DUS 1670

# DRAFT UGANDA STANDARD

First Edition
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## Padlocks — Specifications



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**Compliance with this standard does not, of itself confer immunity from legal obligations**

**A Uganda Standard does not purport to include all necessary provisions of a contract. Users are responsible for its correct application**





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## Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to co-ordinate the elaboration of standards and is

(a) a member of International Organisation for Standardisation (ISO) and

(b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and

(c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 4, *Mechanical engineering and metallurgy*.

# Padlocks — Specifications

## 1 Scope

This Draft Uganda Standard specifies the characteristics and requirements, inspection and test methods of various types and categories of padlocks.

## 2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM B30-16, *Standard specification for Copper alloys in ingot form*

ISO 11997-1, *Paints and varnishes — Determination of resistance to cyclic corrosion conditions — part 1: wet (salt fog)/dry/humidity.*

ISO 15201, *Zinc and Zinc alloys — casting — specifications*

ISO 24153, *Random sampling and randomization procedures*

ISO 1554, *Wrought and cast copper alloys — determination of copper content – electrolytic method*

ISO 19598, *Metallic coatings — Electroplated coatings of zinc and zinc alloys on iron or steel with supplementary Cr (VI)-free treatment*

ISO 1456, *Metallic and other inorganic coatings — Electrodeposited coatings of nickel, nickel plus chromium, copper plus nickel and of copper plus nickel plus chromium*

ISO 9001, *Quality management systems — Requirements*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

**3.1**
**acceptable**
allowable by the authority administering this standard, or to the parties concluding the purchase contract, as relevant

**3.2**
**closed shackle padlock**
padlock in which the body of the padlock encloses or partially encloses the shackle (see figure 3(c) and (d))

**3.3**
**extended shackle**
shackle that is longer than the shackle normally found on padlocks (see figure 3(b))



 

**3.4**
**individually keyed**
descriptive of a padlock that can be opened by means of a specific key only

**3.5**
**key combination**
the way in which the sets of tumblers in the lock mechanism of a padlock are arranged in order to give each padlock its own individual set of keyway steps

**3.6**
**keyed alike [keyed to pass]**
descriptive of padlocks that can all be opened by means of a single key that is not a master key, e.g. padlocks that can be opened by means of a pass key

**3.7**
**key variations**
the different sets of key combinations that can exist without duplication

**3.8**
**master key**
key manufactured in such a way that it opens a set of locks that are all identically master keyed

**3.9**
**master keyed**
descriptive of a padlock that can be opened by a specific key and by an appropriate master key

**3.10**
**normal size**
the overall width and diameter of a padlock at its widest part

**3.11**
**paracentric key way**
keyway that has longitudinal ribs and grooves that project beyond its centre to deter lock picking

**3.12**
**passing**
any key that operates a lock is set to pass that lock. If all the locks in a set are so made that all may be operated by the same key or keys, the locks are set to pass; and the key(s) to pass the locks

**3.13**
**pass key**
key that opens all locks in a set of locks (see 3.5)

**3.14**
**shackle protector**
separate, close-fitting shield that covers the lock and shackle and limits attack on the shackle

**3.15**
**suite**
set of locks that are all either keyed alike or identically master keyed

**3.16**
**padlock**
detachable and portable lock usually for use with hasps and staples, having a hinged or sliding shackle to pass through a staple eye or similar device fixed to the door. The shackle is locked into and released from the case of the padlocks by the key operated bolt.

**3.17**
**chain padlock**
any padlock having permanently attached to it, either:

a) one end of a length of a stout chain for passing round and securing, for example, two stiles of a gate; or

b) one end of a length of a light safety chain to prevent the padlock from being removed or mislaid.

**3.18**
**shackle**
the hinged or sliding part of a padlock which passes through the staple, loop or other device on the door

**3.19**
**spring shackle padlock**
padlock in which the shackle springs open when the key is turned and which usually incorporates a shackle bolt under pressure of second spring so that the shackle becomes locked without the use of a key pushed into the closed position

**3.20**
**disc tumbler padlock**
any padlock having a disc tumbler mechanism

**3.21**
**disc tumbler**
movable detainer in the form of a shaped flat plate, pierced with a slot through which the key passes

**3.22**
**disc tumbler mechanism**
lock mechanism having a cylindrical plug rotating in a body and having, as its principal feature, movable detainers in the form of flat plates (disc tumblers) sliding, generally under spring pressure, in transverse slots in plug. The disc tumblers project from one end or the other of the slots except when correctly aligned by the key. When secured, the projecting tumblers engage in two or sometimes four diametrically opposite longitudinal grooves in the sides of plug hole and thus prevent the plug from turning.

