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SPECIFICATION FOR WHEAT FLOUR
(Second Revision)

SRI LANKA STANDARDS INSTITUTION

Sri Lanka Standard
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(Second Revision)

SLS 144: 2019

(Attached Corrigendum No 1)

Gr. 9

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Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This Standard does not purport to include all the necessary provisions of a contract

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FOREWORD

This Standard was approved by the Sectoral Committee on Food Products and authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2019-07-10.

This Standard was first published in 1972 and revised in 2003. In this second revision types of wheat flour have been amended. Limits for heavy metals and mycotoxins have been introduced.

This Standard is subject to the provisions of the Food Act No. 26 of 1980 and the regulations framed thereunder.

For the purpose of deciding whether a particular requirement of this Standard is complied with, the final value, observed or calculated, expressing the results of a test or an analysis, shall be rounded off in accordance with **SLS 102**. The number of significant places to be retained in the rounded off value shall be the same as that of the specified value in this Standard.

In revising this Standard, the assistance obtained from the relevant publications of Codex Alumantarious Commission, and East African community, is gratefully acknowledged.

1 SCOPE

1.1 This Standard prescribes the requirements and methods of test for wheat flour. This Standard applies to wheat flour for direct human consumption prepared from common wheat *Triticum aestivum* L., or club wheat, *Triticum compactum* Host., or mixtures thereof, which is prepackaged and ready for sale to the consumer or destined for use in other food products.

1.2 It does not apply:

1.2.1 to any product prepared from durum wheat, *Tritucum durum* Desf., singly or in combination other wheat;

1.2.2 to semolina, common wheat, *Triticum aestivum* L., or club wheat, *Triticum compactum* Host., or mixtures thereof;

1.2.3 to wheat flour destined for use as a brewing adjunct or for the manufacture of starch and/ or gluten;

1.2.4 to wheat flour for non-food industrial use;

1.2.5 flours whose protein content have been reduced or which have been submitted after the milling process to a special treatment other than drying or bleaching and/ or to which have been added other ingredients than those mentioned under optional ingredients and additives.

2 REFERENCES

SLS	102	Rules for rounding off numerical values
SLS	124	Test sieves
SLS	143	Code of practice for general principles of food hygiene
SLS	190	Methods of sampling for ground cereals, pulses and milled products
SLS	303	Method for the determination of Cadmium
SLS	311	Method for the determination of Lead
SLS	312	Method for the determination of Arsenic
SLS	428	Random sampling methods
SLS	467	Code of practice for labelling of prepackaged foods
SLS	910	Limits for pesticide residues in food
SLS	962	Foodstuffs -- Determination of aflatoxin B_1, and the total content of aflatoxins B_1, B_2, G_1 and G_2 in cereals, nuts and derived products – Part 1: High-performance liquid chromatographic method
SLS ISO	21415	Wheat and wheat flour- gluten content Part 1: Determination of wet gluten by manual method Part 2 Determination of wet gluten and gluten index by mechanical means Part 3 Determination of dry gluten from wet gluten by an oven drying method Part 4 Determination of dry gluten from wet gluten by rapid drying method

Official Methods of Analysis, Association of Official Analytical Chemists (AOAC) 20th Edition, 2016

3 DEFINITIONS

For the purpose of this Standard, the following definitions shall apply:

3.1 Atta flour/ whole meal flour/ whole wheat flour: Wheat flour obtained by milling the entire wheat grain to fine particle size without any separation

3.2 high protein flour: White wheat flour made from semi hard/ hard wheat which has a high protein content intended for bread making

3.3 home baking/ all-purpose flour: White wheat flour obtained by milling either soft wheat grains or blends of hard and soft wheat grains used for making wide range of baked products

3.4 self-raising flour: White wheat flour obtained by milling soft or a blend of soft and hard wheat to which raising agents are added

3.5 wheat flour: The product prepared from grain of common wheat, *Triticum aestivum* L., or club wheat, *Tritucum compactum* Host., or mixtures thereof, by grinding or milling processes in which the bran and germ are partly removed and the remainder is comminuted to a suitable degree of fineness

4 TYPES

Type 1	Atta flour/ whole meal flour/ whole wheat flour
Type 2	High protein flour
Type 3	Home baking/ all-purpose flour
Type 4	Self-raising flour

