SRI LANKA STANDARD 472:1979
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SPECIFICATION FOR
GLASS FEEDING BOTTLES

BUREAU OF CEYLON STANDARDS

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SLS 472 : 1979

Gr. 6

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

SRI LANKA STANDARD

SPECIFICATION FOR GLASS FEEDING BOTTLES

FOREWORD

This Sri Lanka Standard was authorised for adoption and publication by the Council of the Bureau of Ceylon Standards on 1979-12-21 after the draft, finalised by the Drafting Committee on Glass feeding bottles, had been approved by the Metric Divisional Committee.

Feeding bottles are used extensively to feed infants. Because of the wide useage it was decided to formulate this specification. This specification recommends the general pattern and shape of upright glass feeding bottles. It does not specify detailed dimensions of the bottles which could be agreed between the manufacturer and the purchaser. The pattern should be such that the bottle could be easily cleaned and sterilized and to which a rubber teat could be secured with a plastic screw closure for providing a leak proof grip. The finish of all bottles shall be identical so that there could be interchangeability of the plastic screw closures.

The Committee decided not to specify at present requirements for glass feeding bottle with openings at both ends (boat shape bottle) as they are not yet manufactured locally. When they are manufactured the requirements for them will be included as an amendment.

When preparing this standard the committee took into consideration the moulds presently available in Sri Lanka for the manufacture of glass feeding bottles. Because of this Type 1B bottle which has a nominal capacity of 200-ml has as an interim measure a brimful capacity far in excess of which normally would have been specified.

SLS 253* prescribes requirements for teats which are used with the glass feeding bottles.

This specification has 5.4 dimensions and 6.2 packaging, which provide for agreement between the manufacturer and the purchaser.

All standard values given in this specification are in SI units.

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, shall be rounded off in accordance with CS 102**. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

In the preparation of this standard valuable assistance derived from the relevant publications of the Indian Standards Institution is gratefully acknowledged.

1 SCOPE

This specification prescribes the requirements and the methods of sampling and test for glass feeding bottles.

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*SLS 253 *Rubber teats and valves for feeding bottles and soothers.*

**CS 102 *Presentation of numerical values.*

1.1 This specification does not cover requirements for rubber teats and detailed requirements of plastic closures required for these bottles.

2 REFERENCES

CS 102 Presentation of numerical values.
CS 124 Test sieves.
SLS 428 Random sampling methods.

3 TERMINOLOGY

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

3.1 **nominal capacity**: The volume of milk normally expected to be filled in the bottle at 27 ± 2 °C.

3.2 **brimful capacity**: The volume of water required to fill the bottle completely at 27 ± 2 °C.

3.3 **hairline crack**: A crack in the form of a faint line on the glass surface.

3.4 **brush marks**: A series of fine vertical laps on the outside surface of the bottle.

3.5 **open lap marks**: Horizontal groove on the outside surface of the bottle.

3.6 **cords**: Glossy inclusions of different composition particular in the form of drawn out lines and possessing optical and other properties differing from those of the surrounding glass.

3.7 **bubble**: A cavity within glass.

3.8 **blisters**: Bubbles more than 2.0 mm in diameter, measured by the average of maximum and minimum dimensions.

3.9 stones: Imperfections in glass resulting from inclusions from such sources as batch materials, refractories and blow pipes or resulting from devitrification of glass.

3.10 wedge bottom

3.10.1 A bottom which is thick at one side and thin at the other side.

3.10.2 A feeding bottle is said to have a wedge bottom if the difference between the thick and thin side exceeds 3 mm.

4 TYPES

The bottles shall be of the following type:

4.1 Type 1

With finish having screw threads to permit the rubber teat to be secured with the help of a plastic closure to make it leakproof.

5 REQUIREMENTS

5.1 Pattern

The recommended patterns of glass feeding bottles are illustrated in Figs. 1 and 2.