**3.23**
**disc tumbler key**
bulleted (profiled) key which is flat and has a long bit, or blade, in which 'V' cuts are made on one or both edges to operate the tumblers in a disc tumbler padlock

**3.24**
**double bitted key**
one which has 'V' cuts on both edges of the blade. it may be of following types:

a) double bitted key with reversible key entry (with 'V' cuts on both edges which are symmetrical); and

b) double bitted key with irreversible key entry (with asymmetrical 'V' cuts on both the edges).

**3.25**
**single bitted key**
one which has 'V' cuts on one of the edges of the blade

**3.26**
**plung (rotor)**
part of the disc tumbler padlock into which the key enters and turns



 

**3.27**
**pin**
the lower of two solid metal cylinders which together form one of the set of movable detainers in a pin tumbler lock.

**3.28**
**pin tumbler**
movable detainer consisting of a pin and a detainer

**3.29**
**pin tumbler mechanism**
locking mechanism having a plug rotating in a body and as its principal feature, movable detainers in the form of pairs of pin tumblers (operating and driver pins) fitting, together with their springs, in holes in the plug and body. In the secured position the drivers bridge interface between the body and plug thus preventing the plug from turning.

The key way is an axial radial slot in the plug. Insertion of the correct key lifts the pins and driver against their springs and positions them so that the joint faces between the pin and driver lie on the interface between the plug and body thus permitting the plug to turn.

**3.30**
**locking bolt or shackle locking balls**
bolt or locking balls with in the body of the padlock, which engages with the notch in the shackle when locked. In some padlocks there are two locking bolts or locking balls

**3.31**
**key with indents**
Key wit indents is one, which has blind indents on each side of the blade, and/ or each side of the edge.

A key with indents is generally of the following types:

a) reversible key entry (with indents on both sides and edges, which are symmetrical). It may or may not be profiled.

b) a key with indents may operate two or more number of rows of pins as desired

**3.32**
**lever padlocks**
padlock having as its principal feature a lever mechanism for operating the lock.

**3.33**
**lever**
flat movable detainer pivoted at one end or sliding guide and perforated by a shaped slot or gating which in the secured position prevents axial/ angular movement/rotation of the bolt of the lock but which when lifted by its initial contact with a rotating key bit allows the bolt stump to pass through the gating thus enabling the bolt to be thrown or withdrawn and then falls back to the secured position as key passes out of contact.

**3.34**
**lever mechanism**
lock mechanism having as its principal one or more levers to work as detainers

**3.35**
**driver**
upper of two small solid metal cylinders, which together form one of the set of movable detainers in a pin tumbler lock

**3.36**
**Impressioning**
non-destructive, covert method of creating a working key for a lock without picking or disassembly

# 4 Requirements

## 4.1 Type

A padlock shall be of one of the following types, as required:

a) type CP — a padlock that has a pin tumbler mechanism,

b) type CD — a padlock that has a disc tumbler mechanism, and

c) type LP — a lever padlock.

## 4.2 Grade

A padlock shall be of one of the categories indicated below, as required.

### 4.2.1 Grade 1

A padlock (see figure 1) that has

a) not more than 4 key pins;

b) key combinations of not more than 500 key variations; and

c) a single locking bolt.

