



CP QA RF-035

SPECIFICATIONS – ISO LEVEL 3 DOCUMENT

PAGE

1

OF

8

TWIST-OFF CROWN SPECIFICATIONS

Revision No.	Revision Date	Reason for Review	Reviewed By	Position	Approved By	Signature
1	July 2017	Diageo Request for Separate Documents	Raksha Latchmiah	Raw Material Specialist	J. du Plooy QA Manager	

Contents

1. Introduction..... 2

2. Twist-Off Crowns 2

3. Lining..... 3

4. Coating Material 4

5. Steel 4

6. Material Functionality..... 5

7. Critical to Quality 6

8. Packaging..... 7

9. Crown Handling Practices 8

1. Introduction

The specifications contained in this reference are the latest revision as per world class crown manufacturing standards.

2. Twist-Off Crowns

See Illustration Below

Height

6.00 mm \pm 0.15 mm
 (USL = 6.15 mm) (USWL = 6.10 mm)
 (LSL = 5.85 mm) (LSWL = 5.90 mm)

Internal Diameter

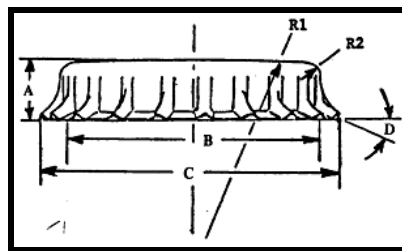
26.77 mm \pm 0.15 mm

Outside Diameter

32.10 mm \pm 0.20 mm
 (USL = 32.30 mm) (USWL = 32.20 mm)
 (LSL = 31.90 mm) (LSWL = 32.00 mm)

Skirt Angle: 15° \pm 3°
 Top Radius: 165 mm \pm 0.6 mm
 Corner Radius: 1.7 mm \pm 0.1 mm
 Corrugations: 21 equally spaced around circumference
 Mass of crown: 2.12 g \pm 0.30 g
 Fresh torque: Not less than 1 Nm (Max. 2 - 3 Nm)
 48-Hours torque: Not less than 0.5 Nm (Max. 1 - 2 Nm)

SHELL CONTOUR



Parameter	Description in Diagram	Specification
Height	A	6.00 \pm 0.15 mm
Internal Diameter	B	26.77 \pm 0.15 mm
Outside Diameter	C	32.10 \pm 0.20 mm
Skirt Angle	D	15° \pm 3°
Top Radius	R1	165.00 \pm 0.6 mm
Corner Radius	R2	1.70 \pm 0.1 mm
Corrugations		21 equally spaced around circumference

Table 1: Dimensions of Shell

3. Lining

Only compounds that are approved by the Customer will be used on crowns supplied to the Customer or to contract packers who package the Customer's products. Material approved for use at the Coleus facility are listed in the table below.

	Supplier	Material Code	Type	Opening	Colour	Application
1.	Darex	DB3481TR	PVC	Twist-Off	Transparent	Generic & Promotions
2.	Darex	DB3481B	PVC	Twist-Off	Blue	Generic & Promotions

Table 2: Lining Material Qualified for use for Twist-Off Crowns at Coleus Packaging

Lining Machine

SACMI

- PMC250
- PMC300
- PMC500

Liner Mass

PVC

- 225 mg \pm 15 mg
- (USL = 240 mg) (USWL = 230 mg)
- (LSL = 210 mg) (LSWL = 220 mg)

Profile

- TOC (PVC): 917

4. Coating Material

Only coatings that are approved by the Coleus will be used on crowns. Specific coating material requested by the Customer will be approved at Coleus if it is not included in the list below. This includes size materials, adhesion lacquers, release lacquers and overprint varnish.

Supplier	Description	Code
Valspar	Silver Size	REN3111
Valspar	Clear Size	GSP257
Valspar	Gold Size	PPH2745
Valspar	Gold Size	PPH3151
Valspar	Gold Size	PPH3142
Valspar	White Size	GTW13
Darex	PVC Internal Adhesion Lacquer	AL1103-27
Darex	Gold Size	PR1159-34
Darex	Clear Size	PR1159-33
Induradec	Gold Size	PRO6379
Induradec	Clear Varnish	RC3043
PPG	Clear Varnish	PPG3351-801/A

Table 3: Coatings Qualified for use at Coleus Packaging

5. Steel

Tinplate

Finish:	Stone bright finish E1 with surface roughness of 0.25 – 0.5 μm
Tin Coating:	2.8g/m ² or 7.2 mg/4 inch ² coating mass on both sides
Chromium level:	3.5 – 9.0 mg/m ² (Passivation code 311)
Thickness:	0.21 mm: -4% to +5%
Tensile:	TH 425 \pm 50 MPa
Hardness:	61 - 67 (Rockwell HR 30T scale)

Tin-free plate

Finish:	Bright finish with surface roughness of 0.25 \pm 0.5 μm
Coating:	50 mg/m ² metallic chromium layer
Chromium level:	5 – 35 mg/m ²
Thickness:	0.21 mm: -4% to +5%
Tensile:	TH 425 \pm 50 MPa
Hardness:	61 \pm 5 (Rockwell HR 30T scale)

Application Specification

Crimp:	28.58 to 28.83 mm
--------	-------------------

6. Material Functionality

Adequate material specifications, including the appropriate liner material, coatings and metal plate that will:

- sustain the desirable properties of the product such as flavour, aroma, clarity and carbonation for a minimum of twelve weeks
- be free from any undesirable tastes or odours that may be imparted to the product
- be generally recognised as safe for use in contact with foodstuffs, and to have been specifically approved for use
- resist the normal forces encountered during brewery processing and storage without separation of the liner from the shell
- ensure suitable removal properties in the case of twist-off crowns

An attractive external appearance, including decoration and protection that will:

- conform to the approved print layout and colour tolerance standards
- colour conformance to be judged under controlled lighting conditions
- the use of inks containing heavy metal based pigments is not allowed
- result in crowns that retain their appearance and remain essentially rust-free after reasonable periods of exposure to normal crown handling, tunnel pasteurisation, warehouse storage and trade practices
- provide a durable, scuff-resistant surface with a level of mobility which facilitates smooth transfer between crown hoppers and crown application

Application

Internal Pressure

Ex-Filler Pressure Retention:

- An un-pasteurised crown shall withstand an internal pressure of at least 100 psi without leaking.