5 INGREDIENTS

5.1 Enzymes

5.1.1	*alpha-amylase-from Bacillus subtilies*	INS 1100(iii)	limited by GMP
5.1.2	*Fungal alpha-amylase from Aspergillus oryzae*	INS 1100(i)	limited by GMP
5.1.3	*Protease enzyme from Aspergillus oryzae*	INS 1101(i)	limited by GMP

5.2 Flour treatment agent

5.2.1	*L- ascorbic acid*	INS 300	300	mg /kg
5.2.2	*Sodium ascorbate*	INS 301	300	mg /kg
5.2.3	*Potassium ascorbate*	INS 303	300	mg/kg
5.2.4	*Sulphur dioxide (in flours for biscuit and pastry manufacture only*	INS 220-225 INS 227-228	200	mg /kg
5.2.5	*Phosphate as phosphorus (*except for the self-rising flour at 12,000 mg.kg)			
	Calcium dihydrogen phosphate	INS 341(i)		
	Calcium hydrogen phosphate	INS 341(ii)		
	Tricalcium phosphate	INS 341 (iii)		
5.2.6	*Lecithin*	INS 322(i)	Limited by GMP	
5.2.7	*Azodicarbonamide for leavened bread*	INS 927a	45	mg /kg
5.2.8	*Diacetyl tartaric and fatty acid esters of glycerol*	INS 472	3,000	mg /kg

5.2.9 Leaving agents/ raising agents (only for self-raising flour)

6 REQUIREMENTS

6.1 Hygienic requirements

Wheat flour shall be manufactured, packaged, stored and transported under hygienic conditions as prescribed in **SLS 143**.

6.2 General requirements

6.2.1 Wheat flour shall have the characteristic taste and odour. It shall be free from insect and fungal infestation, rodent contamination, dirt, dead and living insects and other extraneous and foreign matter.

6.2.2 Wheat flour shall be free from objectionable flavours.

6.2.3 Wheat flour shall not contain extraneous flour or starch or any other extraneous matter.

6.2.4 Wheat flour shall have an extraction rate of minimum 75 per cent.

6.3 Other requirements

Wheat flour shall comply with the requirements given in Table **1** when tested according to the methods prescribed in Column **8** of the table.

TABLE 1 - Requirements for wheat flour

Sl No.	Characteristic	Requirement				Method of test
		Wheat flour	Atta flour/ whole meal flour/ whole wheat flour	Self Raising flour	High protein flour	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Moisture, per cent by mass, max.	14	14	14	14	Appendix **A**
ii)	Total ash, on dry basis, per cent by mass, max.	0.6	2.0	3.0	0.8	Appendix **B**
iii)	Acid insoluble ash, on dry basis, per cent by mass, max.	0.1	0.1	0.1	0.1	Appendix **C**
iv)	Protein (N x 5.7), on dry basis, per cent by mass, min.	9.5	9.5	9.5	12.0	Appendix **D**
v)	Diastatic activity, mg maltose per 10 g flour	200-450	200-450	200-450	200-450	Appendix **E**
vi)	Granularity					
	a) Per cent by mass retained on 180 µm sieve, max.	2	20	2	2	Appendix **F**
	b) Per cent by mass passing through 150 µm sieve, min.	75	75	75	75	
viii)	Wet Gluten, per cent, by mass, min.	26	–	26.5	26.0	SLS ISO **21415**: Part.**1** or **2**
ix)	Dry Gluten, per cent, by mass, min.	8.0	–	8.0	8.0	SLS ISO **21415**: Part.**3** or **4**

NOTE
Requirements given in wheat flour (Column 3) has been covered home baking flour and all-purpose flour

6.4 Contaminants

6.4.1 *Iron dust*

Iron dust shall be less than 3.0 mg/kg in accordance with test method given in Appendix **G**.

6.4.2 *Potentially toxic elements*

The product shall not exceed the limits for potentially toxic element given in Table **2**, when tested according to the methods given in Column **4** of the table.

TABLE 2 - Limits for potentially toxic element

Sl No. (1)	**potentially toxic element** (2)	**Limit** (3)	**Method of test** (4)
i)	Arsenic as As, mg/ kg, max.	0.1	AOAC 986.15 / SLS 312
ii)	Lead as Pb, mg/ kg, max.	0.2	AOAC 994.02 / SLS 311
iii)	Cadmium as Cd, mg/ kg, max.	0.1	AOAC 999.11/ SLS 303

6.4.3 *Mycotoxin*

The product shall not exceed the limits for mycotoxins given in Table **3**, when tested according to the methods given in Column **4** of the table.