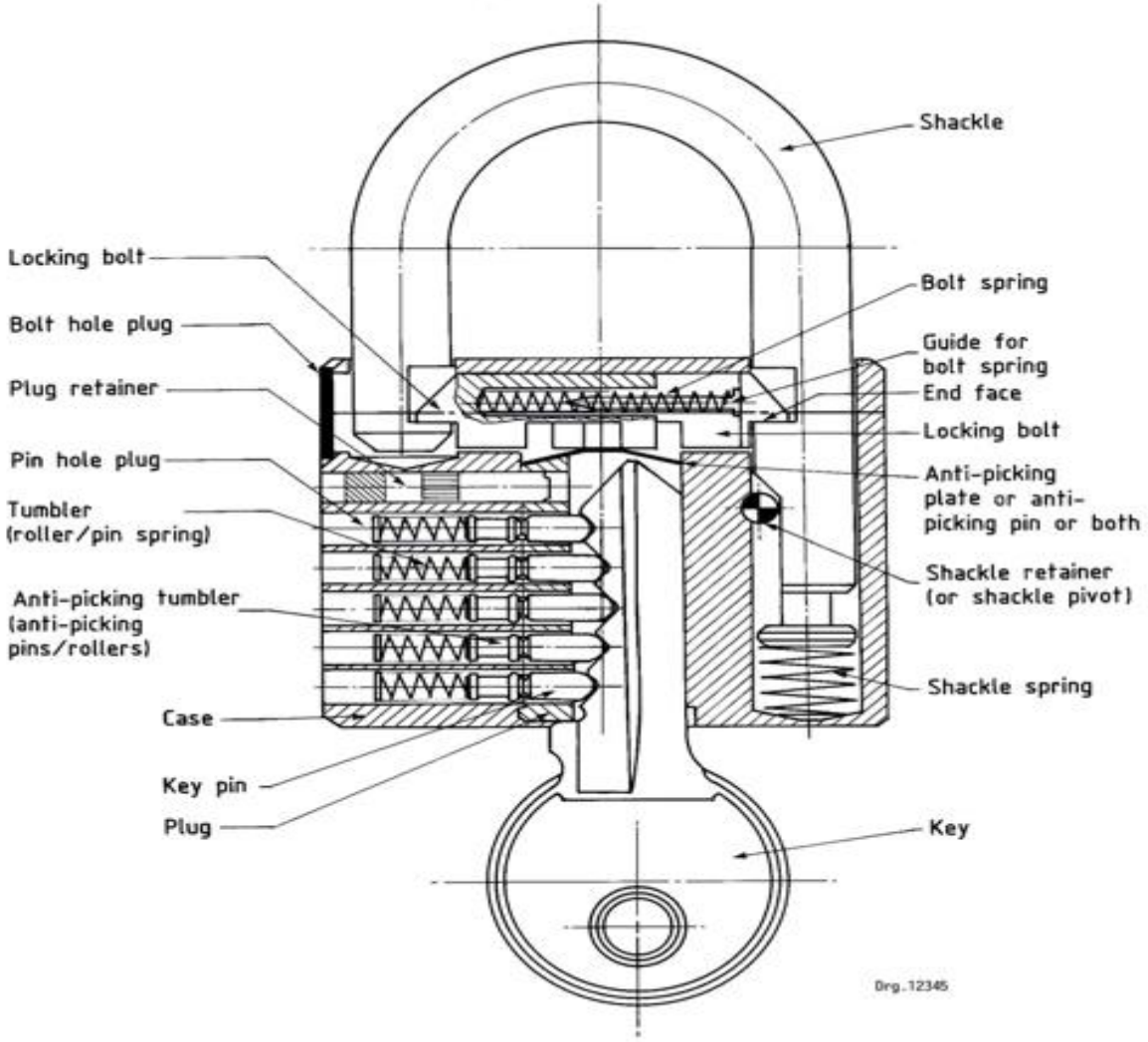


**Figure 1 — Cross-section of a padlock, showing important components**



### 4.2.2 Grade 2

A padlock (see figure 1) that has:

a) at least 4 to 6 key pins;

b) key combinations of at least 2 000 key variations;

c) anti-picking pins (anti-picking rollers);

d) anti-picking plates, or stop pins, to prevent a probe from reaching the locking bolt(s); and

e) single or double locking bolts

### 4.2.3 Grade 3

A padlock (see figure 1) that has:

a) at least 5 key pins;

b) key combinations of at least 5 000 key variations;

c) anti-picking pins (anti-picking rollers);

d) anti-picking plates to prevent a probe from reaching the locking bolts; or

e) anti-picking pins (anti-picking rollers) and anti-picking plate;

f) double locking bolts; and

g) a brass cut key.

#### 4.2.4 Grade 4

A padlock (see Figure 1) that has:

a) at least 5 key pins;

b) key combinations of at least 7 000 key variations;

c) anti-picking pins (anti-picking rollers);

d) anti-picking plates, or stop pins, to prevent a probe from reaching the locking bolt(s);

e) a closed shackle or a shackle protector to limit attacks on the shackle; and

f) a body width of at least 50 mm.

If so required, keys shall be non-removable in the unlocked position of the shackle (see 4.8.3).

#### 4.2.5 Grade 5

A padlock (see Figure 1) that has

a) at least 5 key pins;

b) key combinations of at least 8 000 key variations;

c) anti-picking pins (anti-picking rollers);

d) anti-picking plates, or stop pins, to prevent a probe from reaching the locking bolt(s);

e) a closed shackle or a shackle protector to limit attacks on the shackle; and

f) a body width of at least 50 mm.

