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SPECIFICATION FOR

CROWN CLOSURES

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR CROWN CLOSURES

SLS 398 : 1977
(Incorporating AMD 72)

Gr. 9

SRI LANKA STANDARDS INSTITUTION
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This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD

SPECIFICATION FOR CROWN CLOSURES

FOREWORD

This Sri Lanka Standard has been prepared by the Drafting Committee on Crown Closures. It was approved by the Mechanical Engineering Divisional Committee of the Bureau of Ceylon Standards and was authorized for adoption and publication by the Council of the Bureau on 1977-01-05.

Crown Closures are used as a sealing medium for certain types of glass bottles generally meant for bottling aerated water, alcoholic beverages etc. The dimensions and tolerances of crown closures are closely related to those of the neck finishes of those bottles. The standard carries the title "Crown Closures" instead of "Crown Corks" because compound-lined crowns have been specified in it, in addition to cork-lined crowns.

This Sri Lanka Standard is expected to ensure supply of crown corks of proper quality to the users. Dimensions and tolerances have been given in metric units only, in view of the future changeover to this system.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or observation, shall be rounded off in accordance with CS 102 Ceylon Standard on Presentation of Numerical Values. The number of figures to be retained in the rounded off values shall be the same as that of the specified value in this standard.

This standard is subject to the restrictions imposed under the Food and Drugs Act of Sri Lanka and the regulations framed thereunder.

The assistance gained from the Indian Standards Institution in the preparation of this standard is gratefully acknowledged.

1 SCOPE

1.1 This standard prescribes the requirements and methods of test of the crown closures used on glass bottles having neck dimensions as given in Fig. 2 (a), 2(b) and 2 (c).

2 TERMINOLOGY

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

2.1 **basis box** : A unit of area equivalent to 20.232 $m^2$of tinplate which forms the basis for sale, the mass of the basis box determining the substance.

2.2 **blank** : The piece of sheet metal in the original truly flat condition required to form one closure.

2.3 **coating or coat** : Film of decorative or protective material or both.

2.4 **cork lining** : Natural cork, granulated and bonded.

2.5 **compound lining** : Sealing gasket or film other than cork applied to the closure.

2.6 **corrugation** : Alternate concave and convex strengthening ribs formed to some pre-determined pattern to provide a grip on the bottle neck.

2.7 **lacquer**

2.7.1 *protective lacquer* : Protective film applied externally or internally specially to withstand defined conditions of use, process and/or storage, usually golden in colour.

2.7.2 *adhesive lacquer* : A clear coating applied internally over the protective lacquer to hold the compound lining or cork lining as the case may be.

2.8 **overprint varnish** : A film of lacquer opaque or transparent to provide protection for decoration and lithography.

2.9 **shell (metal closure)** : Pressed or drawn form from which a closure is made.

2.10 **tinplate** : Mild steel sheet carrying a thin coating of tin or both sides.

2.11 **spor** : Sealing gasket incorporated on a cork lining, texture and character appropriate to the nature of contents.

2.12 **tin-free steel** : surgically clean metal sheeting with chromium and free of tin.

3 REQUIREMENTS

3.1 Dimensions and tolerances

3.1.1 The crown shell shall be manufactured to the dimensions and tolerances shown in Fig. 1. The overall height and the diameter of the crown closure shall be checked with the gauge shown in Fig. 3 or other type of gauge with identical measurements.

3.1.2 Crown closures may be lined with cork or compound.

3.1.2.1 Cork-lined - The cork discs shall be manufactured to have a thickness between 2.3 mm and 2.8 mm and a diameter between 26.5 mm and 27.0 mm.

3.1.2.2 Compound-lined - Compound mass shall depend according to proposed contents of bottle. Adequate quantity of compound shall be applied to conform to requirements of 5.1.

