KENYA STANDARD

DKS 2680: 2016
ICS 67.100.10

Emmental Cheese — Specification

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TECHNICAL COMMITTEE REPRESENTATION

The following organizations were represented on the Technical Committee:

Kenya Dairy Board
Ministry of Health — Public Health Department
Ministry of Agriculture, Livestock and Fisheries — State Department of Livestock
Ministry of Agriculture, Livestock and Fisheries — Department of Veterinary Services
Egerton University — Department of Dairy and Food Science Technology
Government Chemist's Department
National Public Health Labs
Kenya Industrial Research and Development Institute (KIRDI)
Consumer Information Network
New Kenya Creameries Cooperative (NKCC)
Brookside Dairy Ltd.
Eldoville Dairies Limited
Githunguri Dairy
Happy Cow Ltd
Sameer Agriculture and Livestock (K) LimitedKIBIDAV Ltd (TOGGS)
Kenya Bureau of Standards — Secretariat

REVISION OF KENYA STANDARDS

In order to keep abreast with the progress in the industry, Kenya Standards shall be regularly reviewed. Suggestions for improvements to published standards, addressed to the Managing Director, Kenya Bureau of Standards, are welcome.

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Emmental Cheese— Specification

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Foreword

This Kenya Standard was prepared by the Milk and Milk Products Technical Committee under the guidance of the Standards Project Committee and it is in accordance with the procedures of the Kenya Bureau of Standards.

Cheese is a very nutritious food which consists of a concentration of the constituents of milk, principally fat, casein and insoluble salts, together with water, in which small amounts of soluble salts, lactose, and albumin from milk are coagulated.

There are various types of cheese that are produced and marketed worldwide. This Kenya Standard specifies the requirements for the type of hard ripened cheese being marketed in Kenya as emmentale cheese.

This standard includes a list of food additives, terminology and classification of cheeses, amongst other technical requirements which are important in checking cheese under the regulatory system to prevent adulteration.

In the preparation of this standard useful information was derived from members of the technical committee, Codex general standard for emmental (CODEX STAN 269-1967) and local manufacturers

Emmental Cheese— Specification

1 Scope

This Kenya Standard specifies requirements and methods of sampling and test for emmental cheese intended for direct consumption or for further processing, in conformity with the description in Clause 3 of this standard.

This Kenya Standard applies to emmental cheese made from cow's milk

2 Normative references

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

CODEX STAN 208, Codex Standard for cheese in brine
KS CAC/GL 21, *Recommended international code of hygienic practice for foods for infants and children*
KS CAC/GL 23*, Guidelines for use of nutrition claims*
KS EAS 38, Labelling of prepackaged foods
AOAC 942.17, Arsenic in foods Molybdenum blue method
AOAC 999.10, Lead, Cadmium,Copper, Iron, and Zinc in foods, Atomic Absorption Spectrophotometry after dry ashing
CAC/MRL 2 Maximum Residue Limits for Veterinary Drugs in Food
AOAC 962.16 Beta-lactam Antibiotics in milk
AOAC 980.21, Aflatoxin M1 in milk and cheese-thin layer chromatographic method
AOAC 980.21, organochlorine and organophosphorous pesticide residues in milk and milk products
KS 2455, General Standard- Food Safety
KS 1552: 2016; Code of hygienic practice for milk and milk products
KS 2455, General Standard- Food Safety
KS 2194:2009 – Good Manufacturing practice guide lines and the Dairy industry
KS EAS 69, Pasteurized milk- Specification
KS ISO 707, *Milk and milk products — Guidance on sampling*
KS ISO 1735, *Cheese and processed cheese products — Determination of fat content — Gravimetric method (Reference method)*
KS ISO 2962, *Cheese and processed cheese products — Determination of total phosphorus content — Molecular absorption spectrometric method*
KS ISO 5534, *Cheese and processed cheese — Determination of the total solids content (Reference method)*
KS ISO 5943, *Cheese and processed cheese products — Determination of Sodium chloride content — Potentiometric titration method*
KS ISO 6731, *Milk, cream and evaporated milk - Determination of total solids content (reference method)*

