SRI LANKA STANDARD 290 : 2006
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SPECIFICATION FOR
GLASS LIQUOR BOTTLES
(FIRST REVISION)

SRI LANKA STANDARDS INSTITUTION

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SLS 290 : 2006

Gr. 7

SRI LANKA STANDARDS INSTITUTION
17, Victoria Place,
Elvitigala Mawatha
Colombo 08
SRI LANKA

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.

SRI LANKA STANDARD
SPECIFICATION FOR GLASS LIQUOR BOTTLES
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FOREWORD

This standard was approved by the Sectoral Committee on Chemicals and Polymer Technology and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 2006-09-27.

This standard was first published in 1974. In this First Revision, the nominal capacities have been revised and the brimful capacity has been excluded.

The capacities of the bottles are prescribed in terms of the nominal capacity in milliliters. As the packers of liquor prefer to retain the individuality of the shapes, it has been decided not to specify same in this standard.

For size grading, **CS** sieves conforming to **CS 124** Test sieves are specified. Where these sieves are not available, other equivalent sieves as judged by the aperture, may be used.

All standard values given in this specification are in SI (metric) units. Equivalent values in imperial units are given in brackets for guidance. These equivalents have been calculated in accordance with **CS 116** Principles of conversion.

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

1 SCOPE

This Sri Lanka Standard specifies the nominal capacities, methods of test and other requirements for glass bottles used to pack potable spirits, wines and liquors.

2 REFERENCES

CS 102 Presentation of numerical values
CS 116 Principles of conversion
CS 124 Test sieves
SLS 222 Glass bottles for pasteurized milk and sterilized milk
SLS 428 Random sampling methods
SLS 601 Glass container finishes - Thread finishes
SLS 628 Standard roll-on-pilfer-proof (ROPP) finish for edible products
SLS 1190 Glass bottles for pharmaceuticals

3 DEFINITIONS

For the purpose of this Sri Lanka Standard the following definitions shall apply :

3.1 nominal capacity : The volume of the fluid normally expected to be filled in the bottle at $27 \pm 2\ ^{o}C$.

3.2 cords : Glassy inclusions at different composition particularly in the form of drawn out lines and possessing optical and other properties differing from those of the surrounding glass.

3.3 bubble : A cavity within glass.

3.4 blisters : Bubbles of more than 2 mm in minimum diameter. It shall be measured by the average of the maximum and minimum dimensions.

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

3.6 hair line : Fine cord on the surface of glass.

3.7 wedged bottom (slugged bottom) : Bottom of a container having thick glass on one side and thin glass on the other side.

3.8 sealing surface : The portion of the finish which makes contact with the sealing gasket or liner of the closure.

4. NOMINAL CAPACITIES

The bottles shall be of the following nominal capacities : 750 ml, 375 ml and 180 ml.

NOTE : *Special permission shall be obtained from the Excise Department if there is any deviation from the above nominal capacities.*

5. REQUIREMENTS

5.1 Material and workmanship

The glass shall be free from cords, bubbles, blisters, stones, hair lines, cracks and any other defects that may impair the strength, efficiency or appearance of the bottle. There shall be no sharp edges inside the neck or any scouring on the top. The bottles shall be well formed with uniform distribution of glass all over the walls, the base and the neck avoiding any wedged bottom and particularly any uneven thickness in the walls.

The sealing surface of the bottles shall be smooth and the mould seam of the neck finish shall have no protruding edges.

In the case of coloured bottles the colour shall be uniform.

The bottles shall have an insweep at the base of the body and the bottom of the bottles shall have minimum amount of push-up necessary to obviate the bottle rocking on its base.

5.2 Colour

Arrack shall be bottled in colourless bottles**.**

NOTE *: Other types of liquor excluding Arrack when bottled in coloured bottles, special permission shall be obtained from the Excise Department.*

5.3 Thermal shock test

The liquor bottles shall not break or show signs of crack when subjected to the test prescribed in Appendix **F**.

5.4 Impact test

The liquor bottles shall pass the test prescribed in Appendix **B**.