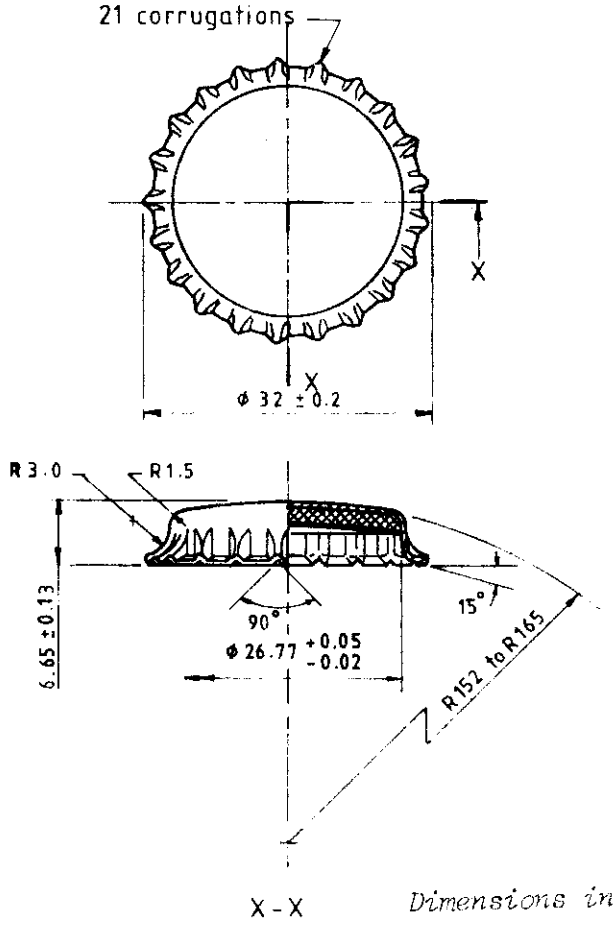


FIGURE 1 - Crown shell

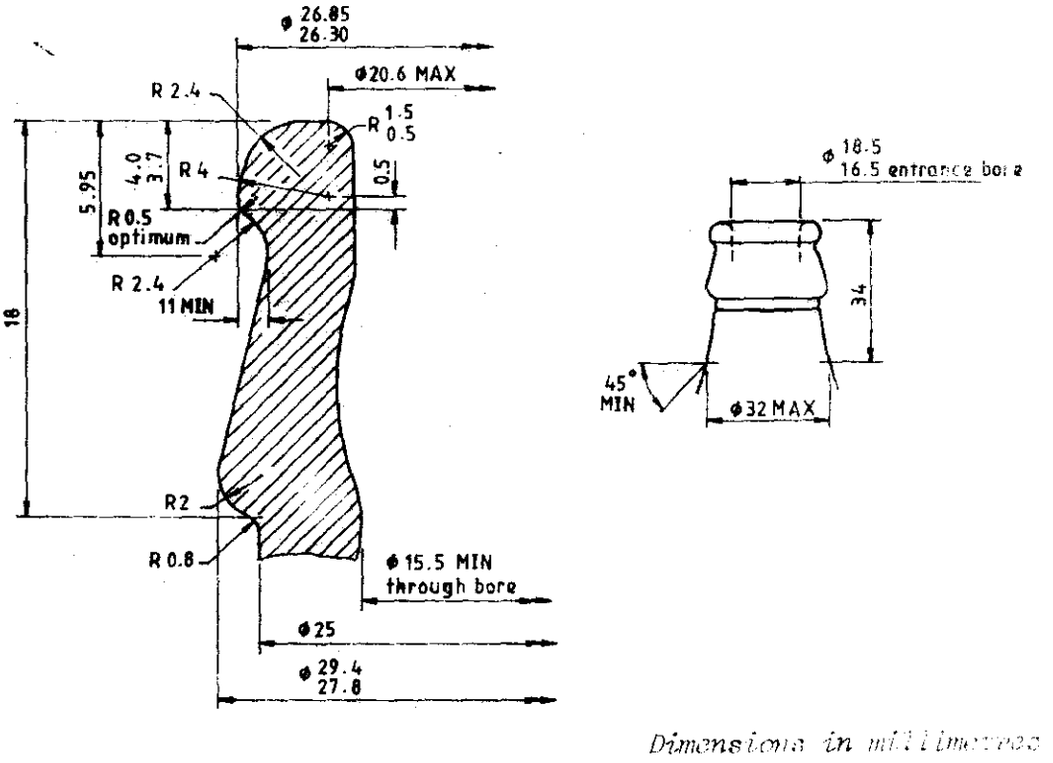
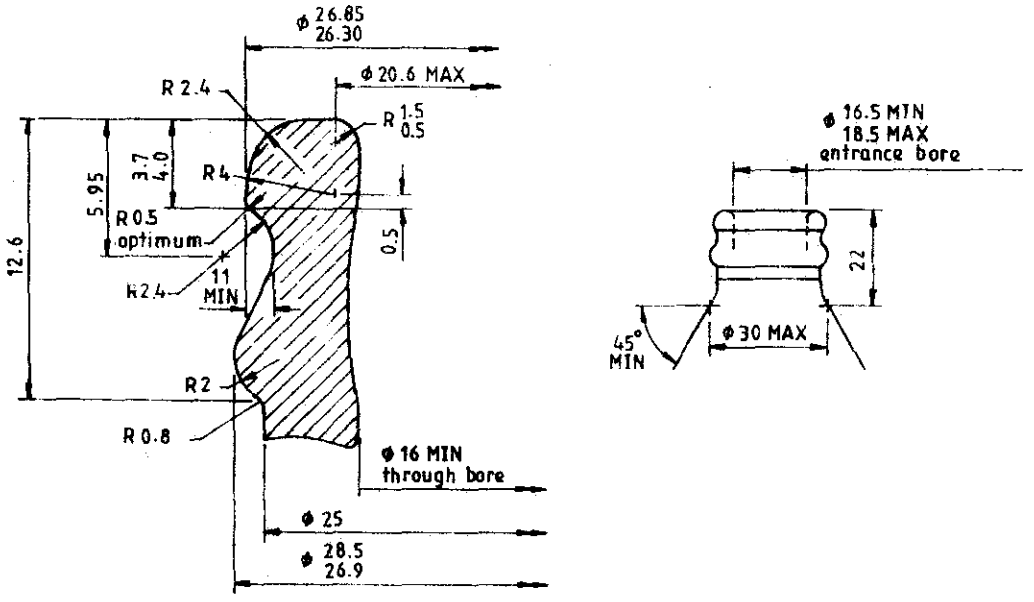