5.2 Material and workmanship

The bottles shall be well annealed and shall have a smooth interior surface without hairline cracks or open lap marks. The glass shall be free from cords, bubbles, blisters, stones, sharp edges, and any other visible defects, that may impair the strength, efficiency or appearance of the bottle. The bottle shall be well formed with uniform distributions of glass all over the walls and the base, avoiding any wedge bottom as defined in 3.10 and particularly thin section in the wall.

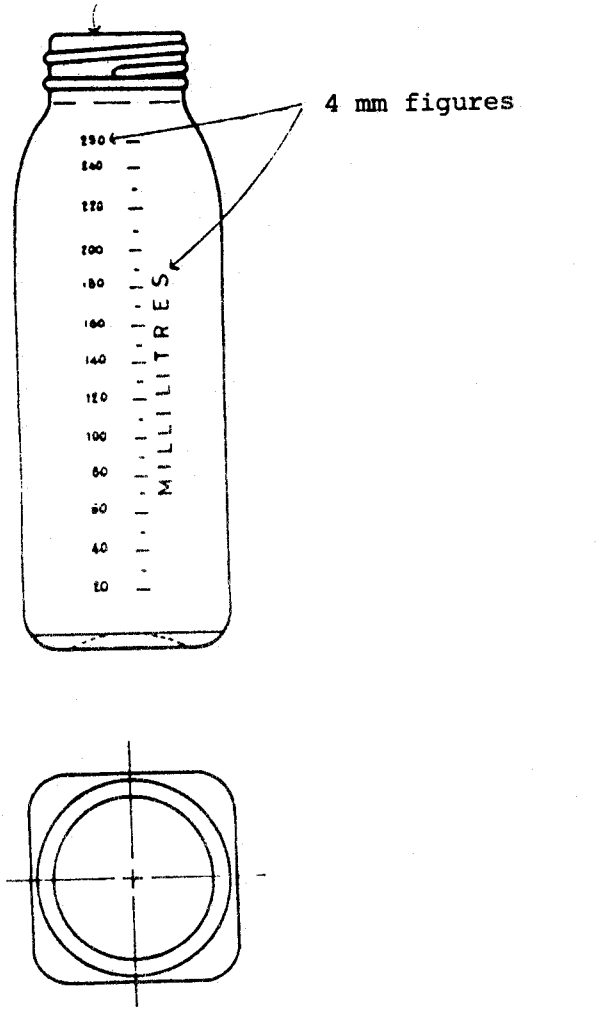
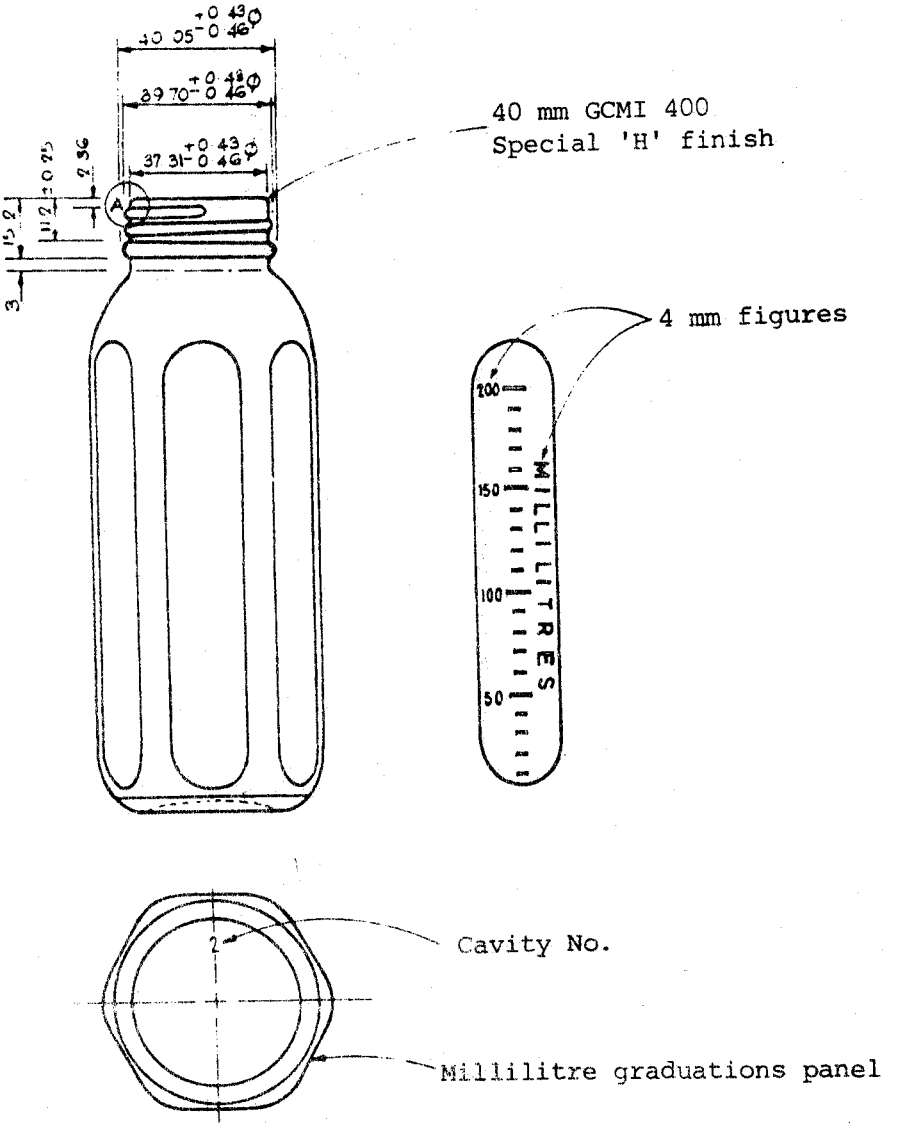