5.5 Limits of alkalinity

The liquor bottles shall pass the test prescribed in Appendix **D**.

5.6 Parallelism between the base and the top sealing surface

The base of the bottle shall be parallel to the top sealing surface to within 0.75^{0} when tested as described in Appendix **E**.

5.7 Verticality

The liquor bottles shall pass the verticality test prescribed in Appendix **C**.

5.8 Annealing

The bottles shall be well annealed.

5.9 Neck finishes

The neck finish of the bottle shall conform to the securo finish specified in **SLS 601 : Part 1.**

The neck finish diameter and bore dimensions shall be measured as prescribed in **8.1.2** and **8.1.3** of **SLS 628**.

6 PACKING

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

7 MARKING

The bottles shall be clearly and indelibly marked or embossed on its surface with the following information.

a) Manufacturer's name, or registered trade mark, if any ; and
b) Production year or identification number or code number.

APPENDIX A
COMPLIANCE OF A LOT

A.1 LOT

In any consignment glass bottles of same type and capacity shall be grouped as a lot.

A.2 SCALE OF SAMPLING

The sample bottles shall be selected and examined separately for each lot for ascertaining their conformity to the requirements of the relevant specification. The number of glass bottles to be selected from a lot shall depend upon the size of the lot and shall be in accordance with Table **2**.

A.2.1 The bottles to be selected from the lot shall be chosen at random. In order to ensure the randomness of selection, a random number table as agreed to between the purchaser and the supplier shall be followed.

A.2.2 In case a random number table is not available, the bottles may be selected from the lot in the following manner :

Starting from any bottle in a lot, the bottles shall be counted as 1,2…….*r* and so on in one order. Every *r*th bottle thus counted shall be withdrawn to constitute the sample where *r* is the integral part *N/n* (*N* and *n* being the lot size and corresponding sample size respectively). This procedure shall be stopped as soon as the required number of bottles is obtained.

A.3 CRITERIA FOR CONFORMITY

A.3.1 Out of the test samples selected according to **A.2**, five test samples shall be subjected to alkalinity test described in Appendix **D**. If these five samples pass the test, then only further testing need be done to examine the conformity of the lot to other requirements. If the five samples fail, the lot shall be rejected without further testing.

A.3.2 Out of the test samples selected according to **A.2**, ten test samples shall be subjected to thermal shock test described in Appendix **F**. Any sample not satisfying the requirement of the test shall be considered as defective.

A.3.3 If the number of defectives among the ten 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. The non-defective samples in the thermal shock test shall be mixed with the remaining samples selected according to **A**.**2**.

A.3.4 If in the first sample the number of defective bottles is less than or equal to the first acceptance number, the lot shall be declared as conforming to the requirements. If the number of defectives is greater than or equal to the first rejection number, the lot shall be deemed as not meeting the requirements. If the number of defectives is greater than the first acceptance number but less than the first rejection number, a second sample of the size equal to that of the first shall be taken to determine the conformity or otherwise of the lot. The number of defectives found in the first and second samples shall be combined and, if the combined number of defectives is less than or equal to the second acceptance number, the lot shall be declared as conforming to the requirements, otherwise not.

TABLE 2 – Scale of sampling

No. of items **in the lot** **(1)**	**Sample** **(2)**	**Sample size** **(3)**	**Cumulative sample size** **(4)**	**First group**		**Second group**	
				Acc. No. **(5)**	**Rej. No.** **(6)**	**Acc. No.** **(7)**	**Rej. No.** **(8)**
Up to 3 200	1st	50	50	0	3	1	4
	2nd	50	100	3	4	4	5
3 201 to 10 000	1st	80	80	1	4	2	5
	2nd	80	160	4	5	6	7
10 001 to 35 000	1st	125	125	2	5	3	7
	2nd	125	250	6	7	8	9
above 35 000	1st	200	200	3	7	5	9
	2nd	200	400	8	9	12	13

The first group includes testing the bottles for the requirements in **5.1, 5.4, 5.5** and **5.9**.