TABLE 3 - Limits for mycotoxins

Sl No. (1)	**Mycotoxin** (2)	**Limit** (3)	**Method of test** (4)
i)	Total aflatoxins, µg/ kg, max	4	SLS 962 : Part 1
ii)	Aflatoxins B_1, µg/ kg, max.	2	SLS 962 : Part 1

6.4.4 *Pesticide residues*

Wheat flour shall be processed with special care under Good Agricultural Practices and Good Manufacturing Practice **SLS 143**, so that residues of those pesticides which may be required in the cultivation and production do not remain or if practically unavoidable, are reduced to the maximum extent possible. The product shall comply with the maximum pesticide residue limits given in **SLS 910**.

NOTE
It is not necessary to carry out this determination as a routine for all the samples. This should be tested in case of dispute and when required by the purchaser or vendor or when there is any suspicion of pesticide contamination.

7 PACKAGING

Material used for packaging and marking shall be of food grade and they shall not impart any toxic substance or undesirable odour or flavour to the product.

8 MARKING AND/ OR LABELLING

8.1.1 The following information shall be marked and/ or labeled legibly and indelibly on each package.

(a) Common name and type of the product;
(b) Brand name or registered trade mark;
(c) Name and address of the manufacturer and the distributor;
(d) Net mass, in "g" or "kg";
(e) Batch or code number; or decipherable code marking;
(f) Date of manufacture;
(g) Date of expiry;
(h) List of ingredients in descending order of proportion;
(j) Instructions for storage if any; and
(k) Any permitted food additive name and INS number, if added.

8.2 All markings shall be applied on the bags before filling in such a manner that the dye or ink does not penetrate into the material inside.

8.3 The markings shall be completely dry before the bags are filled.

8.4 Marking and/ or labeling as given in **SLS 467** shall be followed.

9 METHOD OF TEST

Tests shall be carried out as prescribed in the Appendix **A** to **G** of this Standard**,** Part **1** to **4** of **SLS ISO 21415, Part 1 of SLS 962, SLS 303, SLS 311, SLS 312**, and Official Methods of Analysis of the Association of Official Analytical Chemists (**AOAC**), 20th Edition, 2016.

10 SAMPLING

Sampling shall be carried out as prescribed in **SLS 190**.

APPENDIX A
DETERMINATION OF MOISTURE CONTENT

A.1. PROCEDURE

Weigh to the nearest 5.00 g of the wheat flour in a suitable moisture dish, previously dried in an electric oven and weighed. Place the dish in an electric oven, maintained at 105°C ± 2 for five hours. Cool the dish in a desiccator and weigh with the lid on. Repeat the process of heating, cooling and weighing at half hour intervals until the loss in mass between two successive weighings is less than one milligramme. Record the lowest mass obtained.

A.2 CALCULATION

$$Moisture,\ per\ cent\ by\ mass = \frac{100\ (m_1 - m_2)}{(m_1 - m)}$$

where,

m_1 = mass, in g, of the moisture dish with the wheat flour before drying.

m_2 = mass, in g, of the moisture dish with the material after drying, and

m = mass, in g, of the empty moisture dish.

APPENDIX B
DETERMINATION OF TOTAL ASH

B.1 PROCEDURE

Weigh to the nearest 5.00 g of the wheat flour in a tared, clean and dry platinum or silica dish. Ignite the material in the dish with the flame of a suitable burner for about one hour. Complete the ignition by keeping in a muffle furnace at 550 °C to 600 °C until grey ash results. Cool the dish in a desiccator and weigh. Repeat the process of igniting, cooling and weighing at half - hour intervals until the difference between two successive weighings is less than one milligramme. Note the lowest mass. Preserve this ash for the determination of acid insoluble ash (*see* Appendix **C**).

B.2 CALCULATION

$$Total\ ash\ (on\ dry\ basis),\ per\ cent\ by\ mass = \frac{(m_2 - m_0)\ x\ 10{,}000}{m_1(100 - H)}$$

where,

m_2 = mass, in g, of the dish with the ash.

m = mass, in g, of the empty dish, and

m_1 = mass, in g, of the wheat flour taken for the test; and

H = percentage of moisture in the sample.