KS ISO 6732; Milk and milk products -- Determination of iron content -- Spectrometric method (Reference method)
KS ISO/TS 6733; Milk and milk products -- Determination of lead content -- Graphite furnace atomic absorption spectrometric method

KS ISO 11866-2:2007; Milk and milk products-Enumeration of presumptive escherichia coli - Part 2: Colony-co
KS ISO 11866-1:2005 (IDF 170-1:2005); Milk and milk products -- Enumeration of presumptive Escherichia coli -- Part 1: Most probable number technique using 4-methylumbelliferyl-beta-D-glucuronide (MUG.
KS ISO 6579:2002 Microbiology of food and animal feeding stuffs - Horizontal method for the detection of Salmonella spp

KS ISO 11866-2, *Milk and milk products-Enumeration of presumptive escherichia coli - Part 2: Colony-count technique at 44 °C using membrane*
unt technique at 44 °C using membrane

KS ISO/TS 11869:2012; Fermented milks -- Determination of titratable acidity -- Potentiometric method
KS ISO 14501:2007 Milk and milk powder - Determination of aflatoxin M content - Clean-up by immunoaffinity chromatography and determination by high-performance liquid chromatography
KS ISO 16649-1:2001; Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli -- Part 1: Colony-count technique at 44 degrees C using membranes and 5-bromo-4-chloro-3-indolyl beta-D-glucuronide
KS ISO 4833-1:2013; Microbiology of the food chain -- Horizontal method for the enumeration of microorganisms -- Part 1: Colony count at 30 degrees C by the pour plate technique

KS ISO 5738:2004 (IDF 76:2004); Milk and milk products -- Determination of copper content -- Photometric method (Reference method)

KS ISO 5546:2010 (IDF 115:2010); Caseins and caseinates -- Determination of pH (Reference method
KS ISO 6611, Milk and milk products — Enumeration of colony—forming units of yeasts and/or moulds — Colony-count technique at 25 degrees C
KS ISO 6888-1:1999; Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) -- Part 1: Technique using Baird-Parker agar medium
KS ISO 8968-1:2014 (IDF 20-1:2014); Milk and milk products -- Determination of nitrogen content -- Part 1: Kjeldahl principle and crude protein calculation

3 Description

Emmental is a ripened hard cheese in conformity with the General Standard for Cheese (CODEX STAN 283-1978). The body has ivory through to light yellow or yellow colour and an elastic, sliceable but not sticky texture, with regular, scarce to plentiful distributed, mat to brilliant, cherry to walnut sized (or mostly from 1 to 5 cm in diameter) gas holes, but few openings and splits are acceptable. Emmental is typically manufactured as wheels and blocks of weights from 40 kg or more but individual countries may on their territory permit other weights provided that the cheese exhibit similar physical, biochemical and sensory properties. The cheese is manufactured and sold with or without 1 a hard, dry rind. The typical flavour is mild, nut-like and sweet, more or less pronounced.
Emmental intended for further processing need not exhibit the same degree of ripening, when justified through technical and/or trade needs

4 Essential composition and quality factors

4.1 Raw materials

Cow milk and products obtained from cow milks complying with relevant Kenya standards

4.2 Permitted ingredients

– Starter cultures of harmless lactic acid and/ or flavour producing bacteria and cultures of other harmless micro-organisms;
– Rennet or other safe and suitable coagulating enzymes;
– Sodium chloride and potassium chloride as a salt substitute;
- Calcium chloride in an amount not more than 0.02 percent (calculated as anhydrous calcium chloride) of the weight of the dairy ingredients, used as a coagulation aid.
– Safe and suitable processing aids;
– Potable water;
– Safe and suitable enzymes to enhance the ripening process;
– Rice, corn and potato flours and starches: Notwithstanding the provisions in the General Standard for Cheese (CODEX STAN 283-1978), these substances can be used in the same function as anti-caking agents for treatment of the surface of cut, sliced, and shredded products only, provided they are added only in amounts functionally necessary as governed by Good Manufacturing Practice, taking into account

any use of the anti-caking agents listed in **Clause 5**.