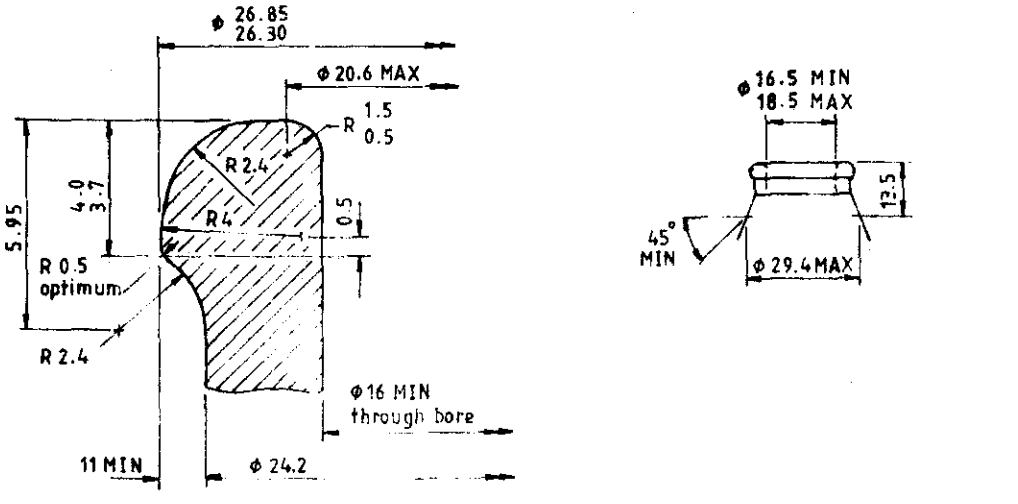


FIGURE 2 (a) - Neck dimensions of glass bottles (Standard crown finishes)