APPENDIX C
DETERMINATION OF ACID INSOLUBLE ASH

C.1 REAGENT

Dilute Hydrochloric Acid - (a) approximately 10 M.
(b) approximately 2 M.

C.2 PROCEDURE

To the ash contained in the platinum or silica dish (**A.2.1**) add 2-4 ml of 10 M hydrochloric acid, evaporate on steam bath and heat for a further hour. Add 25 ml 2 M hydrochloric acid, heat for 5 minutes on the steam bath and decant the liquid through an ash less filter paper. Re-extract the residue in a dish with more of dilute hydrochloric acid. Transfer the residue to the filter paper and wash with hot water until the washing are free from acid. Dry the dish in an oven and then ignite in a muffle furnace at about 550 °C to 600 °C for one hour. Cool the dish in a desiccator and weigh. Repeat the process of igniting in the muffle furnace, cooling and weighing at half hour intervals until the difference between two successive wighings is less than one milligramme. Note the lowest mass.

C.3 CALCULATION

$$\textit{Acid insoluble ash (on dry basis), per cent by mass} = \frac{(m_2 - m)}{m_1(100 - H)} \times 10{,}000$$

Where,

m_2 = mass, in g, of the dish with the acid insoluble ash;

m = mass, in g, of the empty dish;

m_1 = mass, in g, of the wheat flour taken for the determination of total ash (*see* **B.1);** and

H = percentage of moisture in the sample.

APPENDIX D
DETERMINATION OF PROTEIN

D.1 REAGENTS

D.1.1 *Concentrated sulphuric acid – Nitrogen free*
D.1.2 *Anhydrous Sodium sulphate*

D.1.3 *Copper sulphate crystals*
D.1.4 *Granulated Zinc*
D.1.5 *Boric acid solution-2 per cent*
D.1.6 *Ammonia-free disilled water*
D.1.7 *Screened methyl red indicator. Dissolve 15 mg methyl red and 80 mg bromocresol green in 100 ml alcohol.*
D.1.8 *Sodium hydroxide solution -50 per cent*
D.1.9 *Standard Sulphuric acid 0.2 M*

D.2 APPARATUS

D.2.1 *Kjeldahl digestion flask – 300-ml capacity*
D.2.2 *Kjeldahl distillation apparatus (**Fig. 1**)*

D.3 PROCEDURE

D. 3.1 Weigh to the nearest 1.50 g of wheat flour and transfer to 300-ml long necked Kjeldahl digestion flask, taking care not to get the particles of flour on the neck of the flask. It is convenient to weigh out the sample on a small filter paper, folding it over and introducing the whole into the flask.

D.3.2 Add to the flask 10 g anhydrous Sodium sulphate, 0.5 g Copper sulphate crystals and 25 ml concentrated Sulphuric acid. Support the flask in an inclined position on a piece of asbestos board with a hole cut in it of such a size that the flame of the burner strikes only the portion of the flask below the level of the acid. Heat the flask gently at first. When the initial frothing ceases, close the mouth of the flask with a loose fitting pear stopper, and boil briskly. Rotate the flask several times during the heating. Boil until the mixture is clear pale blue. Continue the heating for a further hour to complete the oxidation.

D.3.3 Allow to cool and wash the digest into the distillation flask with 400-ml of ammonia free distilled water. Add a few pieces of granulated Zinc. Place 50 ml of Boric acid solution and a few drops of the screened Methyl red indicator in the receiving flask. Assemble the distillation apparatus (**Fig. 1**) with the delivery tube dipping below the Boric acid solution. Add 75 ml of 50 per cent sodium hydroxide solution into the flask through the tap funnel. The liquid in the flask should be distinctly alkaline; if not more alkali should be added. Close the tap and distill the Ammonia into the Boric acid solution. After 300 ml has distilled over, open the tap and wash down the condenser and delivery tube into the receiver. Titrate the distillate with 0.2 M Sulphuric acid.

D.3.4 Carry out a blank experiment using the same quantities of reagents but leaving out the sample. The blank should not exceed 0.5 ml. Subtract the blank from the titration obtained in the determination and calculate the percentage Nitrogen in the sample. Each ml of 0.2 M Sulphuric acid neutralized by the distillate corresponds to 0.0014 g of Nitrogen. Multiply the percentage Nitrogen by the factor 5.7 to obtain the percentage protein in the wheat flour.