4.3 compositional requirements

Table 1: compositional requirements for Emmental

Milk constituent	Minimum content (m/m)	Maximum content (m/m)	Reference level (m/m)	**Methods of Analysis**
Milkfat in dry matter:	45%	Not restricted	45% to 55%	**KS ISO 1735**
Dry matter (Total Solids):	Depending on the fat in dry matter content according to the table below			**KS ISO 5534**
	Fat in dry matter content (m/m) :)	**Corresponding minimum dry matter content (m/m**		
	or above 45% but less than 50%:	60%		
	Equal to or above 50% but less than 60%	62%		
	Equal to or above 60%:	67%		
Moisture%, Max	40%			**KS ISO 5534 or AOAC 977.11 /AOAC 969.19**
Salt % Max	3%			**KS ISO 5943 or AOAC 975.20**
Propionic acid in cheese ready for sale(a):	minimum150 mg/100g			ISO 19046-2
Calcium content(a):	minimum 800 mg/100g			Test method

(a) The purpose of these criteria is to provide targets for the validation (initial assessment prior to the design of the manufacturing process), respectively, of (i) whether the intended fermentation and ripening conditions are capable of achieving the activity of propionic acid producing bacteria, and of (ii) whether the curd management and pH development are capable of obtaining the characteristic texture.

(b) Compositional modifications beyond the minima and maxima specified above for milkfat and dry matter are not considered to be in compliance with section 4.3.3 of the General Standard for the Use of Dairy Terms (CODEX STAN 206-1999).

5 Food additives

Only those additives classes indicated as justified in the table below may be used for the product categories specified. Within each additive class, and where permitted according to the table, only those food additives listed below may be used and only within the functions and limits specified.

Additive functional class	Justified use	
	Cheese mass	Surface/rind treatment
Colours:	X(	–
Bleaching agents:	–	–
Acidity regulators:	X	–
Stabilizers:	–	–
Thickeners:	–	–
Emulsifiers:	–	–

2 The temperature required to obtain the compositional and sensory characteristics specified by this Standard depends on a number of other technology factors, including the suitability of the milk for Emmental manufacture, the choice and activity of coagulating enzymes and of primary and secondary starter cultures, the pH at whey drainage and at the point of whey removal, and the ripening/storage conditions. These other factors differ according to local circumstances: In many cases, in particular where traditional technology is applied, a cooking temperatures of approx. 50 ºC is typically applied; In other cases, temperatures above and below are applied.

Additive functional class	Justified use	
	Cheese mass	Surface/rind
Antioxidants:	–	–
Preservatives:	X	X
Foaming agents:	–	–
Anti-caking agents:	–	X(b)

(a) Only to obtain the colour characteristics, as described in Section 2. (b) For the surface of sliced, cut, shredded or grated cheese, only.

X The use of additives belonging to the class is technologically justified.
– The use of additives belonging to the class is not technologically justified.

INS no.	Name of additive	Maximum level
Colours		
160a(i)	Carotene, beta-, synthetic	35 mg/kg singly or in combination
160a(iii)	Carotene, beta-, Blakeslea trispora	
160e	Carotenal, beta-apo-8'-	
160f	Carotenoic acid, ethyl esters, beta-apo-	
160a(ii)	Carotenes,beta-, vegetable	600 mg/kg
160b(ii)	Annatto extracts – norbixin based	25 mg/kg
Preservatives		
1105	Lysozyme	Limited by GMP
200	Sorbic acid	1 000 mg/kg based on sorbic acid. Surface treatment only*
201	Sodium sorbate	
202	Potassium sorbate	
203	Calcium sorbate	
234	Nisin	12.5 mg/kg
235	Natamycin (pimaricin)	2 mg/dm2 Not present at a depth of 5 mm. Surface
251	Sodium nitrate	35 mg/kg singly or in combination (expressed as nitrate ion)
252	Potassium nitrate	
Acidity regulators		
170(i)	Calcium carbonate	Limited by GMP
504(i)	Magnesium carbonate	Limited by GMP
575	Glucono delta-lactone	Limited by GMP
Anticaking agents		
460(i)	Microcrystalline cellulose (Cellulose gel)	Limited by GMP
460(ii)	Powdered cellulose	Limited by GMP
551	Silicon dioxide, amorphous	10 000 mg/kg singly or in combination Silicates calculated as silicon dioxide
552	Calcium silicate	
553(i)	Magnesium silicate, synthetic	
553(iii)	Talc	

* For the definition of cheese surface and rind see Appendix to the General Standard for Cheese (KS 28-1).