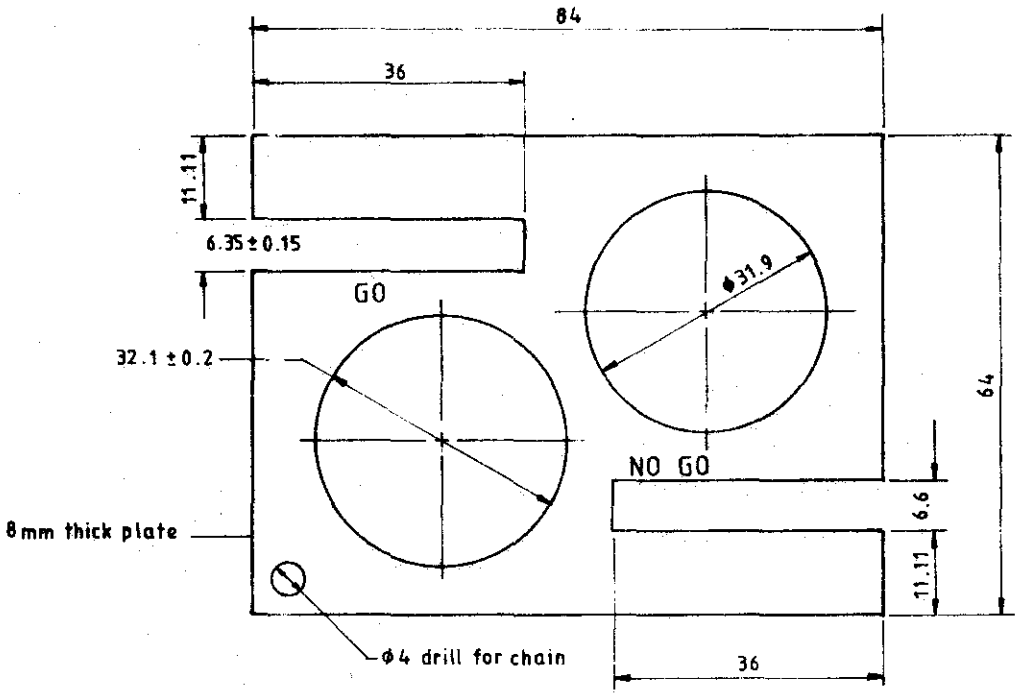
Dimensions in millimetres

FIGURE 2 (b) - Neck dimensions of glass bottles (Shallow crown finishes)



Dimensions in millimetres

FIGURE 2 (c) - Neck dimensions of glass bottles (beadless crown finishes)



Dimensions in millimetres

FIGURE 3 - Outside diameter and height checking gauge

3.2 Material

3.2.1 The crown shell shall be manufactured from tinplate or other suitable material. Such material shall be of temper grade T3, Rockwell hardness T30 of 54-60 and 0.26 mm nominal thickness may be used.

3.2.1.1 The basis-box mass of tinplate shall be 45.4 + 4.5 kg.

3.2.1.2 The carbon content of the tinplate shall be within the range of 0.05 per cent to 0.12 per cent and the tin purity shall be at least 99.75 per cent.

3.2.1.3 Mass of tin coating

The mass per unit area of tin coating, i.e. the mass of the tin coating on both surfaces of tinplate shall be as follows:

a) Hot dipped tinplate - A nominal mass of 28 g/m^2 to 33.5 g/m^2.

b) Electrolytic tinplate with differential coating - Nominal masses of 5.5 g/m^2 and 11 g/m^2 respectively on either side.

3.2.1.4 Finish of tinplate

Electrolytic tinplate shall have bright or matt surface as specified by the purchaser. Hot dipped tinplate shall be available with bright surface only. The surface of all tinplates shall be clean and reasonably free from dirt and grease.

3.2.2 The cork disc when used shall be from natural or composition cork. The natural cork shall be either straight natural or latex coated. The composition cork disc shall be bonded with refined gelatine or resin bonded. The cork granules in the composition disc shall be free from hardback. The disc shall be free from pits and pinholes and shall not impart flavour to the pack.

3.2.3 The initial moisture content of the composite cork shall not exceed 6 per cent.

3.2.4 The adhesive used for bending the composition cork to the crown shell and the adhesive used for bonding the spotting material to the cork disc shall be of non-toxic quality.

3.2.5 The composition cork discs shall contain a mould inhibitor approved for use in edible products.

3.2.6 The material used in the compound lining shall be non-toxic and shall not contaminate the liquid contents of the bottle as for instance giving rise to discolouration, foreign odour, taste etc.

