DRAFT TANZANIA STANDARD

GTDC4 (5483) P3 Packaging – Metal crown closure for glass bottles– Specification (Revision 1274:2010)

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The Tanzania Bureau of Standards is the statutory national standards body for Tanzania, established under the Act.No.3 of 1975, amended by Act.No.2 of 2009.

This Draft Tanzania Standard has been adopted by Packaging Technical committee, under the supervision of the General Techniques Standards Divisional Committee (GTDC) and it is in accordance with the procedures of the Bureau.

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Packaging – Metal crown closure for glass bottles – Specification

0 Foreword

Metal crown closures are widely used for glass bottles containing aerated and none aerated beverages drinks of the neck finishes bottles. The development of this Tanzania Standard has taken into account the technical and environment requirement as well as health and safety concern of consumers. More emphasize has been placed to the critical scenarios such as rusting of the metal crown closure, mechanical strength and the quality of lining.

This Tanzania Standards is intended to provide guideline to the manufacturers and supplies of metal crown closures and ensure good manufacturing practices and proper crown quality to users.

For the purpose of deciding whether a particular requirement(s) of this Tanzania Standard is complying with the final value, observed, calculated, expressing the result of test or measurement shall be rounded off accordance with TZS 4: 2009. The number of significant places retained in the rounded off number should be the same as specified value in this Tanzania Standard.

1 Scope

This Tanzania Standard specifies requirements, design and materials, manufacturing, sampling and test procedures for intermediate metal crown closures for aerated and non-aerated glass bottles.

2 Normative reference

During preparation of this Tanzania Standard reference has been drawn from the following publication:

IS 1342, *Crown closure – Specification,* published by India Institute of Standardization.

3 Terms and definitions

For the purpose of this Tanzania Standard, definitions given in TZS 817: 2004 shall apply.

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4 Requirements

4.1 General requirement

Metal crown closure shall meet the following requirements:

a. Prevent leakage or gas loss of product after gas being applied, according to respective standards, to commercially acceptable bottle finishes.

b. Withstand the normal force that is encountered during the crowning, pasteurizing, labeling, packaging, storage and distribution of the products without function failure.

c. Ensure that finished crowns are free of sharp edges and burrs.

d. Provide the satisfactory operational performance when run on the customer's filling lines.

e. Ensure liners remain secured within the crown shell during normal processing packaging operations.

f. The closure must keep the product properly sealed until the content are consumed.

g. The metal crown closure shall be coated with FDA approved lacquer for improved product compatibility.

h. The metal crown shall not show any sign of rusting after fixed to the bottle with the content.

4.2 Material

4.2.1 The metal crown closures shall be manufacturing from tinplate (TP) or Tin Free Steel (TFS). These materials are strong and therefore well suited for vacuum and pressure seal applications. The metal crown closure has a short skirt with flutes (usually 21) evenly distributed, which shall be crimped into a locking position over the finish by the capping head. Other requirements are as shown in table 1 below:

Table 1 – Materials

1	Materials	Tinplate and Tin Free Steel
2	Thickness	0.18mm -0.24mm with E1[2.8/2.8m2] or TFS
3	Hardness	TH415- T4(61 ± 5); TH435-T5 (65 ± 5); TH550-DR8 (73± 5) on the Rockwell 30T scale
4	Finish metal crown	Shall be free of sharp edge and excessive burrs

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4.3 Design

4.3.1 Dimensions and tolerances

The crown closure shall be manufactured to the dimensions and tolerances specified in table 2. The overall height and the diameter of the metal crown closure and other features including the detail drawing are shown in figure 1.