The second group includes the testing for the requirements in **5.6** and **5.7**

APPENDIX B
DETERMINATION OF IMPACT

B.1 PROCEDURE

The bottles shall be struck with a hardened spherical steel ball 4 times in the same plane at the belly i.e. 40 mm to 100 mm from the base and at the following points with a mass of 400 g falling through a distance of 100 mm:

a) on both seams; and
b) at the extremities of a diameter, at right angles to the joining seams.

A bottle shall be deemed to have failed to pass the test if a crack appears or if the bottle chips.

APPENDIX C
DETERMINATION OF VERTICALITY

C.1 ASSEMBLY

Assembly for the determination of verticality of the bottles shall be as shown in Figure **1**.

C.1.1 Place the bottle on its base on a flat plate having a shaft bound to it at right angles. Adjust the 'V' block mould on the shaft in such a manner that it is in contact with the actual diameter of the bottle at about the middle. Adjust the dial indicator fitted to the shaft so that its measuring point comes in contact with the actual edge of the neck of the bottle. Rotate the bottle, keeping the body always in contact with the 'V' block. The total deflection shown by the indicator shall be the difference in the verticality.

C.1.2 The bottles shall be deemed to have passed the test if the vertical line through the centre of the circle formed by the inside neck opening passes through the centre of the circle by the widest diameter at the bottom of the bottle within a tolerance of 1.5 mm.

APPENDIX D
DETERMINATION OF ALKALINITY

D.1 APPARATUS

D.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.

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

D.1.3 Mortar, a suitable mortar made of steel.

D.1.4 Test sieves, Two, one of aperture size 425 μm and the other of aperture size 600 μm (see **CS 124** Test sieves).

D.2 REAGENTS

D.2.1 Quality of reagents

Unless specified otherwise, chemicals of analytical grade and distilled water shall be employed in tests.

D.2.2 The following reagents shall be used

D.2.2.1 Standard hydrochloric acid solution 0.01 N

D.2.2.2 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

D.2.2.3 Standard sodium hydroxide solution, 0.05 N

D.2.2.4 Methyl red indicator

Dissolve 0.04 g of methyl red in 75 ml of ethyl alcohol or rectified spirit. 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.

D.2.2.5 Test solution

Take 1.0 ml of standard hydrochloric acid and 1.0 ml of methyl red indicator in a previously tested Erlenmeyer flask (see **D.2.3**) and add 240 ml of water. Boil for five minutes, cool quickly under running water and make up to 250 ml in the graduated flask.

D.2.3 Testing of Erlenmeyer flask assembly

D.2.3.1 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 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.

Erlenmeyer flask assemblies which have once passed the test for suitability may fail to do so after prolonged storage. In such a case, they may be revived by washing with 5 per cent (m/v) solution of glacial acetic acid followed by washing with water until free from acid before use.

D.3 PROCEDURE

D.3.1 Use Erlenmeyer flasks as tested under **D.2.3**.

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 the sieve of aperture size 600 μm but fail to pass through a sieve of aperture size 425 μm. The crushing and sieving should be done in three to four stages to avoid too much fines. Spread the sieved particles, weighing more than 5 g on a glazed paper and pass a magnet over them to remove any particles 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 ^{0}C ± 2 ^{0}C. Take two more Erlenmeyer flasks and transfer exactly 5 g of the sieved, clean and dry glass to one of the two flasks. Transfer a 100 ml portion of the freshly prepared test solution **(**see **D.2.2.5)** 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 bath and attach the previously 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 test solution into a third Erlenmeyer flask. Add 4 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. Add 4 ml of water to the second flask containing only the test solution (blank), titrate the solution in the third flask immediately with standard hydrochloric acid to the pink colour of the blank test solution in the second flask.

D.4 RESULT

The glass containers shall be taken to have satisfied the test if not more than 3 ml of 0.01 N hydrochloric acid is required for the titration.