If so required, keys shall be non-removable in the unlocked position of the shackle (see 4.9.3).

NOTE 1 Grade or security grade is often referred to as grade.

NOTE 2 A cross-section of a padlock showing the most important components is given in Figure 1

### 4.3 Materials

#### 4.3.1 General

Each metal used in a padlock shall be uniform in quality, chemical composition, hardness and strength, and shall be free from blowholes, scale, cracks and other deleterious defects. When anti-corrosion padlocks are



 

required, shackles may be made of a material that is softer than casehardened steel or stainless steel, to ensure the durability of the padlock. The integrity of the system shall, however, not be compromised in any way.

#### 4.3.2 Brass

Brass shall comply with the requirements of ASTM B30-16.

#### 4.3.3 Zinc-base alloys

Zinc-base alloys shall comply with the requirements for ISO 15201.

### 4.4 Dimensions

A padlock shall be of one of the nominal sizes given in column 1 of Table 1, as required, and the diameter of the shackle shall be as given in column 2. Column 3 of the Table is related to the test given in 6.2.

**Table 1 — Nominal sizes of padlock**

| Nominal size<br>mm | Minimum shackle diameter<br>mm | Tension<br>kN |
|---|---|---|
| 25 | 4.0 | 1.0 |
| 30 | 5.0 | 1.5 |
| 40 | 6.0 | 3.0 |
| 45 | 8.0 | 5.0 |
| 50 | 8.0 | 5.0 |
| 55 | 8.0 | 5.0 |
| 60 | 10.0 | 10.0 |
| 65 | 11.0 | 11.0 |
| 70 | 12.0 | 15.0 |
| 75 | 12.0 | 15.0 |
| 90 | 12.0 | 15.0 |



### 4.5 Cases

#### 4.5.1 General

Cases shall be solid, laminated or formed, as required

#### 4.5.2 Solid cases

A solid case shall be made in one piece and the only openings shall be for inserting the shackle and the lock mechanism and, if necessary, for drainage. The diameter of a drainage hole shall not exceed 3 mm. Any other openings required during assembly of the padlock shall be individually plugged by riveting or pressing (or both).

#### 4.5.3 Laminated cases

A laminated case shall be assembled from metal laminates that, if not of inherently corrosion resistant metal, are individually plated before assembly. All laminates shall be so riveted (or riveted and brazed) as to render the case substantially solid and such that it will not be possible to dismantle the padlock by filing off the rivet heads.

#### 4.5.4 Formed case

A formed case shall consist of shaped metal plates covering a sintered metal or similar body.

Steel cases around locks shall have been case-hardened to a depth of between 0.15 mm and 0.50 mm and to a Vickers hardness in the range 650 HV to 850 HV or Rockwell C hardness in the range of 56.5 HRC to 64.5 HRC, measured subject to the maximum test loads given in Table 2.

### 4.6 Finish

**4.6.1** The method of manufacturing of padlocks and its components is left to the manufacturer, however, it shall meet the requirements laid down in this standard.

**4.6.2** All components of the padlocks and keys shall be finished smooth to minimize frictional resistance in their working.

**4.6.3** The body of the padlock, if required, shall be suitably painted/plated. The shackle and keys for brass padlocks shall, however be finished bright.

**4.6.4** Steel components shall be suitably protected to resist corrosion. The electroplated coating of nickel plus chromium or zinc on iron and steel wherever specified, shall be done in accordance with ISO 1456, ISO 19598 respectively. The electroplated coating of copper plus nickel plus chromium shall be done in accordance with ISO 1456

**4.6.5** When the thickness of the plating is determined in accordance with 5.4, it shall be one of the following, as required:

a) at least 10 µm for locks intended for use in inland areas (standard conditions);

b) at least 20 µm for locks intended for use in severe conditions.

**4.6.6** When a padlock is tested in accordance with 5.5, there shall be no separation of the plating from the underlying metal.

**4.6.7** When a padlock intended for use in severe conditions (see 4.6.5(b)) is tested in accordance with 5.6, the plating shall show no sign of discoloration or rust or other failure.

### 4.7 Shackles

#### 4.7.1 General

A shackle shall be of the closed, the normal, the extended or the removable type, as required.

#### 4.7.2 Design

Unless a pull-out, key-locking design is required, shackles shall be of a spring-opening, self-locking design.

NOTE 1 A pull-out, key-locking design refers to a shackle that is spring loaded, that has to be pulled open and the padlock cannot be locked without use of the key.