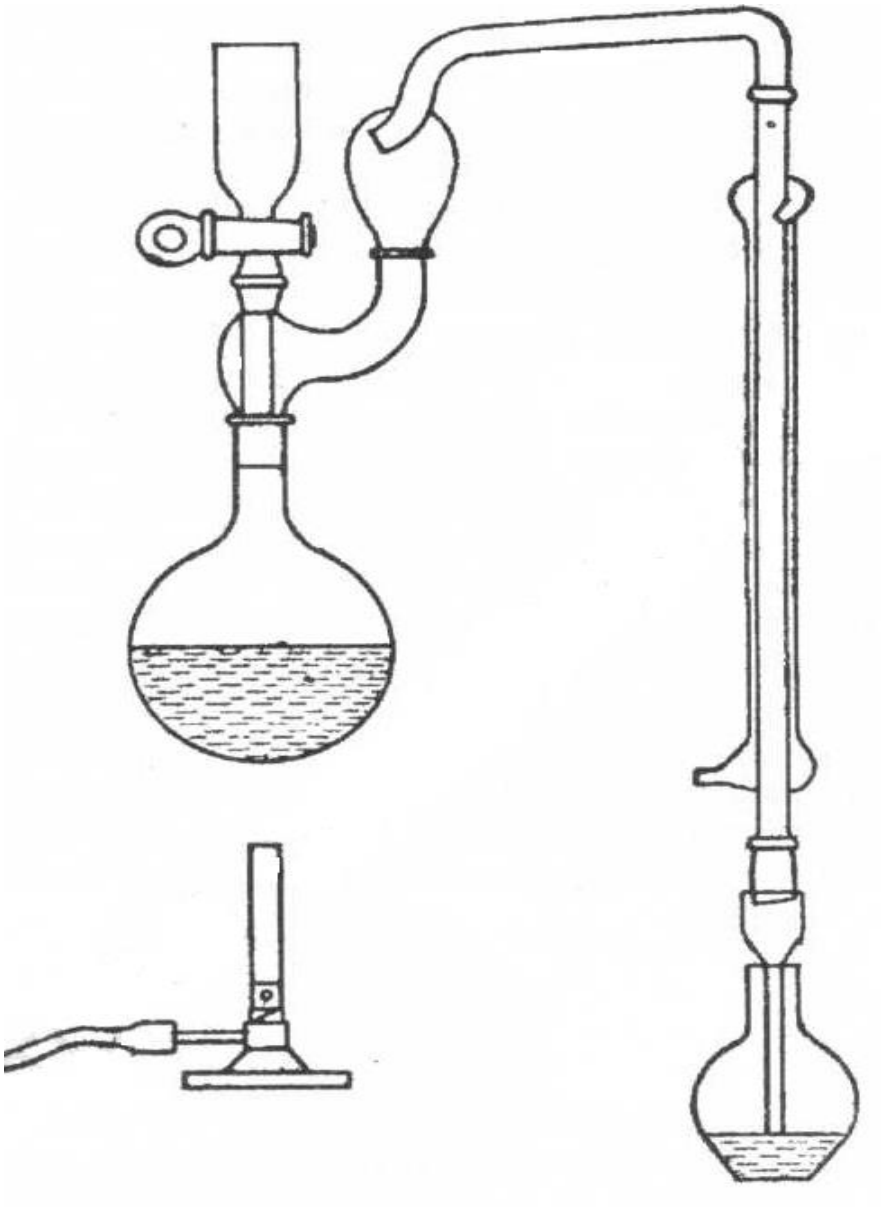

Fig. 1: Macro Kjeldahl distillation apparatus

D.4 CALCULATION

Total protein (on dry basis), per cent by mass $= \dfrac{798\ (V_1 - V_2)c}{m\ (100 - M)}$ x 2

where,

m is the mass, in g, of the prepared material taken for the test;
V_2 is the volume, in ml of the standard Sulfuric acid required for the blank determination;
V_1 is the volume, in ml of the standard Sulfuric acid required for titration the distillate in the test with the material;

c is the concentration, mol/ 1 of the standard Sulfuric acid solution; and
M is the moisture per cent by mass of the material (*see* Appendix **B**).

