Bangladesh Standard
SPECIFICATION FOR
ULTRA HIGH TEMPERATURE (UHT) TREATED MILK
(Draft for First Revision)

1. SCOPE

1.1 This standard prescribes the requirements and the method of sampling and tests for Ultra High Temperature (UHT) treated milk.

2. REFERENCES

2.1 The Bangladesh Standards listed in Annex A is necessary adjuncts to this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

3. TERMINOLOGY

3.1 For the purpose of the specification the following definitions shall apply:

3.2 Milk– Milk is the normal lacteal secretion derived from complete milking of healthy animal without either addition of thereto or extraction therefrom. It shall be free from colostrum and obtained by the complete milking of one or more healthy animals (cow, buffalo, sheep or goat).

3.3 Whole milk/Full cream milk – Whole milk/Full cream milk means any of the milk mentioned under section **3.2** or adding water[1] in Whole milk powder/Full cream milk powder which obtain through spray-drying process (comply with the requirements of BDS 860). In both cases, minimum milk fat and milk solids-not-fat content are 3.5 and 8.0 respectively.

3.4 Whole milk powder/Full cream milk powder – A product obtained by the removal of water only from milk of cow, buffalo, sheep or goat (see section **3.3**) through spray-drying process and comply with the requirements of BDS 860.

3.5 Skimmed milk powder – A product obtained by the removal of water only from skimmed milk (see section **3.11**) of cow, buffalo, sheep or goat (section **3.2**) through spray-drying process and comply with the requirements of BDS 860.

3.6 Standardized milk – Milk prepared by adjusting fat and/or solids–not-fat (SNF) content to a certain pre-determined level. The standardization can be done by partially skimming of fat in the milk with a cream separator, or by admixture with fresh or reconstituted skimmed milk/reconstituted whole milk in proper proportions to adjust prescribed milk fat and SNF content.

3.7 Reconstituted milk – Milk prepared by dispersing whole milk powder/full cream milk powder (see section **3.4**) in water[1]in the amount necessary to re-establish the appropriate water-to-solids ratio to achieve similar characteristics and appropriate compositional requirements of whole milk.

3.8 Toned milk – Milk obtained by addingwater[1] and skimmed milk powder (see section **3.5**) to whole milk.

[1]Water means drinking water, which obtain from a treatment process and conform BDS 1240

3.9 Medium fat milk – Medium fat milk which obtain from milk (see section **3.2**) having milk fat minimum 2.0 % (m/m) and not more than 3.4 % (m/m).

3.10 Low fat milk – Low fat milk which obtain from milk (see section **3.2**) having milk fat minimum 0.5 % (m/m) and not more than 1.9 % (m/m).

3.11 Fat free or skimmed milk – Fat free or skimmed milk which obtain from milk (see section **3.2**) having milk fat less than 0.5 % (m/m).

3.12 UHT treated milk – Milk, described in section **3.2** to **3.11** has undergone through processes mentioned in section **4** and fulfilled the requirements described insection**5** of this standard.

3.13 UHT whole/full cream milk – Whole/full cream milk mentioned in section **3.3** that has undergone through processes mentioned in section **4** and fulfilled the requirements described in section**5** of this standard.

3.14 UHT standardized milk – Standardized milk mentioned in section **3.6** that has undergone through processes mentioned in section **4** and fulfilled the requirements described in **5** of this standard.

3.15 UHT reconstituted milk – Reconstituted milk mentioned in section **3.7** that has undergone through processes mentioned in section **4** and fulfilled the requirements described insection**5** of this standard.

3.16 UHT toned milk – Toned milk mentioned in section **3.8** that has undergone through process mentioned in section 4 and fulfilled the requirements described in section 5 of this standard.

3.17 UHT medium fat milk – Medium fat milk mentioned in section **3.9** that has undergone through processes mentioned in section **4** and fulfilled the requirements described in section **5** of this standard.

3.18 UHT low fat milk – Low fat milk mentioned in section **3.10** that has undergone through processes mentioned in section **4** and fulfilled the requirements described in section **5** of this standard.

3.19 UHT fat free or skimmed milk – Fat free or skimmed milk mentioned in section **3.11** that has undergone through processes mentioned in section **4** and fulfilled the requirements described in section **5** of this standard.