 

NOTE 2 A spring-opening, self-locking design refers to a shackle that is not spring loaded, that opens by itself when the key is turned and the padlock can be locked without use of the key.

### 4.7.3 Construction

Shackles shall lock either at the toe or at the toe and the heel, as determined by the grade, and the slot(s) in the shackle shall be so formed as to securely engage the locking bolt(s).

### 4.7.4 Resistance to tension

When a padlock is tested in accordance with 5.2, using the relevant loadings given in column 3 of Table 1, the shackle shall not release from the locking bolt(s), and the shackle pivot, when relevant, shall not separate from the shackle or from the case.

### 4.7.5 Hardness of shackles

#### 4.7.5.1 Surface hardness

The surface of shackles shall have been case-hardened to a Vickers hardness in the range 650 HV to 850 HV or Rockwell C hardness in the range of 56.5 HRC to 64.5 HRC (the load depending on the case depth, as indicated in 4.6.5.2) and to the following depths:

a) material of diameter in the range 2.5 mm to 5.0 mm shall have been case-hardened to a depth of between 0.10 mm and 0.15 mm;

b) material of diameter 6.0 mm shall have been case-hardened to a depth of between 0.25 mm and 0.30 mm;

c) material of diameter in the range 8.0 mm to 13.0 mm shall have been case-hardened to a depth of between 0.30 mm and 0.35 mm;

#### 4.7.5.2 Maximum hardened test load

The maximum allowable load for Vickers hardened testing shall be as follows.

**Table 2 — Test loads for Vickers hardness testing**

| Case depth<br>mm | Maximum allowable load<br>Kg |
|---|---|
| 0.1 to 0.15 | 2.5 |
| 0.15 to 0.25. | 5.0 |
| 0.25 to 0.35 | 10.0 |

The duration of loading shall be between 10 s and 15 s.

The shackle shall be tested on a flat surface.

## 4.8 Lock mechanism

### 4.8.1 Lock and key variations

The key variations for a particular padlock shall, without duplication of a particular step height on a single key, be as given in Table 3.



 

**Table 3 — Key variations**

| Grade of padlock | Minimum number of variations |
|---|---|
| 1 | 500 |
| 2 | 2000 |
| 3 | 5000 |
| 4 | 7000 |
| 5 | 8000 |

### 4.8.2 Durability

After a padlock has been tested in accordance with 5.3, it shall be possible to lock (when relevant) and unlock it by using the duplicate key (if supplied).

### 4.8.3 Bolt

**4.8.3.1** The design and construction of the padlock shall be such that it is not possible to release the locking bolt by inserting a probing device between the shackle and the case of the padlock.

**4.8.3.2** The tension in the bolt springs, when relevant, shall be such as to prevent any movement of the closed shackle that could compromise the security of the lock.

**4.8.3.3** The end face(s) of the locking bolt(s) shall be normal to the bolt axis and flat, and shall have a width of at least 20 % of the diameter of the bolt.

**NOTE** Although the end faces of some locking bolts are tapered, they should not be tapered to a point

## 4.9 Keys

**4.9.1** Any two steps of a key shall have a minimum difference of 0.4 mm in step height, to prevent the key from passing when adjacent heights are transposed.

**4.9.2** Duplicated step heights may be used in a key system provided that each lock mechanism complies with the requirements of 4.8.1 and 4.9.1.

**4.9.3** If so required, keys shall be non-removable in the unlocked position of the shackle

**4.9.4** A padlock of grade 3 or 4 may have a paracentric keyway or other acceptable shape of keyway.

## 4.10 Keying of padlocks

**4.10.1** Padlocks supplied in sets shall be either individually keyed or, to pass, keyed alike, as required, and shall, when so required, be master keyed

**4.10.2** The number of padlocks controlled by an individual master key shall be as required

**4.10.3** Unless otherwise required, all keys shall be supplied in duplicate



 

# 5 Inspection and methods of test

## 5.1 Inspection

Visually examine each padlock for compliance with all the relevant requirements of this standard for which tests to assess compliance are not given in 5.2 to 5.15 (inclusive)

## 5.2 Tension test

Clamp the padlock firmly in a vertical position in a vice. Apply, along the vertical centre-line of the padlock under test, the appropriate force given in column 3 of table 1 between the shackle and the case and maintain the force for 5 min. Check for compliance with 4.8.3.1.

## 5.3 Locking test

### 5.3.1 Apparatus

A device, capable of carrying out the following cycle of operations at a rate of 15 to 20 cycles per minute:

a) inserting the key;

b) unlocking the padlock;

c) opening the shackle;

d) closing the shackle;

e) (where relevant) locking the padlock;

f) removing the key.