APPENDIX E
DETERMINATION OF DIASTATIC ACTIVITY

E.l REAGENTS

E.1.1 *Buffer solution*, pH 4.6 to 4.8. Prepare by dissolving 3 ml of glacial acetic acid and 4.1 g of anhydrous Sodium acetate in water and diluting to a volume of 1 litre with water.

E.1.2 *Sulphuric acid solution* 3.58 N (± 0.05), Prepared by diluting 10 ml of concentrated H_2SO_4 (sp. gr. 1.84) to 100 ml volume. Adjust the concentration if necessary.

E.1.3 *12% sodium tungstate solution* Prepared by dissolving 12.0 g of $Na_2SO_4.2H_2O$ in water and diluting to a volume of 100 ml with water.

E.1.4 *0.1 N alkaline ferricyanide reagent* - Prepared by dissolving 33 g of pure dry $K_2Fe(CN)_6$ and 44 g of anhydrous Na_2CO_3 in water and diluting to a volume of 1 litre with water. Standardise by adding 25 ml of the acetic acid salt solution and 1 ml of soluble starch potassium iodide solution to 10 ml of the alkaline ferricyanide solution and tritrate with standard 0.1 N thiosulphate solutions. Exactly 10 ml of solution should be necessary to discharge completely the blue colour.

E.1.5 *Acetic acid salt solution* - Prepared by dissolving 70 g of KCl and 40 g of $ZnSO_4.7H_2O$ in 750 ml of water, then slowly adding 200 ml glacial acetic acid and diluting to a volume of 1 litre with water.

E.1.6 *Soluble starch potassium iodide solution* - Prepared by suspending 2 g of soluble starch in small a amount of cold water and pouring slowly into toiling water with constant stirring. Cool thoroughly, add 50 g KI, and dilute to a volume of 100 ml with water. To this solution add 1 drop of a saturated NaOH solution.

E.2 PROCEDURE

Place 5 g of flour and a teaspoon of ignited quartz sand into a 125-ml Erlenmeyer flask and mix by rotating the flask. Add 46 ml of the buffer solution at 30 °C and mix by rotating the flask until all the flour is in suspension, (the flask and all the ingredients should be individually brought to 30 °C before being mixed together). Place the flask and contents in a thermostat at 30 °C for exactly 1 hour, shaking the flask by rotation every 15 minutes.

Remove the flask from thermostat at the end of 1 hour, add 2-ml of die 3.58 NH_2SO_4 solution and mix thoroughly. Immediately add 2 ml of the Sodium tungstate solution, mix thoroughly, allow to stand 2 minutes and filter through No. 4 Whatman or equivalent filter paper, discarding the first 8 to 10 drops of filtrate.

Thoroughly mix the filtrate and determine the maltose on a 5 ml aliquot as follows: Into a test tube of approximately 50 ml capacity (2 by 20 cm) pipette exactly 5 ml of the extract and 10 ml of the alkaline ferricyanide reagent, mix, and immerse the test tube in a

vigorously boiling water bath. The surface of the liquid in the test tube should be 30 to 40 mm below the surface of the boiling water. (Delay between filtering of the extract and treatment in the boiling water bath shall not exceed 15 to 20 minutes. Further delay may cause an error from sucrose hydrolysis in the acid solution). After exactly 20 minutes in the boiling water bath, remove the tube and contents, cool under running water and pour at once into a 125-ml Erlenmeyer flask. Rinse test tube with 25 ml of the acetic acid salt solution and add rinsings to the Erlenmeyer flask. Mix the contents of the flask, add 1 ml of soluble starch Potassium iodide solution, mix thoroughly, and titrate with the standard 0.1 N thiosulphate solution to the complete disappearance of the blue colour. (A 10 ml microburette is recommended for the titration). Calculate the millitres of ferricyanide reduced by subtracting the millitres of thiosulphate required from the thiosulphate equivalent of the ferricyanide reagent (*see* Note 2). Report as milligrammes of maltose produced by 10 g of flour in 1 hour at 30 °C by reference to Table **4.**

NOTES

1. *The foregoing directions are applicable to all ordinary flours where values for milligrammes of maltose produced from* 10 g *of flour in 1 hour will not exceed* 600*. If the solution in the test tube is colourless after treatment in the boiling water bath and gives no blue colour after the addition of the starch Potassium Iodide solution, there is an excess of reducing sugar present. Repeat the determination using a smaller aliquot of extract***,** *e.g.* 1, 2 *or* 3 ml *instead of* 5 ml*. However, in such cases, dilute to* 5 ml *and multiply the milligrammes of maltose found by the appropriate factor (*5, 5/2*, or* 5/3 *according to* 1,2 *or* 3 ml *of aliquot are taken).*