3.3 **Manufacture**

3.3.1 The crown shell shall be drawn from a single piece of steel plate of blank size 38.1 mm.

3.3.2 The spotting material shall be vinylite or aluminium foil or any other suitable material of diameter 21 mm and thickness 0.05 mm + 0.01 mm or as agreed between the manufacturer and purchaser.

3.3.3 The spot should firmly adhere to the cork disc.

3.3.4 The cork disc when used with spotting material shall conform to the dimensions prescribed under 3.1.2.1.

3.3.5 The cork disc or compound lining must firmly adhere to the shell so that it cannot be removed in one piece.

3.3.6 The diameter of the area of adhesive applied to the crown shell at its centre shall be 16 mm approximately.

3.4 **Internal finish**

3.4.1 The inside surface of the crown shell shall be given a suitable protective coating of lacquer of non-toxic quality. When compound is used the lacquer must provide good adhesion for the compound. The lacquer shall conform to the specifications given in 3.4.1.1 and 3.4.1.2.

3.4.1.1 The lacquer shall be clear and free from foreign matter, sediment and undissolved water.

3.4.1.2 The lacquer shall be based on resins, drying oils, driers and thinners in suitable proportions.

3.5 **External treatment**

3.5.1 The outside surface of the crown shall be given a uniform protective coating and may also be given a decorative coating if required by the purchaser.

3.5.2 The average lacquer coating shall not be less than 6 g/m^2.

3.5.3 Provision shall be made for a wax or other lubricant application to the decorated plate, to ensure the uninterrupted hoppering of the crowns.

3.5.4 The lacquer shall be baked sufficiently, so as to ensure elasticity of the outer film of varnish on the crown shell.

4 SAMPLING

4.1 Definitions

4.1.1 *Lot :* In any consignment all the crown closures of the same type shall be grouped together to constitute a lot.

4.2 Scale of sampling

4.2.1 A sample consisting of 3655 closures shall be drawn at random from the lot.

4.2.2 In order to form the required sample, at least 50 per cent of the containers in the lot shall be selected at random and opened. From each of the containers thus opened, equal number of closures as far as possible shall be drawn from different positions in the containers to form the sample of 3655 closures.

4.3 Testing of samples

4.3.1 From the sample drawn as above, 3600 closures shall be selected at random and tested for cork dust content in accordance with 5.4.

4.3.2 From the remaining 55 closures, 20 shall be drawn at random and inspected for the requirement specified in 5.2.2 (External Finish).

4.3.3 After completing the inspection specified in 4.3.2 above, the 55 closures shall be divided at random into 5 sub-samples; two containing 20 closures each and three containing 5 closures each. The closures in these sub samples shall be tested as follows :

4.3.3.1 For the dimensional requirements specified in 3.1.1 and 3.1.2.1 - One sub sample of size 20.

4.3.3.2 For the requirements specified in 5.2.1 (Defective crowns) the remaining sub-sample of size 20.

4.3.3.3 The other 3 sub-samples shall be tested by the methods specified in 5.1, (Air pressure test) 5.2.4 (Unsatisfactory bonding) and 5.3 (Boiling test) respectively.

4.4 Criteria for conformity

The lot shall be considered as conforming to the requirements of this specification if the following conditions are satisfied.

4.4.1 The closures tested for the cork dust content satisfy the requirement specified in 5.4.3.

4.4.2 The number of closures not conforming to the test specified in 4.3.2 does not exceed three (3).

4.4.3 The number of closures failing to conform to the dimensional requirements (3.1.1 and 3.1.2.1) does not exceed one (1).

4.4.4 All the closures in the remaining three sub-samples conform to the relevant requirements.

4.4.5 The number of closures failing to conform to requirements specified in 4.3.3.2 above does not exceed one (1).

5 TESTS

5.1 Air pressure test

A dummy bottle top made of mild steel shall be used for this test. The bottle neck shall be manufactured to the nominal dimensions given in Fig. 2(a).The dummy shall be fitted with a non-return air valve and a pressure gauge as shown in Fig. 4. The crown closure shall be crowned on to the dummy and the uniformity of the scaling shall be examined by using a 'GO' and 'NO GO' ring gauge as shown in Fig. 5. A crown closure found improperly sealed shall not be used, for the purpose of this test. An air pressure of 6.5 kg/cm^2 as read on the pressure gauge shall be pumped in through the non-return air valve. The bottle shall now be immersed in water for a period of 15 seconds and there shall be no leakage of air.