### 5.3.2 Procedure

**5.3.2.1** Position the padlock in its normal working position (i.e. vertical).

**5.3.2.2** Submit the padlock to the relevant of the following cycles of operation:

a) 12 000 cycles of operation for grade 4 and 5 padlocks;

b) 9 000 cycles of operation for grade 3 padlocks;

c) 6 000 cycles of operation for grade 2 padlocks; and

d) 3 000 cycles of operation for grade 1 padlocks.

Ensure that padlocks are lubricated with silicon lubricant or graphite after every 2 000 cycles

**5.3.2.2** Check for compliance with 4.8.2

## 5.4 Thickness test for plating

Use an acceptable electrochemical method to determine the thickness of the zinc, cadmium, copper-nickel or chromium on plated components and check for compliance with 4.6.5.

## 5.5 Adhesion test for plating

### 5.5.1 Apparatus

A hacksaw and a blade that has 90 to 100 teeth per 100 mm.

### 5.5.2 Procedure

Saw through the plating on plated components and examine the edges of the cuts for compliance with 4.6.6.

## 5.6 Test for corrosion resistance

Use the procedure given in ISO 11997-1 with an exposure time of 16 h, and check for compliance with 4.6.7.

## 5.7 Non-interchangeability test

For the purpose of testing non-interchangeability, the padlocks of each size in batches shall be presented for non-interchangeability test for that size or part thereof, 15 in case of sizes up to 40 mm and 22 mm in case of higher sizes of padlocks shall be selected in such a manner that the arrangement of the wards of their keys is nearly similar, that is, the ward of the keys differ from each other slightly. The padlocks with their keys so selected shall be tested for non-interchangeability by using each key with all other padlocks. If none of the keys works or opens any other padlock then the batch from which the padlocks have been selected shall be considered to have passed the non-interchangeability test.

## 5.8 Soundness test

Each padlock in the locked condition shall be firmly held by the shackle and five sharp blows from height of 600 mm shall be given on a 75 mm thick lead block with that side of the padlock on which the shackle is riveted. The padlock shall then be opened and the above test is repeated by striking five sharp blows on the opposite side of the padlock. During or on completion of the test the padlock shall not open or show any sign of damage or defective functioning.

## 5.9 Load test

The body of the sample padlock shall be held in the clamping jaws in the locked condition with shackle engaged in a suitable hook or eye in a vertical position. The tensile load as mentioned in Table 1 shall be gradually applied to the padlock through the hook without jerks and maintain the force for 1 min. The padlock shall not fail under the load.

## 5.10 Shock impactor

5.10.1 Provide a fixture as illustrated in Figure 2 which allows the weights described in 5.10.2 to be properly guided to strike the anvil rod which will be placed in direct contact with the top surface of a padlock using the mounting block described in 5.10.3.



 