2. *It is unnecessary when dealing with normal sound flours to make a blank determination which indicates the maltose or reducing sugar originally present in the flour. The amount of reducing sugars originally present as such in flour milled from sound wheat is so small and so constant that it may be neglected for all practical purposes. However, if a blank determination is desired, the procedure is as follows. Combine the following:* 5 ml *of ethanol,* 95% *by volume,* 50 ml *of acid, buffer solution (dissolve 3 ml of glacial acetic acid,* 4.1 g *of anhydrous sodium acetate and* 4.5 ml *of sulphuric acid, sp. gr.* 1.84 *and dilute* Type equation here.*to a volume of* 1 litre *with water); and* 2 ml *of the sodium tungstate solution (reagent* **E.1.3***). To* 5 ml *of this mixture (used in place of the* 5 ml *of flour extract) add* 10 ml *of the ferricyanide solution (reagent* **E.1.4***), and proceed as in the determination of maltose above. It should require* 10 ml *of the thiosulphate solution to discharge the blue starch iodine colour. If the titration ("thiosulphate equivalent") falls within* 10 (± 0.05) *ml the reagents need not be discarded, but the appropriate correction should be made in the maltose calculations.*

TABLE 4 Conversion of 0.1 N thiosulphate titration values to milligrammes of maltose per 10 grammes of flour

0.1 N Thiosulphate ml	Maltose per 10g flour mg	**0.1** N Thiosulphate ml	Maltose per 10 g flour mg	**0.1** N Thiosulphate ml	Maltose per 10 g flour mg
0.10	618	3.40	373	6.70	166
0.20	608	3.50	367	6.80	161
0.30	598	3.60	360	6.90	156
0.40	588	3.70	353	7.00	151
0.50	578	3.80	347	7.10	145
0.60	568	3.90	341	7.20	140
0.70	558	4.00	334	7.30	135
0.80	550	4.10	328	7.40	130
0.90	542	4.20	322	7.50	126
1.00	534	4.30	315	*7.60*	121
1.10	527	4.40	308	*7.70*	116
1.20	519	4.50	302	7.80	111
1.30	512	4.60	295	7.90	106
1.40	505	4.70	288	8.00	101
1.50	499	4.80	282	8.10	96
1.60	492	4.90	276	8.20	90
1.70	485	5.00	270	8.30	85
1.80	478	5.10	264	8.40	80
1.90	472	5.20	257	8.50	76
2.00	465	5.30	251	8.60	71
2.10	458	5.40	244	8.70	65
2.20	451	5.50	237	8.80	60
2.30	445	5.60	231	8.90	56
2.40	438	5.70	225	9.00	51
2.50	431	5.80	218	9.10	46
2.60	425	5.90	213	9.20	41
2.70	418	6.00	207	9.30	36
2.80	412	6.10	201	9.40	31
2.90	406	6.20	195	9.50	25
3.00	398	6.30	188	9.60	20
3.10	392	6.40	182	9.70	15
3.20	385	6.50	176	9.80	10
3.30	379	6.60	171	9.90	5

APPENDIX F
DETERMINATION OF GRANULARITY

F.1 PROCEDURE

Transfer about 10 g of the material to the top sieve of a mechanical sieve set of aperture size of 180 µm and 150 µm and conforming to **SLS 124** and sieve for 5 minutes. For cleaning the sieves during the sifting, rubber discs are used. After sifting, the discs are removed. The residue is passed through the lower sieve and weighed, and shown in percentage of the flour sample.

APPENDIX G
DETERMINATION OF IRON DUST

G.1 REAGENTS

G.1.1 O-Phenanthroline solution - dissolve 0.1 g of O-phenanthroline in about 80 ml H_2O at 80 °C, cool and dilute to 100 ml.

G.1.2 α, α - dipyridyl solution - dissolve 0.1 g of α,α - Dipyridyl in H_2O and dilute to 100 ml.