APPENDIX E
DETERMINATION OF PARALLELISM BETWEEN THE BASE AND THE TOP SEALING SURFACE

E.1 APPARATUS

Any acceptable apparatus suitable for determining whether the base of the bottle is parallel to the top sealing surface. Two optically flat plates and a spirit level calibrated to the accuracy required for the purpose may be used.

E.2 PROCEDURE

Test each bottle for compliance with **5.6**.

APPENDIX F
DETERMINATION OF THERMAL SHOCK FOR THE BODY AND THE RIM OF BOTTLES

F.1 APPARATUS

The apparatus required for the thermal shock test is shown in Figure **2**. It consists essentially of a basket for holding the bottles upright, two water baths, one containing hot water and the other containing cold water and automatically timed means for transferring and immersing the basket of bottles from the hot to the cold bath. The temperature of the water baths shall be controlled within $\pm$ 1 ^{0}C. Each water bath may also be provided with a stirrer to keep a uniform temperature.

F.2 PROCEDURE

Adjust the cold water bath to a temperature of 30 $\pm$ 1 ^{0}C and the hot water bath to a temperature of 72 $\pm$ 2 ^{0}C. Place the empty sample bottles in the basket vertically with the mouth upwards. When the baths have attained the prescribed temperature immerse immediately the basket containing the bottles in the hot bath in such a manner that the bottles become completely filled with the hot water. Allow the bottles to soak for 15 minutes. Transfer the basket with the bottles filled with hot water to the cold bath so that the bottles are immersed in water. Keep the bottles immersed for 5 minutes. Remove the basket from the cold bath. The process of transference from the hot to the cold bath shall be completed in 15 $\pm$ 2 seconds. Take every precaution to protect the apparatus from draughts. Inspect each bottle for cracks or breaks.