FIG. 1 - Glass feeding bottle, Type 1 A



All dimensions in millimetres

FIG. 2 - Glass feeding bottle, Type 1 B.

5.3 Capacity

The bottles shall have nominal and brimful capacities as follows:

Type	Nominal capacity	Brimful capacity	Tolerance on brimful capacity
1A	250 ml	275 ml	± 5 ml
1B	200 ml	230 ml (260 ml as an interim measure*)	± 5 ml

5.4 Dimensions

The dimensions for bottles of Type 1, A and B shall be as agreed to between the manufacturer and purchaser.

5.5 Finish

The finish of Type 1, A and B bottles shall be identical. It is known as 40 mm GCMI** 400 special '*H*' finish.

5.5.1 The details of dimensions of finish of feeding bottles is given in Fig. 2. The details of screw thread for finish of feeding bottles shall be as given in Fig. 3.

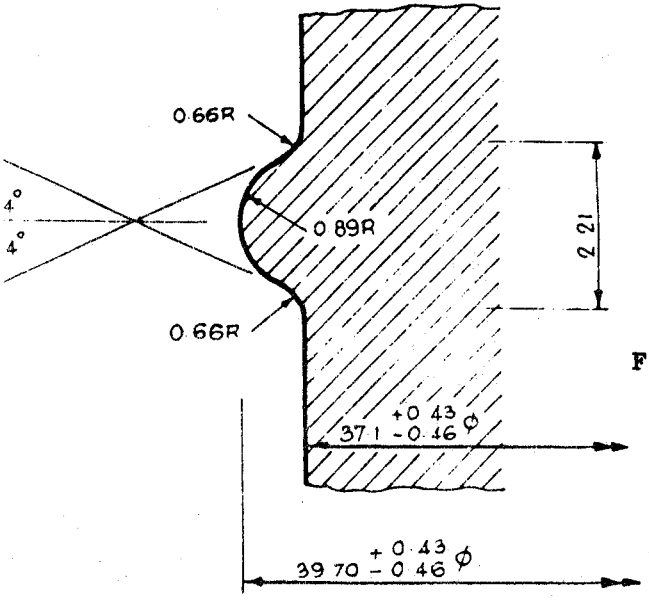
5.5.2 The closure shall be made of non-reactive plastic material free of any toxic compounds.