4 Ultra High Temperature (UHT) Method

a) Milk (see section **3.2** to **3.11**) treated by the direct culinary steam injection method, water[1]may be introduced into the milk (see section **3.2** to **3.11**) by direct culinary steam injection, provided that this process is necessary for manufacture and that exactly the same amount of water[1]vapour is driven off as was introduced into the milk. Water shall not be otherwise introduced to the milk.

b) Milk (see section **3.2** to **3.11**) treated by the ultra-high temperature method shall efficiently heated to and maintained at not less than 135 ^{0}C for not less than 2 seconds then followed by immediate cooling and aseptic packaging into sterile hermetically sealed containers in which it is supplied to the consumer and kept in a wholesome state at room temperature for not less than fifteen days from the date of manufacture.

c) All UHT treated milk (see section **3.13** to **3.19**) should be homogenized. There should be no visible separation of fat after 48 hours of quiescent storage at 7 ^{0}C. The fat percentage of the top 100 ml of milk in a one liter bottle or of proportionate volumes in containers or other sizes, does not differ by more than 10% from the fat percentage of the remaining milk as determined after thorough mixing (see Annex B).

[1]Water means drinking water, which obtain from a treatment process and conform BDS 1240

5. REQUIREMENTS

Physical, chemical and microbiological requirements of UHT treated milk are as follows:

5.1 Description – All UHT treated milk (see section **3.13** to **3.19**) shall have white yellowish opaque colour with fresh sweetish characteristic flavour of milk. It shall be free from visible dirt and extraneous matter. UHT treated milk shall not contain whey powder, preservatives, detergent or any other added substances except water[1] (only for reconstituted milk).

5.1.1 All products shall be free from any kind of foreign fat (other than milk fat) and solids. Milk fat in any form like cream, butter, butter oil, ghee, etc. are not allowed to add in any UHT treated milk for standardization and reconstitution purpose.

5.2 Hygienic condition – The products shall be prepared in the premises maintained in accordance with BDS 822.

5.3 Legal Requirement

The products shall also comply in all other aspects with the requirements of the legislations enforced in the country.

5.4 The products shall also comply with the requirements given in Table 1

TABLE 1: REQUIREMENT FOR UHT TREATED MILK

Sl No.	Characteristic	Requirement	Method of Test
(1)	(2)	(3)	(4)
i)	Fat, percent by mass, a) UHT whole milk b) UHT standardized milk c) UHT reconstituted milk d) UHT toned milk e) UHT medium fat milk f) UHT low fat milk g) UHT fat free or skimmed milk	 a) Min. 3.5 b) Min. 3.5 c) Min. 3.5 d) Min. 2.0 e) 2.0 - <3.5 f) 0.5 - <2.0 g) Max. 0.5	AOAC 905.2/ISO 2446
ii)	Solids Non Fat (SNF), percent by mass, Min.	8.0 9.0*	ISO 6731
iii)	Density, g/ml at 15.5 ºC	1.028 - 1.036	See note-1
iv)	Lactose, percent by mass, Min.	4.4	ISO 5548
v)	Protein, percent by mass, Min.	3.0	ISO 8968-1
vi)	Titratable acidity (as Lactic acid per 100 ml of milk), Max.	0.18	ISO TS 22113:2012
vii)	Total plate count, CFU/ml, Max.	10	ISO 4833-1
viii)	Coliform count, CFU/ml	absent	Annex C
ix)	Alcohol test	Negative	Annex E

* Solids-not-fat (SNF), percent by mass, Min. subject to UHT toned milk only

NOTE 1: Density of normal milk may be determined by hydrometer (lacto-meter)

[1]Water means drinking water, which obtain from a treatment process and conform BDS 1240

5.5 Pesticides and veterinary drug residues, heavy metal and Aflatoxin M_1

5.5.1 The product may comply with the requirements described in Bangladesh Food Safety Authority Regulation. This characteristic shall be tested only if considered as necessary.

6. Packing and Marking

6.1 Packing – The UHT treated milk (see section **3.12** to **3.19**) shall be filled in clean, sound and sanitary containers made of glass or food grade polyethylene pouches, inner laminated tetra pack, plastic containers, cans or any other suitable materials or dispensing units. The product when marketed shall be packaged in well-sealed containers in order to prevent spoilage or contamination of the product. The packaging material used shall be food grade light proof, gas proof, mechanically strong, non-toxic and do not impart any off-flavour to the milk.

6.1.1 All packets/containers shall be clean and free from chips, cracks and any other defects. Bottles shall be hermetically sealed with new and clean closures and cans shall be sealed with new and clean can closures. The plastic container shall be heat sealed along one or more edges and shall not leak after it is filled with the products. All containers shall be subjected to cleansing and sanitizing process before filling.