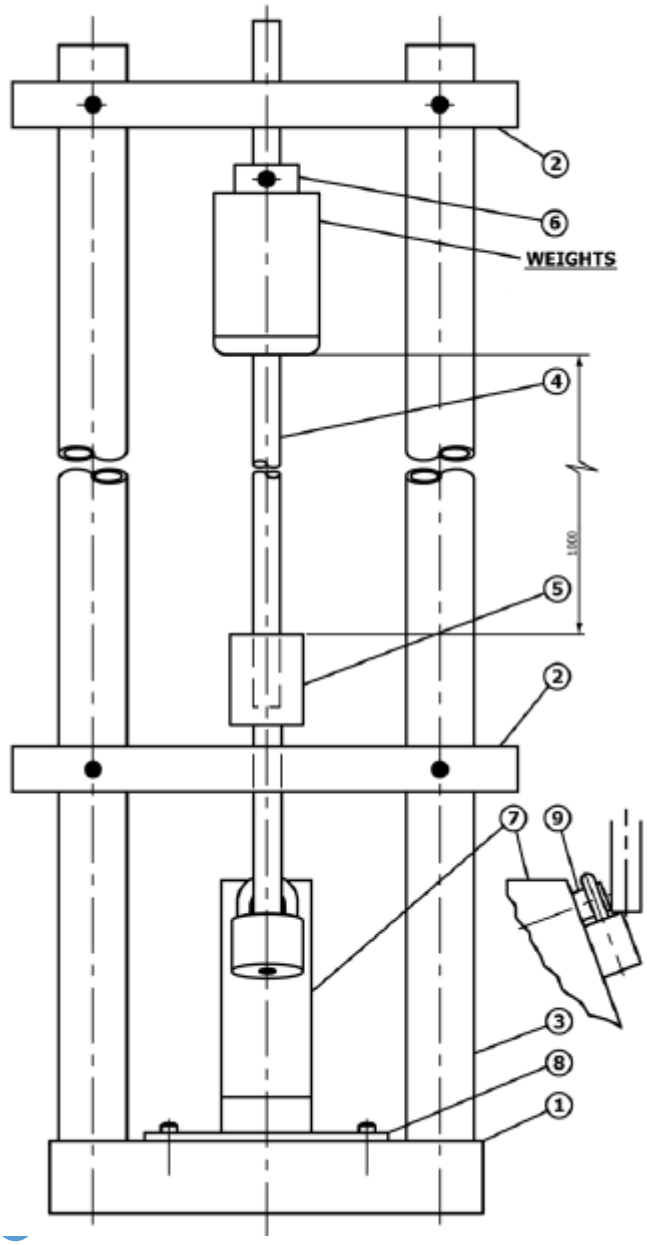


**Figure 2 — Shock impactor**



**Key**

1. Base plate
2. Shaft cross support
3. Support tube
4. Weight guide shaft
5. Anvil rod
6. Stop collar
7. Mounting block

8. Mounting block base

9. Mounting pin

5.10.2 Make a set of weights as shown in Figure 2, with a central hole in each that allows the weight selected to free fall and strike the top surface of the anvil rod.

5.10.3 Make a mounting block that will support the specimen on the mounting block when being subjected to the required shock load as given in Table 4.

**Table 4 — Required values for different tests**

| Forcing tests | Grades | | | | |
|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** |
| Shock test blows | 5 | 5 | 5 | 5 | 5 |
| Shock test weights, (kg) | 1 | 2 | 3 | 4 | 5 |
| Shock test heights, (m) | 1 | 1 | 1 | 1 | 1 |
| Plug pull test, (N) | 1000 | 1500 | 2000 | 3000 | 6000 |
| Plug torque test, (Nm) | 10 | 15 | 20 | 25 | 30 |
| Shackle cutting force test, (N) | 4450 | 9000 | 13500 | 18000 | 31 000 |



## 5.11 Shock test

Using the impactor drop the weight as given in Table 4 the required number of times as in Table 4 on the top of the locked padlock case. Failure occurs if the padlock opens.

## 5.12 Plug pulling test

Drill the keyway with a number 20 (4.0 mm.) diameter drill and insert a Type AB No. 12 screw at least 19 mm deep. Apply the required tension as given in Table 4 axially between the case and the installed screw. Failure occurs if the cylinder plug or cylinder assembly completely separates from the case, or if the padlock can be opened by manipulation with a screwdriver at the conclusion of the test.

## 5.13 Plug torque test

5.13.1 Install the padlock in a rigid fixture such as a vice to support it firmly but not restrict free rotation of the plug in the cylinder.

5.13.2 Insert a blade type tool into the keyway, so that a torque load as given in Table 4 can be applied to the plug. Failure occurs if the padlock opens.

## 5.14 Shackle cutting test

Shackles shall withstand cutting through when 2 shearing blades made of a steel hardened to a minimum Rockwell C hardness of 50 HRC, are used in conjunction with the blade positioning holder, is placed in a tensile loading device having a compression load capability and compressed with the required force as given in Table 4. Failure occurs if the shackle is cut through.

 

## 5.15 Surreptitious entry tests

### 5.15.1 Picking or manipulating test

**5.15.1.1** Cylinders in padlocks shall resist picking for the required time specified in Table 5. Combination padlocks shall resist manual manipulation for the specified time.in Table 5

**Table 5 — Surreptitious entry tests required values**

| Surreptitious entry tests | Grades | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Picking or manipulation, (min) | 0.5 | 1 | 2 | 4 | 8 |
| Bump key attack, (min) | 2.5 | 5 | 7.5 | 10 | 12.5 |
| Impressioning or Decoding, (min) | N/A | N/A | 2 | 4 | 8 |
| Shackle shimming test, min | 0.5 | 1 | 2 | 4 | 8 |
| Drilling and shimming, (min) | N/A | N/A | N/A | 4 | 8 |
| Rapping, (min) | N/A | N/A | 2 | 4 | 8 |

**5.15.1.2** Padlocks submitted for test containing pin tumblers shall be loaded using one of the three or four mid-range bittings available unless such a combination would not normally be supplied as a stock product. Padlocks containing other tumbler elements shall be loaded using maximum ranges. If lock design and cylinders used are the same in several different sizes of padlocks submitted for testing, only a total of five samples of any size or sizes need to be tested.