5.6 Scale and graduations

The scale with graduations at every 10 ml shall be embossed or printed on the outside of the bottle and shall also indicate in millilitres the nominal capacity. In the case of printed scale, bottles shall be tested for the permanency of pigment as prescribed in Appendix A. The pigment used shall be non-toxic.

**See fourth paragraph of the Foreword.*

***Glass container manufacturers' institute.*



All dimensions in millimetres

FIG. 3 - Details of screw thread for finish of Type 1 Glass feeding bottle (Thread detail at point A in Fig. 2)

5.6.1 Between any two, 20-ml graduation marks the accuracy shall be within ± 2 ml.

5.7 Limit of alkalinity

The maximum titre value when tested according to Appendix B shall be 2.0 ml.

5.8 Thermal shock resistance

The bottles shall pass the test prescribed in Appendix C.

6 MARKING AND PACKAGING

6.1 Marking

Each bottle shall be marked permanently and legibly on its surface with the following information:

a) Manufacturer's name or registered trade-mark, if any, or purchaser's name or registered trade-mark; or both at the bottom or any prominent place.

b) Nominal capacity followed by letters 'ml', on the side.

c) The word 'millilitres' along the side of the scale; and

d) Production year or identification number.

6.2 Packaging

The bottles shall be packed as agreed to between the purchaser and the supplier.

7 SAMPLING AND CRITERIA FOR CONFORMITY

Representative samples of the bottles shall be drawn and the criteria for conformity be determined as prescribed in Appendix D.

APPENDIX A
(See 5.6)

TEST FOR PERMANENCY OF PIGMENT

A.1 GENERAL

This test is meant only for those feeding bottles which have a printed scale and graduations.

A.2 REAGENTS

A.2.1 *Sodium dichromate*

A.2.2 *Concentrated sulphuric acid,* relative density, 1.84 approximately.

A.3 PROCEDURE

A.3.1 Weigh about 20 g of sodium dichromate and dissolve in 1500 ml of concentrated sulphuric acid and dilute to 2500 ml with water. Immerse the bottles in the solution at room temperature for 15 minutes. Rinse the samples with water and dry.

A.3.1.1 The bottles shall be taken as having satisfied the requirements of the test if the printed impressions do not become illegible.

APPENDIX B

(See 5.7)

TEST FOR ALKALINITY (POWDER METHOD)

B.1 APPARATUS

B.1.1 *Erlenmeyer flask assembly*, of chemically resistant glass, preferably borosilicate; consisting of Erlenmeyer flask of 250-ml capacity with a suitable reflux condenser with ground glass joints.

B.1.2 *Graduated flask*, of chemically resistant glass, of known brand (preferably borosilicate) 250-ml capacity.

B.1.3 *Mortar;* a suitable mortar made of steel.

B.1.4 *Test sieves*, one of aperture size 425 µm and the other of aperture size 600 µm conforming to CS 124.

B.2 REAGENTS

All reagents unless otherwise specified shall be of analytical reagent quality. Distilled water or water of equivalent purity shall be used wherever water is specified.

B.2.1 *Standard hydrochloric acid,* 0.01 N.

B.2.2 *Ethyl alcohol or rectified spirit*

a) ethyl alcohol, 95 per cent by volume; or

b) rectified spirit, containing 95 per cent ethyl alcohol by volume.

B.2.3 *Standard sodium hydroxide solution,* 0.05 N.

B.2.4 *Methyl red indicator* Dissolve 40 mg of methyl red in 60 ml of ethyl alcohol, then add sufficient water to make it to 100 ml.

B.2.5 *Test solution* Dissolve 40 mg of methyl red powder in 75 ml of ethyl alcohol. Add 1.5 ml of standard sodium hydroxide solution or a quantity sufficient to ensure that the colour of the solution corresponds to pH 5.2 and then dilute to 100 ml with water.

Add one ml of this solution and one ml of standard hydrochloric acid to a previously tested Erlenmeyer flask (see B.3.1) and 240 ml of water. Boil for five minutes, cool quickly under running water and make up to 250 ml in the graduated flask.

