Pira Consultancy Report

Tamper evidence assessment

Prepared for Versapak Doping Control Limited

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Commercial in confidence

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1 Objective

To assess the level of tamper evidence provided by the Versapak doping control canister.

2 Samples

Twenty complete doping control kits were supplied, each consisting of a sealed bag containing two sets of sample bottles and canisters – one set green, labelled A and the other yellow labelled B. All the components in each bag were identified by the same serial number and prefixed with either an A or B.

The glass sample bottles were identified with coloured adhesive labels and feature a screw topped lid.

The security canisters consisted of a single moulded lid and body assembly, both parts embossed with the kit's serial number.

Figure 1 – Contents of the doping control kit

3 Programme of work

An initial review of the canisters features was made by following the provided instructions (see appendix A).

The security of the doping control kit's canister was then evaluated using a range of physical and thermal techniques. These were limited to a window of opportunity of 1 hour and the use of non-specialist equipment.

The tamper evidence was assessed by attempting to gain access to the samples and then reproduce, repair or substitute the individual features found on the canister.

4 Review of kit features

All of the kit's components are labelled with the same serial number to prevent substitution with parts from other kits and to ensure traceability of the samples.

Once the test sample has been placed in the "A" and "B" bottles, each one is placed in its corresponding canister and closed. The canisters lid has an interference fit and employs a double bore seal. Three splines on the inner bore and a single interlocking slot on the outer bore are used to prevent the lid being rotated in the body of the canister. The inner bore of the canister also features three protruding lugs which latch against corresponding holes in the inner bore seal to prevent the lid being withdrawn.

After the canister has been closed, access to the sample bottle inside is gained by using the tamper evident ring pull, which is used to tear the centre of lid off the canister.

5 Test methods

The security of the bottle inside its canister was evaluated using the following techniques. In each case tampering with the canister was assessed and reported as the ability to undetectably tamper with the contents of the canister. The level of sophistication or complexity of the technique together with the approximate time required to perform the violation were also reported.

5.1 Lid impact technique

Canisters were conditioned to temperatures of -18, 23 and 55°C and then impacted on the base and lid in an attempt to release the lid's interlocking features.

5.2 Lid leverage technique

Attempts were made to pry the lid free from the body of a canister using a screwdriver blade, after the canister had been preconditioned to a temperature of -18°C, 23°C and 55°C.

5.3 Ring pull panel replacement technique

The ease with which the ring pull panel could be replaced and repaired was investigated by opening the ring pull of the canister and removing the sample bottle.

5.4 Canister base removal technique

The base of the canister was cut away using a knife and the possibility of withdrawing the bottle through the base investigated.

5.5 Canister code alteration

Attempts were made to alter the embossed security code found on the side and lid of the canisters by removing the original code using emery paper. The surface was then polished and a new code substituted using permanent ink.

6 Results

Table 1 – Summary of canister security assessment

Technique	Undetectable tampering successful	Tool sophistication	Tampering time (minutes)
Lid impact	No	Low	20
Lid leverage	No	Low	60
Ring pull panel replacement	No	Moderate	20
Canister base removal	No	Moderate	60
Canister code alteration	No	Moderate	20

6.1 Lid impact technique

Impacts and shock, were unable to disengage the lid of the canister. Access to the sample bottle could only be achieved by breaking the canister open. Sufficient impacts to the base of the canister were found to detach the entire base, allowing access to the bottle. However, after gluing the canister back together, the canister split was clearly visible when viewed at arms length.

Lid impact	
Undetectable tampering successful	No
Tool sophistication	Low
Test time (minutes)	20

Figure 2 – Cracked canisters caused by impact damage

6.2 Lid leverage technique

Attempts to pry open the lid of the canister failed to disengage the interlocking lugs on the lids inner bore seal and resulted in clear evidence of tampering. At -18°C the rim of the canister was found to split or crack when forced. While at 23 and 55°C, deformation and scoring could be clearly seen on the body and lid of the canister as shown in figure 3.

Lid leverage	
Undetectable tampering successful	No
Tool sophistication	Low
Test time (minutes)	60

Figure 3 – Tamper evidence caused by leverage of the canisters lid at -18°C (left) and 55°C (right)

6.3 Ring pull panel replacement

The damage done to the ring pull panel in removing it, made its replacement difficult and the detection of any repair using adhesive easy.

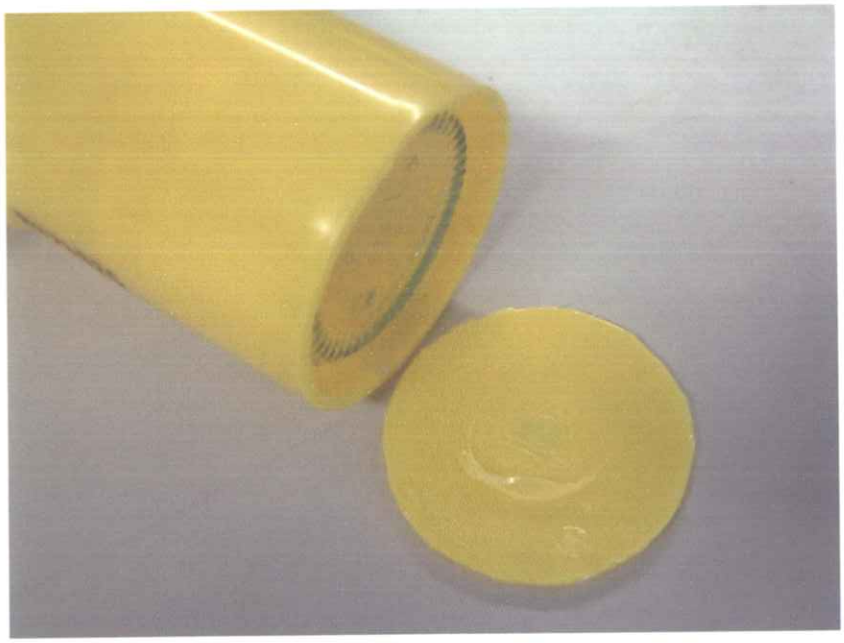
Ring pull panel replacement	
Undetectable tampering successful	No
Tool sophistication	Moderate
Test time (minutes)	20

