = \frac{(Loss in weight on ignition - loss in weight of asbestos blank × 100)}{Weight of sample}$ 

Report results to 0.1 %.

## Annex G

(normative)

# Degree of acidity of raw pasta

#### **G.1** Procedure

Weigh 4 g of milled raw pasta into an Erlenmeyer flask and carefully suspend 100 ml of neutralized 50 vol. % ethanol. Stopper the flask to avoid solvent loss and leave for one hour at room temperature. The contents should be whirled by hand four times during this period. At the end, agitate the suspensions vigorously, clear by centrifuging (3 min at 300 rvm) or filtration (funnel sitting directly on the neck of another Erlenmeyer flask and flute paper filter (15 cm) covered with petri dish, both measures to avoid solvent losses). The suspension is to be filtered in total and also 100 mL 50 vol. % neutralized ethanol are to be filtered in the same way to be used as a blank (to compensate for any absorption on the filter paper). To 50 ml of the cleared-extract and 50 ml of the filtered blank (in case of centrifuging no blank is necessary), three drops of 1 % phenolphthalein in ethanol are added. These aliquots are titrated with 0.1 N NaOH from a burette with 0.02 mL graduation until the first reddish tint appears and remains visible for at least 10 s (change in colour from greenish yellow to reddish yellow in sample extracts).

## **G.2 Calculation**

Acidity degree (pasta dry matter) =  $\frac{(n - n_0) \times 5 \times 100}{100 - m}$ 

where,

- n is the ml 0.1 N NaOH for 50 mL extract,
- $n_{\rm o}$  is the ml 0.1 N for 50 ml blank,
- *m* is the moisture content of raw pasta.

## Annex H

(normative)

# Determination of egg yolk solids

## H.1 Preparation of sample

Grind in pestle and mortar about 30 g of the material so that at least 90 % passes through 425 micro sieve. Transfer this prepared sample to a well-stoppered glass bottle for use.

#### H.2 Procedure

**H.2.1** Reflux 100 g sample in a Soxhlet apparatus using 100 cm<sup>3</sup> pure methanol for two hours. Decant and add a further 100 cm<sup>3</sup> pure methanol fractions. Evaporate to dryness. Carry out a phosphorus determination as detailed below.

**H.2.2 Phosphorus Determination** — Weigh 0.05 g of sample into a platinum dish. Add 5 cm<sup>3</sup> of analytical grade chloroform. Add 8 cm<sup>3</sup> of 4 % alcoholic potash and evaporate to dryness in an oven held at 105 °C. Char using an Argand burner and then ash at dull red heat in a muffle furnace. When the dish has cooled, add 5 cm<sup>3</sup> concentrated hydrochloric acid and evaporate to dryness. Extract the residue with 10-cm<sup>3</sup> mL hydrochloric acid. Filter through a Whatman No 54 grade filter paper into a 100 cm<sup>3</sup> graduated flask. Wash any residue well with hot distilled water. Neutralize with normal sodium hydroxide using phenolphthalein as indicator. Make to the mark with distilled water.

Take a sufficient volume by pipette of the prepared solution containing 5 mg to 5 mg phosphorus and transfer to a stout boiling tube.

The total volume should be 5 cm<sup>3</sup>, if lower than this add distilled water. Add, by fast running pipette, 1 cm<sup>3</sup> 10 M sulphuric acid 1 cm<sup>3</sup> 2.5 % ammonium molybdate and 1 cm<sup>3</sup> 20 % potassium iodide solution (containing 0.5 % sodium carbonate). Swirl stopper with a glass ball and hold in a boiling water bath for fifteen minutes. Remove and cool in an ice bath.

Add sufficient freshly prepared 0.5 % sodium sulphate to remove the iodine colour and to give a light excess. Transfer solution and make up to 50 cm<sup>3</sup> in a graduated flask (or smaller volume if found necessary). Measure the colour strength of the solution when held in a 1 cm glass cell using 14 and 608 filters on the Spekker Absorptiometer. Carry out a check on the Absorptionmeter using distilled water in the cell. Calculate the phosphorus content by reference to the reference curve for a standard phosphorus solution.

This solution can be prepared by dissolving 4.388 g analytical grade potassium dihydrogen phosphate in distilled water, adding 2 cm<sup>3</sup> in graduated flask. The solution contains 1 000  $\mu$ g phosphorus/cm<sup>3</sup>, lower concentrations can be obtained by dilution. For comparison purposes, in a series of tests 1  $\mu$ g phosphorus/cm<sup>3</sup> gave a Spekker Absorptiometer of 0.285.

#### **H.3 Calculation**

Egg yolk solids =  $P_2O_5 \times 56$ 

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