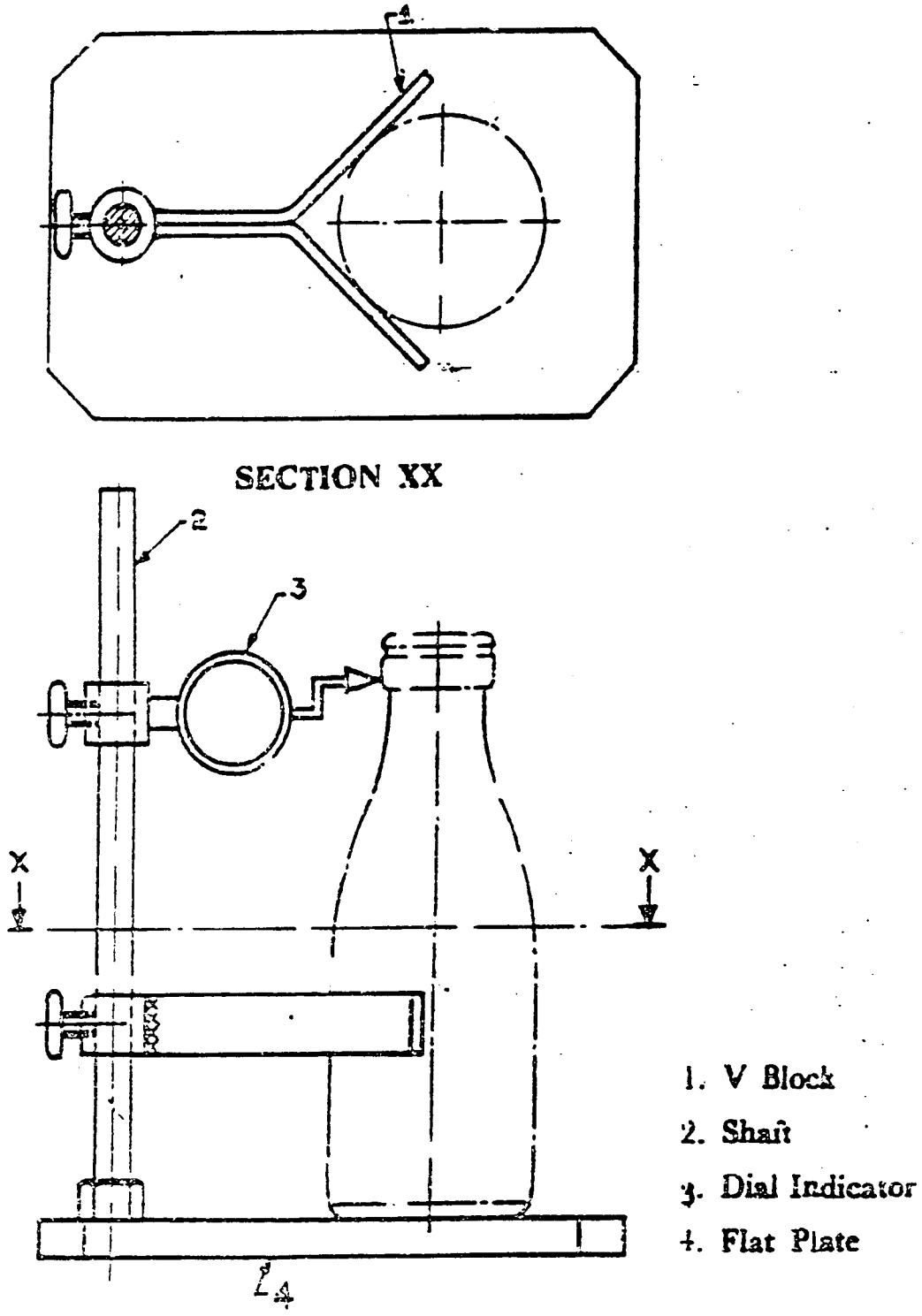
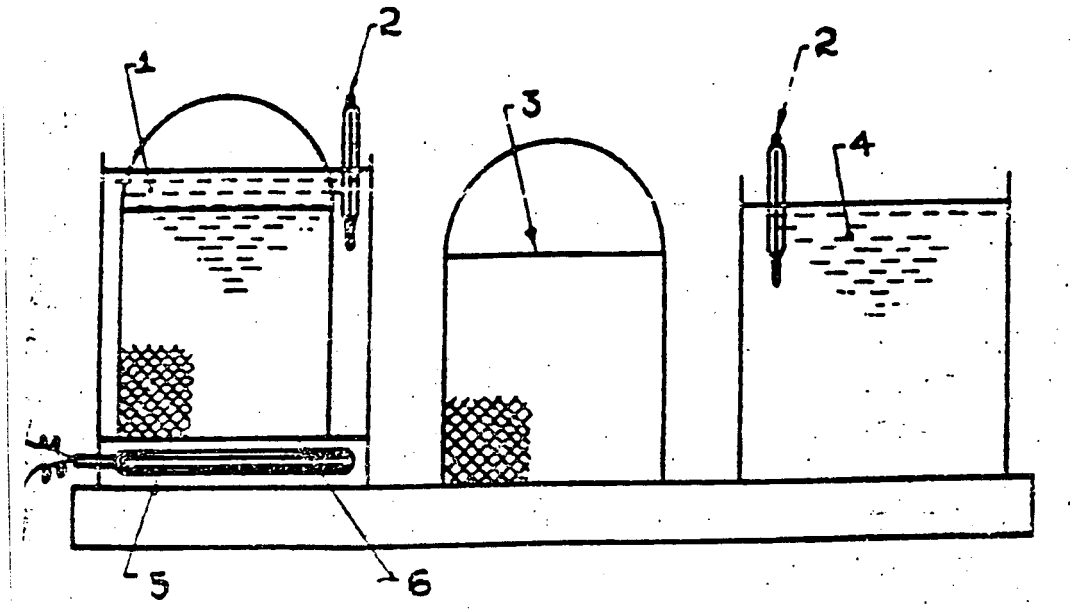


FIGURE 1 – Assembly for the Verticality Test



1. Hot Water Bath
2. Thermometer
3. Wire Basket
4. Cold Water Bath
5. Immersion Heater
6. Basket Support

FIGURE 2 – Apparatus for the Thermal Shock Test

SRI LANKA STANDARDS INSTITUTION

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