6.2 Labeling – All labelling information shall be in Bangla and if necessary, any other suitable languages. The following information shall appear legibly on each container or label. Labels shall be clear in readable form of normal vision, easily visible and pasted securely. Brand name and product name shall be close together front panel preferably in similar font size. Product name shall not smaller than two font size of the brand name.

a) Name of the product: 'UHT whole milk/UHT standardized milk/UHT reconstituted milk/UHT toned milk/UHT medium fat milk/UHT low fat milk/UHT fat free or skimmed milk' as applicable;

Note 2:

(i) For UHT whole milk/UHT medium fat milk/UHT low fat milk/UHT fat free or skimmed milk declaration on the label shall be **"Prepared from fresh whole milk''**.

(ii) For UHT standardized milk/UHT toned milk declaration on the label shall be **"Prepared by adding skimmed milk with fresh whole milk"/"Reconstituted skimmed milk with fresh whole milk"/ "Reconstituted milk with fresh whole milk"**.

(iii) For UHT reconstituted milk declaration on the label shall be **"Prepared by mixing water with whole milk powder"**.

b) Fat -------- percent [see item (i) of Table 1];
c) Batch or code number;
d) Name and address of the manufacturer/importer;
e) Net volume of the contents in litres or milliliters;
f) Nutritional information;
f) Date of packing;
g) Date of expiry;
h) Storage and user instruction;
i) Maximum Retail Price (MRP) and
j) Any other requirements as specified in the current Legislations and Regulation enforced in the country.

6.2.1 The container or label shall be marked with the BSTI Certification Mark

NOTE 3: The use or BSTI Certification Mark is governed by the provisions of the Bangladesh Standards and Testing Institution Act, 2018 and the Rules and Regulations made there under. Details of conditions under which a licence for the use of BSTI Certification Mark may be granted to manufacturers or processors or importer may be obtained from the Bangladesh Standards and Testing Institution.

7. SAMPLING

7.1 The method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in BDS 1009.

8. TESTS

8.1 Tests shall be carried out as prescribed by the methods specified in section 4 (c) and column 4 of Table 1.

8.2 Quality of regents **–** Unless specified otherwise, pure chemicals shall be employed in tests and distilled water (see BDS 833) shall be used where the use of water as a reagent is intended.

NOTE4: `Pure chemicals' shall mean chemicals that do not contain impurities, which affect the result of analysis.

Annex A
(Clause 2)
List of Relevant Standards

BDS and ISO No.	Title
BDS 103	Methods of rounding off numerical value
BDS 822	Code of hygienic conditions for food processing units
BDS 833	Water for laboratory use
BDS 1009	Method of sampling and test for milk and milk products
BDS 1240	Drinking water
ISO 2446:2008	Milk – Determination of milk fat content
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
ISO 5548:2004	Caseins and caseinates – Determination of lactose content – Photometric method
ISO 6731:2010	Milk, cream and evaporated milk – Determination of total solids content (Reference method)
ISO 8968-1	Milk and milk products - Determination of nitrogen content - Part 1: Kjeldahl principle and crude protein calculation
ISO TS 22113:2012	Milk and milk products — Determination of the titratable acidity of milk fat

ANNEX B
[Clause 4(C)]
Homogenization Test

B-1 APPARATUS

B-1.1 Bottle/container, 1 litre (or containers of other sizes)

B-2 PROCEDURE

B-2.1 Transfer the milk (1 litre or proportionate volumes) to a one litre bottle or container of other sizes.

B-2.2 Mix the sample thoroughly.

B-2.3 Withdraw 100 ml (or of proportionate volume in containers of other sizes) of the top milk. Determine the fat contain of this milk according to the method as described in ISO 2446 in Table 1.

B-2.4 Determine also the fat content of the remaining milk

B-2.5 Compare the fat content between these two samples. The fat percentage of the top 100 ml of milk in one litre bottle/container (or of proportionate volumes in containers of other sizes) should not differ by more than 10% from the fat percentage of the remaining milk.

ANNEX C
[Table 1, item (viii)]
DETERMINATION OF COLIFORM COUNT

C-1 GENERAL

C-1.1 Coli form Bacteria – Coliform bacteria include all aerobic and facultative anaerobic gram negative non-spore forming bacteria which ferment lactose with the production of acid and gas. A positive presumptive test is indicated by formation of acid and gas within 48 hours at 35 ^{0}C to 37 ^{0}C in a fermentation tube containing lactose bile salt broth. Alternatively, the development of dark red colonies at least 0.5 mm in diameter in a solid medium (violet red bile agar) within 20 to 24 hours at 35 ^{0}C to 37 ^{0}C may be considered as a positive evidence of the presence of coliform bacteria. Violet red bile agar is one of the standard media used for determination of general types of coliform organisms including those of faecal origin in water, milk and other materials or sanitary importance.