B.3 TESTING OF ERLENMEYER FLASK ASSEMBLY

B.3.1 Transfer 100 ml of test solution to the Erlenmeyer flask to be tested. Place the flask quickly in a bath of boiling water so that the level of the contained solution in the flask is below the level of the water in the bath and attach a small reflux condenser. Continue boiling for one hour and at the end of this period observe the colour of the solution. Reject the flask if any change of colour of the test solution has taken place.

B.3.1.1 Erlenmeyer flask assemblies which have once passed the test (see B.3.1) for suitability may fail to

do so after prolonged storage. In such a case, they may be revived by washing with five per cent (m/v) solution of glacial acetic acid followed by washing with water until free from acid before use.

B.4 PROCEDURE

B.4.1 Take sufficient number of bottles to get 100 g of glass. Rinse the glass bottles selected for this test with distilled water, dry in a stream of dry air and crush them in the mortar such that the glass particles pass through a 600 μm CS sieve but fail to pass through 425 μm CS sieve. The crushing and sieving should be done in three to four stages to avoid too much fineness. Spread the sieved particles weighing in excess of five g on a glazed paper and pass a magnet over them to remove any particle of iron which may have been introduced during crushing. Wash the sieved glass free from dust in Erlenmeyer flask with four successive 30-ml portions of ethyl alcohol or rectified spirit and dry the flask and contents at 100 ± 2 °C. Take two Erlenmeyer flasks previously tested as prescribed in B.3 and transfer exactly 5.000 g of the sieved, clean dry glass to one of the flasks, 100 ml of water previously boiled for five minutes in an Erlenmeyer flask and cooled rapidly under running water is added to both flasks. Place the flasks quickly in a bath of boiling water so that the levels of the contained solutions are below the level of the water in the bath and attach the preciously tested reflux condensers. Keep the flasks in the boiling water bath for 30 minutes and then take them out and cool quickly under running water. From the first flask containing powdered glass sample, decant out the solution into a third Erlenmeyer flask. Add four ml of water to the powdered glass residue in the first flask, shake a little and decant out into the third flask, taking care to see that transference of the powdered glass is avoided as far as possible. Also add four ml of water to the second flask containing only the blank solution.

Add two drops of methyl red indicator solution and titrate the solution in the third flask immediately with standard hydrochloric acid to the pink colour. Also add two drops of methyl red indicator to the blank solution in the second flask and titrate with standard hydrochloric acid to the same end point.

B.5 RESULT

Report the titre value, correct to the first decimal place, as the number of millilitres of 0.01 N hydrochloric acid used to neutralize the extract from 5.000 g of the glass powder, less titration of the blank.

APPENDIX C
(See 5.8)

TEST FOR THERMAL SHOCK RESISTANCE

C.1 PRINCIPLE

The bottles are subjected to a sudden change of temperature and examined for damage.

C.2 APPARATUS

C.2.1 *Hot water bath,* preferably fitted with a stirrer electrical heating elements and a thermostat to enable water to be heated within limits of 72 ± 2 °C.

C.2.2 *Cold water bath,* preferably of the same capacity as hot water bath and fitted with a stirrer and a thermometer.

C.2.3 *Wire net basket,* of such a size as would hold t required number of samples and would be easily immerse and taken out of the hot and cold water baths.

C.3 PROCEDURE

C.3.1 Place the requisite number of bottles (see D.2.2) in the basket and immerse in the hot water bath previously heated to 72 ± 2 °C in such a way that they get filled with hot water and are completely immersed in it for 15 minutes. Maintain the temperature of the bath at 72 ± 2 °C.

C.3.2 Transfer the basket containing bottles filled with hot water to the cold water bath maintained at 27 ± 2 °C. The process of transferring the basket from hot to cold water bath shall be completed within 10 ± 2 s. The bottles shall be completely immersed in the cold water bath, without allowing cold water to enter them, the period of immersion being 1.5 minutes to 2 minutes. The basket shall be taken out of the cold water bath and the bottles shall be examined for any damage.