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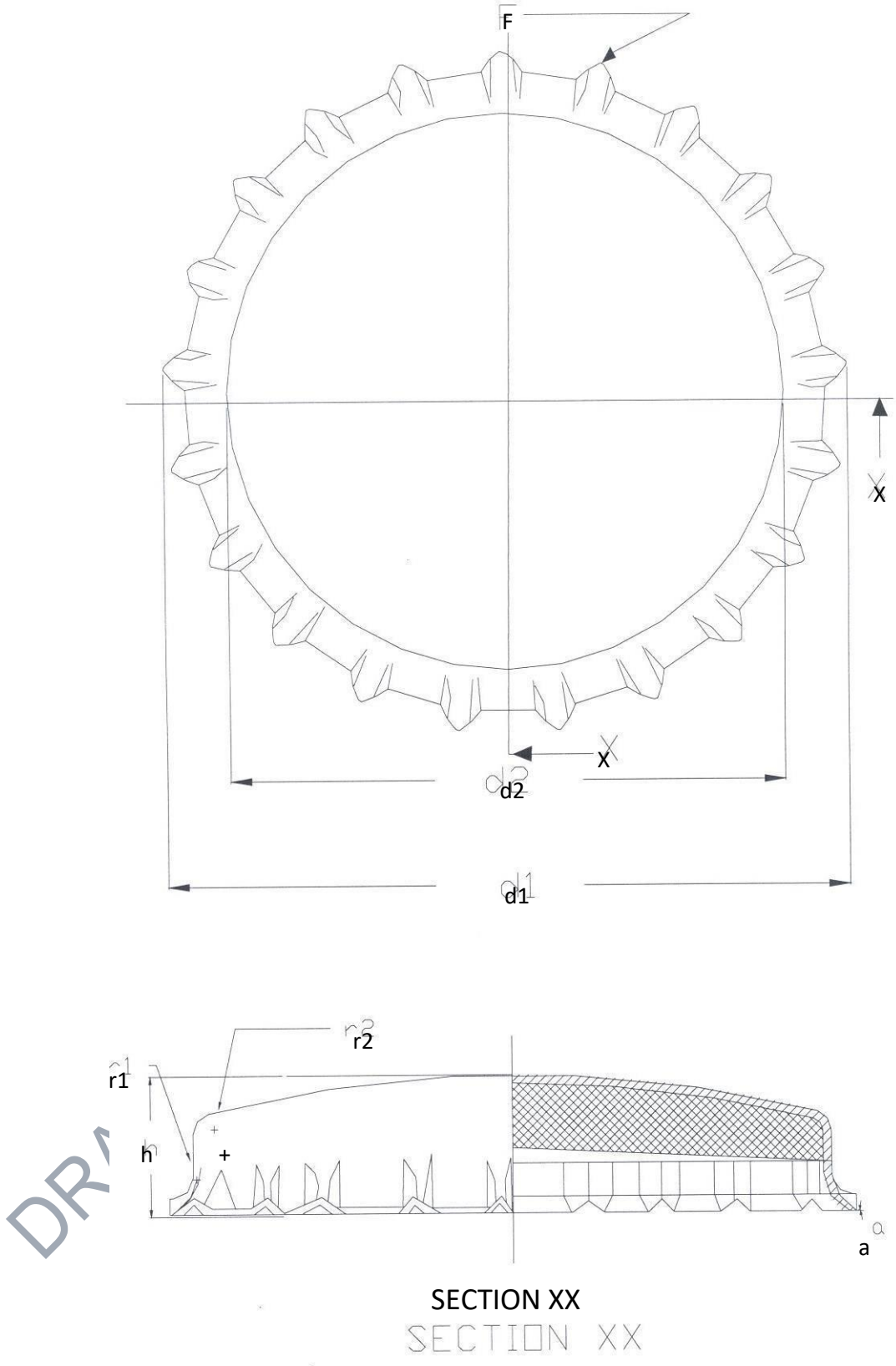

Figure 1 – Crown shell

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Table 2 – Dimensions and tolerances

Symbol	Description	Standards
d1	Inside diameter	26.77 ± 0.15 mm
d2	Overall diameter	32.10±0.20 mm
h	Press shell height	6.00±0.15 mm
r1	Shoulder radius	1.70±0.10 mm
r2	Spherical radius	165.00±0.60 mm
a	Press shell skirt angle	18º ± 5º
F	Number of serrations	21 equally spaced around circumference

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4.4 Lining materials

The lining is often direct contact with the content, the compatibility with the contents and the performance requirements of the lining are essential for good seal.

Crown closures shall be lined with materials such as Polyvinyl chloride (PVC) or Polyethylene (PVC-free) as a functional alternative if the use of PVC is prohibited by the local legislation. The details for liner profile and their masses are described below.

4.4.1 Liner profile and mass shall include

a) Double sealing semi-puff PVC
b) Double sealing foamed plastisol
c) PVC Free
d) PVC free dry blend

4.4.2 Weight:

a) Foamed plastisol 240 ±10 mg
b) PVC free 180 ± 10 mg or as per recommendation by manufacturer of the liner
c) PVC free dry blend 225 ±15 mg

4.5 Manufacture

4.5.1 A suitable spotting material like vinylite, aluminum foil, etc. may be provided if required by the purchaser.

4.5.2 The adhesive used for bonding the spotting material to the cork disc shall be of non-toxic quality.

4.5.3 The cork disc when used with sporting material shall conform to the proper dimension.

4.5.4 The cork wad or compound as applicable must firmly adhere to the shell so that it cannot be removed in one piece.

4.6 Internal finish

The inside surface of the crown shell shall be given a suitable protective coating of lacquer of non-toxic quality with FDA approval. When compound is less used, the lacquer must provide good adhesion for the compound.

4.7 External treatment

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

5 Sampling

Sampling of the metal crown closure for glass bottles

5.1 Lot

5.1.1 In any consignment all the items of the same grade, type shape and size and being manufactured from the same raw materials under relative similar conditions of production shall be grouped together to form a lot for inspection.

5.1.2 Sample shall be selected and inspected from each lot separately to ascertain its conformity or otherwise to the requirements of the specification.