6.4 Canister base removal

Using simple laboratory equipment it was difficult to cleanly remove and replace the base of the canister so as to avoid detection. Figure 4 shows a new base about to be glued in position.

Canister base removal	
Undetectable tampering successful	No
Tool sophistication	Moderate
Test time (minutes)	60

Figure 4 – Base substitution



6.5 Canister code alteration

The canisters security codes could not be credibly substituted using simple laboratory equipment. The embossed print was difficult to reproduce and the evidence of the old codes removal was hard to conceal. The type face used for the code does not lend itself to alteration from one character to another.

Figures 5 shows a comparison of canisters before and after removal of the security codes.

Figure 6 demonstrates the effectiveness of a duplicated code which, at a glance might be sufficient to deceive a "sampling officer" or "athlete", but would not withstand closer scrutiny.

Canister code alteration	
Undetectable tampering successful	No
Tool sophistication	Moderate
Test time (minutes)	20

Figure 5 – Canisters with security codes (left) and after code removal (right)

Figure 6 – Canisters with original code (left) and duplicated code (right)

7 Conclusions

The doping control canister provides a range of tamper evident features which make violation of a test sample difficult to achieve in a short period of time with simple tools.

The canister also includes features which make substitution of a test sample difficult, as the replacement kit would need the same identifying security code.

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Appendix A

Instruction sheet

DOPING CONTROL - URINE SAMPLING KIT

PLEASE READ CAREFULLY

This document does not form part of any governing body Rules or Procedural Guidelines but is a guide to the correct use of the Versapak urine sampling kit. It is important that athletes and sampling officers familiarise themselves with the Anti-doping Rules and/or Procedural Guidelines of the appropriate governing body of sport.

KIT CONTENTS

The Versapak urine sampling kit comprises two security canisters (green for the "A" sample and yellow for "B"), two screw topped glass bottles, two moisture absorbtion discs (one in each canister) and an instruction sheet. Each kit is uniquely coded and the code appears in the following positions: Branded into the top and side of each canister, printed on the special tamper-evident bottle labels (the labels will flake if attempts are made at removal) and on a label which is fastened inside the tamper evident bag in which the kit is packed.

KIT CHECK

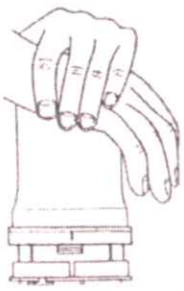
The sampling officer should ensure that all components referred to above are present and in good order. Where a fault is evident the kit should be rejected. The code allocated to each kit must be the same on each component.

KIT SELECTION

1. After a urine sample has been provided, the athlete and sampling officer will return to the administration area with the sealed collection vessel.
2. The working table in the administration area should be clear of any unnecessary equipment, drinks etc and to avoid any remote possibility of confusion should not hold canisters, bottles etc related to any athlete other than the one being processed.
3. The athlete should be invited to choose a kit from a selection and to open the sealed bag to obtain the kit items. To ensure prevention of tampering, the bag is factory sealed with a tamper-evident tape which will show a "void" marking if attempts have been made at removal.
4. In the presence of the athlete and the sampling officer, the sample should be divided between the "A" and "B" bottles (minimum fill lines appear on the green topped "A" bottle and the yellow topped "B" bottle).
5. Bottle tops should be screwed into position and both the athlete and sampling officer should ensure that caps are tight. The athlete should invert the bottle and shake it to test for leakage.
6. The athlete or sampling officer should place the green topped "A" bottle UPRIGHT in the green "A" canister and the yellow topped "B" bottle UPRIGHT in the yellow "B" canister.

SEALING

7. Prepare the canister for closure by gently introducing the top into the bottom section. Invert the canister and close and seal by applying pressure on the canister base
(as per diagram).
This action will bring the top and bottom sections firmly and securely together.
Athlete and sampling officer should check to ensure that the top and bottom edges are flush and that the canisters are therefore properly closed.



ADMINISTRATION

8. All entries into the doping control documents should be meticulously made and checked by both athlete and sampling officer. Throughout the process and whenever a fresh entry is made the sampling officer should invite the athlete to verify the accuracy of the entry. The athlete should accept such invitations and ensure that all entries are correct.

SECURITY AND TRANSPORT

9. Sealed samples should be kept in a secure, cool place and prior to despatch to the laboratory, should be placed in secure protective packaging (details of suitable security bags can be obtained on request from Versapak).

Any governing body chain of custody documents should be carefully prepared and one or more copies should accompany the consignment.

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