C-2 APPARTUS

C-2.1 Weighing scoop sterile - with counter mass (weight)

C-2.2 Bacteriological transfer pipettes sterile – accurately graduated, with cotton plug in the upper orifice.

C-2.3 Dilution bottles, sterile - made of heat-resistance glass (preferably silicate glass) closed with rubber stoppers (preferably screw cap) with new friction-fit liners for making them leak-proff and of the following capacities:

a) 150 ml with mark at 99 ml level; and
b) 25 ml with mark at 9 ml level.

C-2.4 Petri dishes - with outside dish diameter 100 mm, inside dish diameter 91 mm and depth 15 mm. The exterior and interior surfaces of the bottom should be flat and free from bubbles scratches or other defects which would interfere with counting of colonies.

C-2.5 Bacteriological tubes sterile - 25 ml capacity with a mark at the 10 ml level, with cotton plugs.

C-2.6 Tubes having inverted vials - Durham tubes.

C-3 REAGENT

C-3.1 Dilution water - Dissolve 34 g of potassium dihydrogen phoshate (KH_2PO_4) in 500 ml of distilled water, adjust with 1 N sodium hydroxide solution and make up to one litre with distilled water. Dilute 1.25 ml of this stock phoshpate buffer solution with distilled water to one litre to obtain dilution water.

C-3.2 Medium - Violet red bile agar of following composition and pH shall be used as the medium:

Yeast extract	3.0 g
Peptone	7.0 g
Sodium taurocholate	1.5 g
Lactose	10.0 g
Sodium chloride	5.0 g
Agar-agar	20.0 g
Indicator	
Neutral red	0.03 g
Crystal violet	0.002 g
Water	100 ml
Final pH	7.4 ± 0.1

C-3.2.1 Preparation and sterilization of medium - Soak the materials (C-3.20) for 3 to 5 minutes in cold water, then bring the mixture into complete solution with minimum delay by boiling above asbestos centered wire gauze, over a flame. Stir continuously and efficiently to avoid charring. Adjust the solution to pH 7.4 ± 0.1 at 5 ^{0}C with sodium hydroxide solution. Filler through cotton pad till clear filtrate is obtained. Fill into bacteriological tubes to 10 ml mark. Sterilize in an autoclave 121^{0}C for 15 minutes.

C-4 PROCEDURE

C-4.1 Dilution - Weigh 11 g of the material from the samples for bacteriological examination using a sterile spatula and suspend in 99 ml of dilution water at 45 ^{0}C. Agitate mildly, soak for one to three minutes and then agitate vigorously to avoid churming out the fat. Prepare dilutions of this and add on millilitre of suitable dilutions in triplicate to the sterile petri dishes.

C-4.2 Pouring plates - Melt the medium (see C-3.2.1) in bacteriological tubes and keep at 48 ^{0}C to 50 ^{0}C. Introduced this medium aseptically at 42 ^{0}C to 44 ^{0}C into the petri dishes and mix by rotating and tilting dishes without spreading over the edges, spread the mixture evenly over the bottom of the plate. Allow to solidify, after solidification of medium in plate, add cover layer of the medium.

C-4.3 Incubation - Invert plates and incubate at 35 ^{0}C to 37 ^{0}C for 24 hours.

C-4.4 Counting - Count the dark red colonies which have a diameter of 0.5 mm or over.

C-4.5 Computation - Compute the coliform count per gram from the dilutions used (see C-4.1).

NOTE 5: In case of doubt regarding the colonies developed on violet red bile agar representative colonies are picked and transferred to lactose bile salt broth in tubes having inverted vials. Production of acid and gas in confirmatory for coliform organisms.

NOTE 6: All precautions shall be observed to prevent microbiological contamination throughout the test.

Annex D
Table -1, Item (ix)
Alcohol test

D-1 Alcohol Test

The test is quick and simple. It is based on instability of the proteins when the levels of acid and/or rennet are increased and acted upon by the alcohol. Also increased levels of albumen (colostrum milk) and salt concentrates (mastitis) results in a positive test.

D-2 Procedure

The test is done by mixing equal amounts of milk and 68% of ethanol solution in a small bottle or test tube. 68 % Ethanol solution is prepared from 68 ml 96% (absolute) alcohol and 28 ml distilled water. If the tested milk is of good quality, there will be no coagulation, clotting or precipitation, but it is necessary to look for small lumps. The first clotting due to acid development can first be seen at 0.21 - 0.23 % Lactic acid. For routine testing 2 ml milk is mixed with 2 ml 68 % alcohol.