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Table 3 – Sampling plan

Lot size	Number of cartons to sample size
5-15	All
16-50	10
51-100	15
101-150	20
150-200	25
201-250	30
251-300	35
301-350	40
351-400	45
401-500	50
≥501	60

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Table 4 – Acceptance quality level

Defect	Final sample size	AQL%	Accept	Reject
Liner:				
Missing	500		3	4
Over fill		0.25%		
Under-fill	800		5	6
Loose liner				
Malformed	1250		7	8
Soot particles				
Dust				
Liner:	500	1.25%	10	11
Over weight				
Underweight				
Poor adhesion	800		15	15
Foreign matter				
Density out of specification	1250		22	22
Shell:	500		3	4
Malformed		0.25%		
Double				
Rough edge	800		5	6
Bent				
Crushed				
Burrs	1250		7	8
Height out of Specification				
Diameter out of Specification				

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Mixed design	500		3	4
	800	0.25 %	5	6
	1250		7	8
Shell:				
Rust	500	1.25%	10	11
Grease	800		14	15
	1250		21	22
Decoration:				
Print layout not to Standard	500	1.25%	10	11
Resistance to decoration	800		14	15
	1250		21	22
Decoration:				
Colour to colour				
Register>0.5mm	500	4%	21	22
Off centre				
Inconsistent ink				
Ink coverage	800		21	22
Filling in smudging				
Soiled (any foreign matter on				
Decoration)				
Scratches>4mm	1250		21	22
Ink:				
Smudging	500	4.0%	21	22
Soiled	800		21	22
	1250		21	22

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6 Marking

6.1 Each unit of packaging shall carry the following information

6.1.1 Manufacturer name;

6.1.2 Brand identification;

6.1.3 Crown type/specification number;

6.1.4 Batch number;

6.1.5 Quality

6.1.6 Production date and supplier identification

6.2 The crown shells may also be marked with the TBS standard mark of quality.

NOTE – The conditions of using TBS standard mark of quality shall be obtained from Tanzania Bureau of Standards.

7 Tests

Compliance of all requirements for performance and specification shall be checked by use of relevant test method as shown below.

7.1 Visual inspection

The metal crown shall be visually inspected to check presence of any damage or apparent defects in manufacture.

7.2 Dust level test

The main objective of this test is to determine the resistance of decoration and Coatings to the bottling process. This involves the following procedures:

a. Take a set of 50 random crown samples from the running production.

b. Divide the set into two samples of 25 crowns each.

c. Clean the first sample by blower brush.

d. Weigh the samples and record results.

e. Put the samples in the tumbling machine and tumble for 50 minutes/1000 rounds.

f. Clean the samples by blower brush.

g. Weigh the samples and calculate the difference.

h. Record the results.

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i. Repeat No.3 to 8 for the second sample.

j. Calculate average for both samples.

k. Record the results.

Acceptance level of the dust level is given in the table 5 below

Printed crown	Maximum allowable abrasion (mg)
Plain crown	20
Printed (1-2 colours)	25
Printed (3 or more colours)	35
Silver size/ aluminum varnish	40

7.3 Liner mass test

Principally the objective of this test method is to determine if applied liner is as per specifications. In performing the test, the following procedures should apply

a. Line ten easy peeling samples through liner machine.

b. Collect the samples at the exit belt to the packing carton.

c. Peel the samples from their shells

d. Weight the samples on the analytical balance

e. Record the results.

7.4 Copper Sulphate test

The main objective of this test method is to determine corrosion and shall coating material coverage. To carry out the test the following procedures should be observed;

a. Place 20 random crown samples in a beaker, fill the beaker with copper sulphate solution, and start your stop watch.

b. Let the samples stay in the copper sulphate solution for two minutes

c. Remove the samples from copper sulphate solution and wash them with running tap water.

d. Dry the samples with cotton towel or mutton cloth

e. Examine each crown for rusty by using microscope or magnifying lens

f. Any noticeable rust sign indicates a failure.

g. Allowance is given to any sign of rust at the cut edges.

h. Record the results.

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7.5 Pasteurization test

The main objective of this test method is to determine the resistance of decoration and coatings to the pasteurization process. The procedure for carrying out the test is as shown below;

a. Place 20 random crown samples in a beaker

b. Cover the sample with sodium hydroxide 10N and stir.

c. Place the beaker in the water bath and heat up to 65 ^{0}C. Hold at this temperature for 30 minutes.

d. Remove 3 crowns and immediately rub each crown on a soft towel on the decorated side by a single stroke approximately 15 mm.

e. If the is any indication of softening on the first half of the samples, allow the remaining crowns to cool for 3 minutes before continuing.

f. Examine each crown for cracking on the skirt.

g. Any noticeable cracking or peeling of ink indicates a failure

h. Record the results.

7.6. Leak test

a. Pick 5 random crowns after lining process and examine for any obvious defects.

b. Examine the bottle finishes and check for correct diameter by use of GO NO GO gauge.

c. Fill the bottles to approximately the standard fill level with clean tap water.

d. Crimp each sample to the bottle by using hand crowner, in case of failure during crimping process, replace the affected crowns until they pass the crimp test. Check the process by using crown crimp No Go, Go gauge, 28.6mm and 28.8mm respectively.

e. Put the crowned bottle in the leak test machine and allow the pressure.

f. Bubbles indicate failure.

g. i. Unpasteurized samples shall withstand an internal pressure of at least 100psi without leaking.

ii. Crowned samples after pasteurization shall withstand average internal pressure of minimum 115psi.

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