5.2 Visual examination

Each crown shall be visually examined for compliance with the relevant requirements specified in 5.2.1, 5.2.2, 5.2.3 and 5.2.4.

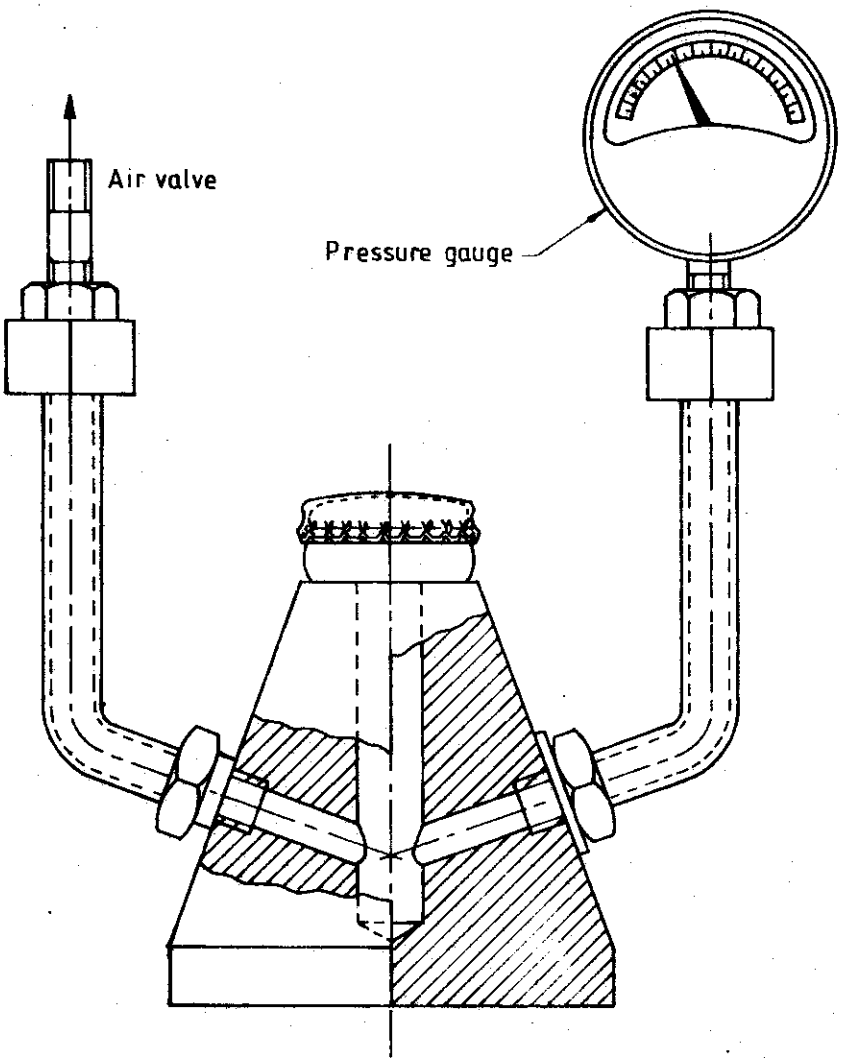
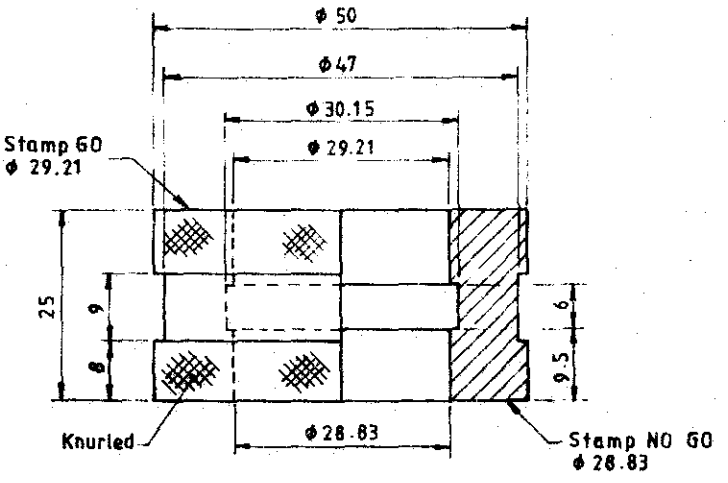