Ex-Pasteuriser Pressure Retention

- The average internal pressure must be at least 115 psi with no more than 15% of individual pressure results below 115 psi but greater than 100 psi.

7. Critical to Quality

Compliance with the requirements listed below is critical

Crown Defect	Comment/Description
Height	Any deviations outside specification
Outside Diameter	Any deviations outside specification
Liner Mass	Any deviations outside specification
Removal Torque	Any deviations outside specification
Dust Test	Any deviations outside specification
Sealing	Any deviations outside specification
Shell Defect	Description
Lamination	Separation of the base metal into two or more discrete layers
Multiple Shell	Two or more thickness of tinplate
Chopped Shell	Gap in the continuity of the shell shape
Scrap	Extra metal - not part of the normal shell
Malformed	Corrugations badly formed or pleated
Burrs	Ragged cut edge
Bent / Rocker	Shape - distorted beyond height or diameter dimensional tolerance
Liner Defect	Description
Missing	Empty shell
Overfill	Liner material extending up the wall of the shell
Underfill	Incompletely formed or small diameter liner resulting in leaking bottles
Bubble-Gum	Un-moulded pellet
Loose	Incompletely adhered liner
Decoration Defect	Description
Missing	All or part of the design missing
Colour Deviation	1. Colour to colour mismatch when viewed at arm's length 2. Any deviations as per colour standard
Smudged	Design indistinct when viewed at arm's length
Mixed	Two or more different decorations (brands)
Incorrect Brand	Brand identification on carton is different from contents
Off register	Design > 1 mm off the crown surface

Table 4: Defects Table

Dusting

Crown Type	Allowable Abrasion	The Coca-Cola Company
Plain	≤ 20 mg	≤ 16 mg
Printed 1 & 2 colours	≤ 25 mg	≤ 20 mg
Printed 3 or more colours	≤ 35 mg	≤ 25 mg

Table 5: Allowable Dusting

8. Packaging

Outer Packaging

Board

Board for outer packaging shall be in accordance with the requirements of SABS 431

Carton Detail

Dimensions

Box outer dimensions will be 367 x 367 x 367 mm

Locking mechanism of box shall be either H-Lock or seal at the bottom with glue.

Single wall and double wall

Carton Contents

	Pry- and Twist-Off
Crown Count – electronically counted	10 000 ± 30
Filled Mass – approximate kg	22.08

Table 6: Carton Content Detail

Construction

- Manufacturers joint
- The flap must be on the long panel and glued on the outside of the carton.
- The overlap must be not less than 25 mm
- Bottom and top short side flaps
- Carton closing: bottom – friction locked (H-Lock), stapled or glued;
top - glued or sealed with tape.
- The box must be constructed in such a way that it must be load bearing

Identification

- All cartons must be identified with the manufacturing company's logo or similar.
- Cartons should be clearly identified as containing pry-off or twist-off crowns.
- Each carton to be labelled with manufacturing information including brand, job number, production date, production time.
- Crown brand and type must be readily identifiable on each carton. This is done by inserting an identifying crown, representing the contents, in a cut-out window on one side of the carton. All identifying crowns must be visible on a stacked pallet.
- Each carton to be clearly marked with the manufacturing factory identification and date of manufacture.

Inner packaging

Clear virgin plastic bags to line the inside of the carton:

- Lay flat measurement: 540 mm (box dependent)
- Gusset: 340 mm (box dependent)
- Length: 800 mm (box dependent)
- Material thickness: ≥ 25 microns

Storage

- Cartons must be stacked on 2-way entry pallets for storage. Pallets dimensions are 1 170 mm x 1 170 mm.
- No carton to protrude over the edge of the pallet. Lack of support of any area of the base of the carton may cause bent crowns.
- Meet overall pallet stacked height of 1.70 m.
- Pallets of crowns must not be stacked one on top of the other.
- Crowns and cartons must not be allowed to get wet and must not be stored in direct sunlight.
- Crowns and cartons should be stored at room temperature.
- Nothing must be stored or placed on top of palletised crowns.
- No sitting, walking or standing on crown cartons are allowed.
- The shelf life of the unused crowns is 3 years depending the storage of the product.

9. Crown Handling Practices

- Twist-off crowns **must not** be used within 24 hours of manufacture. 'Fresh' crowns give high removal torques.
- Pallet-loads of crowns shall not be stacked on top of each other. The use of rack storage is recommended.
- Cartons containing unused crowns that are returned to storage from production must be closed and resealed. Mixing of unused crowns in "part-cartons" is to be avoided.
- Part-cartons must be used first.
- Walking or standing on filled cartons must be avoided. Alleyways should be provided to facilitate stock control and stocktaking.
- Crown bin and hopper cleaning must be in accordance with Machine Specifications to avoid the build up of print dust and other potential beer contaminants.
- The method of distribution is specified by the customer requirements.