C.3.2.1 The bottles shall be deemed to have complied with the requirements of this test if the bottles do not chip, crack or break.

NOTE - Bottles used for the purpose of this test shall not be subjected to further testing and shall also not be put into service.

APPENDIX D

(See 7)

SAMPLING AND CRITERIA FOR CONFORMITY FOR GLASS FEEDING BOTTLES

D.1 SCALE OF SAMPLING

D.1.1 Lot

In any consignment all the glass feeding bottles of the same type, pattern and nominal capacity produced under essentially the same conditions of manufacture shall be separated in groups of 10 000 bottles or less. Each such group shall constitute a lot.

D.1.2 Test samples

A sample of 365 feeding bottles shall be selected at random from each lot.

D.1.2.1 In order to ensure the randomness of selection, the random number table given in SLS 428 shall be used.

D.1.2.2 The test sample from each lot shall be tested for ascertaining the conformity of the bottles to the requirements of this specification.

D.2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

D.2.1 Out of 365 bottles selected according to D.1.2, 5 test samples shall be subjected to the alkalinity test specified in Appendix B. If the test results shows that the glass conforms to the requirements of the specification (see **5.7**) then only further testing need to be done to examine the conformity of the lot to other requirements. If the test results fails to satisfy the requirements, the lot shall be rejected without further testing.

D.2.2 From the remaining 360 test samples any 10 shall be chosen at random and subjected to the thermal shock resistance test specified in Appendix C. Any test sample not satisfying the requirements of the test shall be considered as defective.

D.2.2.1 If the number of defectives among the 10 test samples tested for thermal shock is not more than one, the lot shall be subjected to further tests otherwise the lot shall be rejected without further tests.

D.2.3 Tests for ascertaining the conformity of the lot for visual and dimensional requirements specified in 5.1 to 5.6 shall be carried out in stages by taking 50 test samples at each stage out of the total number of the remaining test samples (350) and a decision taken in accordance with the directions given in D.2.3.1 to D.2.3.4 when read with Table 1. When a decision is reached at any stage of testing further test samples need not be tested. Any test sample not satisfying the visual and dimensional requirements of 5.1 to 5.5 shall be considered defective.

D.2.3.1 The first stage of testing shall consist of selection of 50 test samples at random from the total number of test samples and testing them individually for the visual and dimensional requirements specified in 5.1 to 5.6.

D.2.3.2 If the number of defectives found is less than or equal to the corresponding acceptance number (which is 0 at the first stage), the lot shall be accepted without any further testing.

D.2.3.3 If the number of defectives found is greater than or equal to the corresponding rejection number (which is four at the first stage), the lot shall be rejected without any further testing.

TABLE 1 Criteria for conformity at different stage of testing
(See D.2.3)

Stage	Number of test samples	For cumulative test samples		
		Size	Acceptance No.	Rejection No.
(1)	(2)	(3)	(4)	(5)
First	50	50	0	4
Second	50	100	1	6
Third	50	150	3	8
Fourth	50	200	5	10
Fifth	50	250	7	11
Sixth	50	300	10	12
Seventh	50	350	13	14

D.2.3.4 If the number of defectives found is between the corresponding acceptance and rejection numbers, another 50 test samples shall be examined. The total number of defectives in the cumulative test sample (that is, the number of defectives in the first and second stages of testing put together) shall then be compared against the acceptance and rejection numbers at the second stage of testing. If no decision is arrived at by the procedures similar to those given in D.2.3.2 or D.2.3.3, testing shall be carried to third stage and so on up to the seventh stage till a decision is finally reached. When a decision is reached the lot is accepted or rejected with respect to visual and dimensional characteristics.

D.2.4 In the case of glass feeding bottles with printed scale on them five bottles shall be selected at random from those remaining 350 test samples (see D.2.3). These bottles shall be tested for permanency of pigment by the method described in Appendix A. The lot shall be deemed acceptable in respect of this characteristic if all the bottles selected above pass the test.

D.2.5 The lot shall be deemed to conform to all the requirements of this specification if the test samples satisfies the conditions given in D.2.1 to D.2.4.

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