6. Hygiene Requirements

6. It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of KS 2194:2009 and other relevant Kenya standards and regulations. The products should comply with any microbiological criteria established in accordance with KS CAC/GL 21

6.2 The products shall comply with any microbiological criteria established in accordance with Table 2 below.

Table 3 — Microbiological requirements for emmentale cheese

S/N	Quality	Requirements	Test method
	Total plate count /g, Max	*20000 cfu/g*	KS ISO 4833
	Listeria monocytogenes *max,*	*Nil per gram*	*KS ISO 4833*
	Salmonella spp in 25g or (ml)	*Nil*	*KS ISO 4833*
	Shigella in25g or (ml)	*Nil*	*KS ISO 21567 or KS ISO 4833*
	Clostridium botulinum	*Nil per gram*	*KS ISO 4833*
	Staphylococcus aureus in 25g or (ml)	*Nil*	*KS ISO 4833*
	E.coli in25g or (ml)	*Nil*	*KS ISO 4833*
	Faecal coliforms:, max	*Nil per gram*	*KS ISO 4832*
	Non-faecal coliforms, max	*10 cfu/g*	*KS ISO 4832*
	Mould, max	*100 cfu/g gram*	*KS ISO 6611*
	Yeast, max	*100 cfu/g*	*KS ISO 6611*

7 Contaminants

The products covered by this Standard shall comply with the Maximum Levels for contaminants that are specified for the product in the General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995).
The milk used in the manufacture of the products covered by this Standard shall comply with the Maximum Levels for contaminants and toxins specified for milk by the General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193-1995) and with the maximum residue limits for veterinary drug residues and pesticides established for milk by the CAC.

7.1 Heavy metals

The products covered by this standard shall comply with the maximum limits in Table 5

Table 4 — Limits for heavy metal contaminants for Emmentale cheese

SL No	Heavy metal	MRL (Max.)	Test method
i).	Arsenic (AS)	0.1 mg/kg	*AOAC 942.17*
ii).	Lead (PH)	0.02 mg/kg	AOAC 972.25 / KS ISO 6733
iii).	Mercury (Hg)	1.0 mg/kg	AOAC 999.10
iv).	Copper (Cu)	5.0 mg/kg	AOAC972.25 / KS ISO 5738
v).	Zinc (Zn)	50 mg/kg	AOAC 999.10
vi).	Tin (Sn)	250 mg/kg	AOAC 999.10
vii).	Cadmium as Cd,	1.5 mg/kg	AOAC 999.10
viii).	Iron (fe),	0.5 mg/kg	AOAC 999.11/ KS ISO 6732

7.2 Pesticide residues

In addition to the maximum limits in table 5 below; the products covered by the provisions of this standard shall conform to those maximum limits for pesticides established by the Codex Alimentarius Commission for these products in codex Stan 193;

Table 7- maximum pesticide residue Limits for Emmental cheese

S/N	Parameter	Requirements	Test method
i	ORGANOCHLORINE Group	0.01 ppm	KS ISO 3890-1:2009 OR AOAC 970.52
ii	ORGANOPHOSPHOROUS Group	0.01 ppm	AOAC 970.52

7.3 Mycotoxin residues

Emmental cheese shall not have more than 0.05ppb aflatoxin m1 content when tested according to KS ISO 14501:2007/ **AOAC 974.17 and AOAC 980.21 ,** Aflatoxin M1 in milk and cheese-thin layer chromatographic methods

7.4 Total Antibiotic residues

Emmantal cheese shall not have more than 10.0 ppb total antibiotic residues as (beta lactam) content when tested according to AOAC 982.14, 15, 16, 17 and18 and AOAC 962.14, Beta-lactam Antibiotics in milk

7.5 Veterinary Drug Residues

In addition to the maximum limits in table 6 below; the products covered by the provisions of this standard shall conform to those maximum limits for veterinary drug residue limits established by the Codex Alimentarius Commission for these products in codex Stan 193;

Table 6- maximum veterinary drug residue Limits for Emmantal cheese

S/N	Parameter	Requirements/ MRL	Test method
i	ChloramPhenical	*ND*	*AOAC 972.17*
ii	Nitrofunas(including metabolites)	*ND*	*AOAC*
	Ronidazole	ND	*AOAC*
	Metronidazole	ND	*AOAC 991.17*
	Fenbendazole	100ppb	*AOAC 991.17*
	Albendazole	100ppb	*AOAC 991.17*
	Phenylbutazone	ND	*AOAC 991.17*

8 PACKAGING AND LABELLING

8.1 Packaging

The product shall be packed in food grade material that ensures product safety and integrity.