FIGURE 4 - Dummy bottle top



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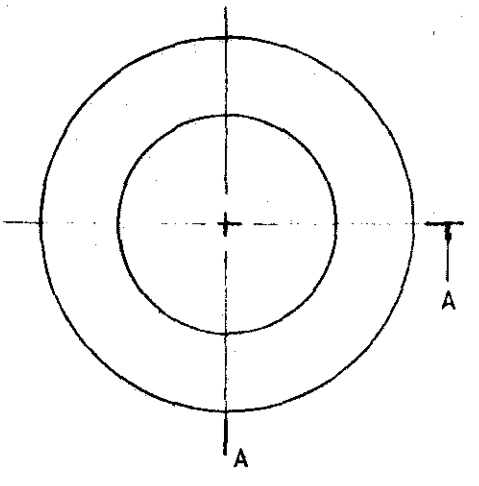

Dimensions in millimetres

FIGURE 5 - Ring gauge for crown cork

5.2.1 *Defective crowns*

The crowns shall not be deformed or dented. Defective crowns shall consist of the following:

a) Crowns without aluminium spot or plastisol.

b) Crowns with uneven or wedge shaped cork discs.

c) Cork disc or plastisol damaged or absent in a crown.

5.2.2 *External finish*

The lacquer shall not peel off. In the case of printed crowns the point shall be clear and not placed off centre.

5.2.3 *Cork dust*

The crowns shall be free from contamination with cork dust, and shall comply with the test requirements specified in 5.4.

5.2.4 *Unsatisfactory bonding*

The plastisol or cork disc shall not fly off the shell, nor the aluminium or vinylite spot fly off the cork disc. The aluminium or vinylite spot shall not be placed off centre.

5.3 Boiling test

5.3.1 The gelatin bonded composition cork disc, when subjected to a boiling test in water for one hour, shall not show any signs of disintegration.

5.3.2 The resin bonded cork disc when boiled in a concentrated solution of hydrochloric acid for one hour, shall not show any signs of disintegration.

5.4 Test for cork dust content

The scratch resistance and 'dusting' of the crowns shall be determined by running 3600 crowns from each lot of crowns through a standard bottle crowning machine hopper. The hopper shall be arranged with a star wheel at the end of the hopper chute. Parts of the hopper shall be enclosed in order to collect all the dust particles that accumulate from each run.

5.4.1 Twenty five gross of crowns shall be put into the hopper and fed through the chute of the machine at the rate of 150 crowns per minute.

5.4.2 After the crowns have been through the hopper the collected dust shall be weighed.

5.4.3 The mass of the dust in the 3600 crowns shall not exceed 50 mg.

6 MARKING

6.1 The manufacturer's name or initials or trade-mark shall be legibly marked on the crown shell skirt.

7 PACKING

7.1 Crowns shall be packed in either wooden cases or cartons or any other suitable container. The quantities packed shall be in multiples of 500 crowns up to a maximum of 15,000 crowns.

7.1.1 The crowns shall be suitably packed so as to prevent rusting or moulding within a period at least 90 days from the date of packing. The type of closure and date of packing should be legibly marked on the container.

7.1.2 A packing slip should be inserted in every pack. The slip should specify the following details :

a) Date of manufacture ;

b) Lot number ;

c) Date of packing ; and

d) Type and brand.

SLS CERTIFICATION MARK

The Sri Lanka Standards Institution is the owner of the registered certification mark shown below. Beneath the mark, the number of the Sri Lanka Standard relevant to the product is indicated. This mark may be used only by those who have obtained permits under the SLS certification marks scheme. The presence of this mark on or in relation to a product conveys the assurance that they have been produced to comply with the requirements of the relevant Sri Lanka Standard under a well designed system of quality control inspection and testing operated by the manufacturer and supervised by the SLSI *which includes surveillance inspection of the factory, testing of both factory and market samples.*

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The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

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