NOTE
Reagents **G.1.1** *and* **G.1.2** *kept in cool, dark place will remain stable several weeks*

G.1.3 Iron standard solution - 0.01 mg Fe/ ml Dissolve 0.1 g analytical grade Fe wire in 20 ml HCl and 50 ml H_2O, and dilute to 1000 ml. Dilute 100 ml of this solution to 1000 ml or dissolve 3.512 g $Fe(NH_4)_2 (SO_4)_2 . 6H_2O$ in H_2O, add 2 drops HCl, and dilute to 500 ml. Dilute 10 ml of this solution to 1000 ml.

G.1.4 Acetate buffer solution - dissolve 8.3 g anhydrous $NaC_2H_3O_2$ (Previously dried at 100 °C) in H_2O, add 12 ml acetic acid, and dilute to 100 ml. (It may be necessary to redistill acetic acid and recrystallize $NaC_2H_3O_2$ from H_2O, depending on amount of Fe present)

G.2 APPARATUS

Spectrophotometer

G.3 PROCEDURE

G.3.1 Preparation of standard curve

Construct a 10-point standard curve, plus zero, preparing solutions containing 0.0 (Zero), 2.0, 5.0, 10.0, 15,0, 20.0, 25.0, 30.0, 35.0, 40.0 and 45.0 ml) respectively, of final diluted Fe standard solution **(G.1.3),** plus 2.0 ml HCl in 100 ml H_2O

Alternatively, construct a 5-point curve (5.0, 15.0, 25.0, 35.0 and 45.0 ml), plus zero, after correction for reagent blank.

Using 10 ml of each these solutions proceed as in **G.3.2** beginning add 1 ml $H_2NOH.HCl$ plot concentration against scale reading.

G.3.2 Determination by dry ashing

Ash 5.00 g of flour in Pt, SiO, or porcelain dish about 60-mm diameter, 35-ml capacity as in Appendix C (Porcelain evaporating dishes of about 25-ml capacity are satisfactory. Do not use flat-bottom dishes of diameter > 60 mm). Cool and weigh. If % ash is desired, continue ashing until practically C-free. To diminishing time, or for samples that do not burn practically Carbon tree e, use one of following ash aids.

Moisten ash with 0.5 - 1.0ml Mg $(NO_3)_2$ solution or with redistilled HNO_3. Dry and carefully ignite in furnace, avoiding spattering, (white ash with no C results in most cases) Do not add these ash aids to self-rising flour (products containing NaCl) in Pt dish because of vigorous action on dish cool, add 5 ml HC1, letting acid rinse upper portion of dish, and evaporate to dryness on steam bath. Dissolve residue by adding 2.0 ml HC1, accurately measured, and heat 5 min on steam bath with watch glass on dish. Rinse watch glass and dilute residue solution to 100 ml with H_2O. If necessary (undissolved particles visible in residue solution), filter diluted residue solution through ashless paper and discard first 15-20 ml filtrate.

Pipette 10 ml aliquot into 25 ml volumetric flask and add 1 ml H_2NOH.. HC1 solution; let stand 5 min and then add 5 ml buffer solution, **G.1.4** and 1 ml O-Phenanthroline, **G.1.1** or 2 ml dipyridyl solution, **G.1.2** and dilute to volume. Determine absorbance A, in spectrophotometer to photometer at about 510 nm. From reading, determine Fe concentration form equatic line representing standard points or by reference to standard curve for known Fe concentration. If further dilution is required to maintain sample absorbance reading below highest standard point on curve, pipette smaller aliquot into 25.0 ml flask, dilute to 10.0 ml with 2 % HC1 solution and continue as described in **G.3.2** paragraph 3 Determine blank on reagents and make correction. Calculate Fe in flours as mg/ kg.

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CORRIGENDUM TO SLS 144 : 2019
SRI LANKA STANDARD SPECIFICATION FOR WHEAT FLOUR
(Second Revision)

5 INGREDIENTS

5.2 Flour treatment agent

5.2.5 *Phosphate as phosphorus (*except for the self-raising flour)

Calcium dihydrogen phosphate	INS 341 (i)	12,000 mg/kg
Calcium hydrogen phosphate	INS 341 (ii)	12,000 mg/kg
Tricalcium phosphate	INS 341 (iii)	12,000 mg/kg

NOTE :
Limits should be in maximum.

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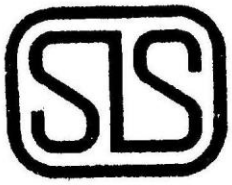

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