8.2 Labelling

In addition to the provisions of the General Standard for the Labelling of Prepackaged Foods; KS EAS 38 and the General Standard for the Use of Dairy Terms (CODEX STAN 206-1999), the following specific provisions apply:

8.2.1 Name of the food

The name Emmental or Emmentaler may be applied in accordance with KS EAS 38, provided that the product is in conformity with this standard.

The use of the name is an option that may be chosen only if the cheese complies with this standard. Where the name is not used for a cheese that complies with this standard, the naming provisions of the KS 28, General standard for cheese shall apply.

The designation of Emmental in which the fat content is below or above the reference range but above the absolute minimum specified in section 3.3 of this Standard shall be accompanied by an appropriate qualification describing the modification made or the fat content (expressed as fat in dry matter or as Percentage by mass whichever is acceptable in the country of retail sale).

The designation may also be used for cut, sliced, shredded or grated products made from cheese which cheese is in conformity with this Standard.

8.2.2 Country of origin

The country of origin (which means the country of manufacture, not the country in which the name originated) shall be declared. When the product undergoes substantial transformation in a second country, the country in which the transformation is performed shall be considered to be the country of origin for the purpose of labeling.

8.2.3 Declaration of milkfat content

The milk fat content shall be declared in a manner found acceptable in the country of retail sale, either;

i) as a percentage by mass,

ii) as a percentage of fat in dry matter, or

iii) in grams per serving as quantified in the label, provided that the number of servings is stated.

8.2.3 Nutrient Declaration

Nutritional claim shall be made in accordance with the Guidelines for the Use of Nutritional Claims (CAC/GL 23-1997)

8.2.4 Date marking:

i) Date of manufacture

ii) Expiry date;

ii) Storage instructions and / or conditions

8.2.5 Name and address of manufacturer

8.2.6 Net weight content

8.2.7 Brand name of the product

8.2.8 Batch or code number

8.2.9 Labelling of non-retail containers

If necessary, storage instructions, shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name of the manufacturer or packer shall appear on the container, and in the absence of such a container, on the product itself. However, lot identification and the name

and address may be replaced by an identification mark, provided that such mark is clearly identifiable with the accompanying documents.

9 Methods of Analysis and Sampling

The methods of sampling and analysis shall be those provided in the normative references listed in Clause 2 of this standard.

ANNEX A
(Normative)

A.1 ripening procedure

For Emmental ready for consumption, the ripening procedure to develop flavour and body characteristics is normally from 2 months at 10–25°C depending on the extent of maturity required. Alternative ripening conditions (including the addition of ripening enhancing enzymes) may be used, provided a minimum period of 6 weeks is observed and provided the cheese exhibits similar physical, biochemical and sensory properties as those achieved by the previously stated ripening procedure.

A.2 Essential manufacturing characteristics

Emmental is obtained by microbiological fermentation, using thermophilic lactic acid producing bacteria for the primary (lactose) fermentation; the secondary (lactate) fermentation is characterized by the activity of propionic acid producing bacteria. The curd is heated after cutting to a temperature significantly above2 the coagulation temperature.

ANNEX B- ADDITIONAL INFORMATION

(Informative)

The additional information below does not affect the provisions in the preceding sections which are those that are essential to the product identity, the use of the name of the food and the safety of the food.

1. Appearance characteristics
Usual dimensions:
Shape: Wheel Block
Height: 12–30 cm 12–30 cm
Diameter: 70–100 cm –
Minimum weight: 60 kg 40 kg
2. Method of manufacture
2.1 Fermentation procedure: Microbiologically derived acid development