5.15.1.3 The tools used for this test shall be manual manipulating tools required by the operator, providing no visible marks are left detectable by the unaided eye.

### 5.15.2 Cylinder impressioning and decoding tests

**5.15.2.1** Cylinders shall resist successful impressioning and decoding for the required time in Table 5.

**5.15.2.2** Padlocks with cylinders submitted for test shall be loaded in accordance with 5.15.1.2.

### 5.15.2 Shackle shimming test

Insert any shim stock selected that can be inserted in the clearance between the shackle and the case in either or both of the case shackle holes of a locked padlock and manipulate for the time in Table 5

### 5.15.3 Cylinder drilling and shimming test

5.15.3.1 Use hand-held tools.

**5.15.3**.2 Load cylinders in accordance with 5.15.1.2.

5.15.3.3 Cylinders in locked padlocks hanging from a hasp shall resist drilling and shimming for the time specified in Table 5. Results of the drilling test shall not be obvious to the unaided eye.



 

**5.15.4 Rap test:**

5.15.4.1 Use hand-held tools.

5.15.4.2 Padlocks shall resist successful rapping on the cylinder and case for the specified time in Table 5.

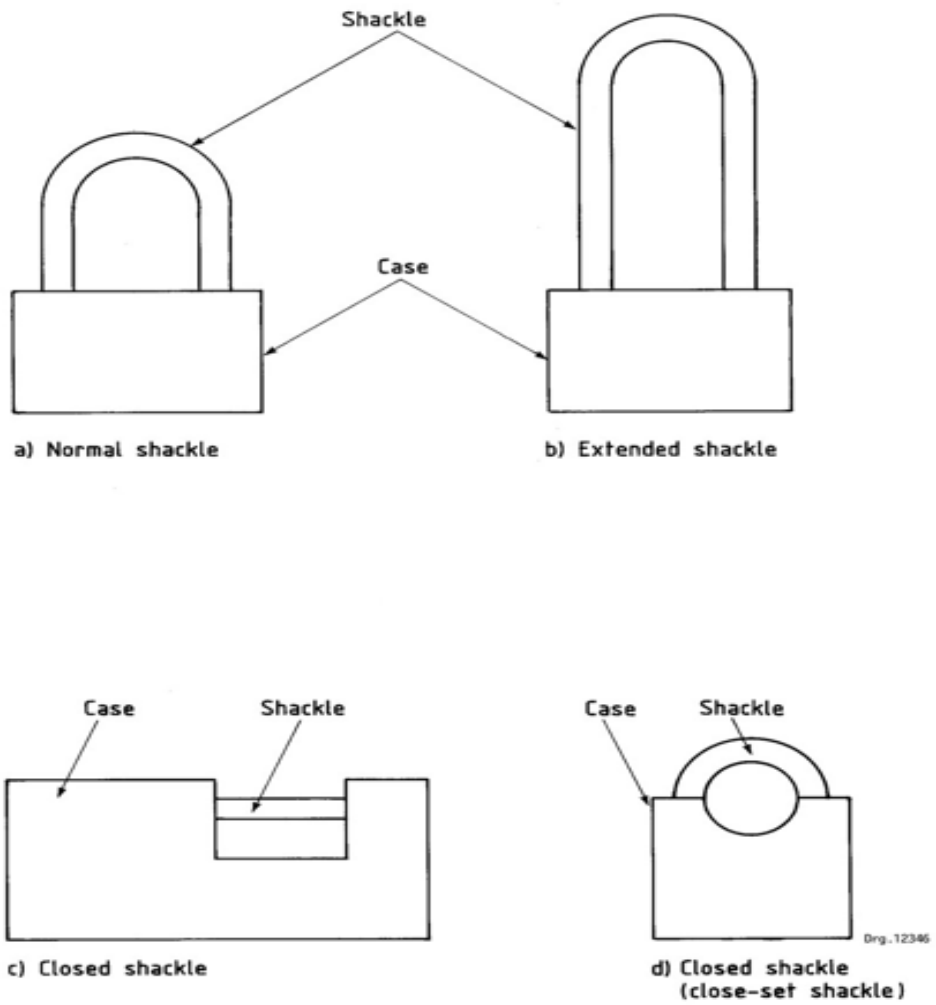


**Figure 3 — Examples of different shackles found on padlocks**



 

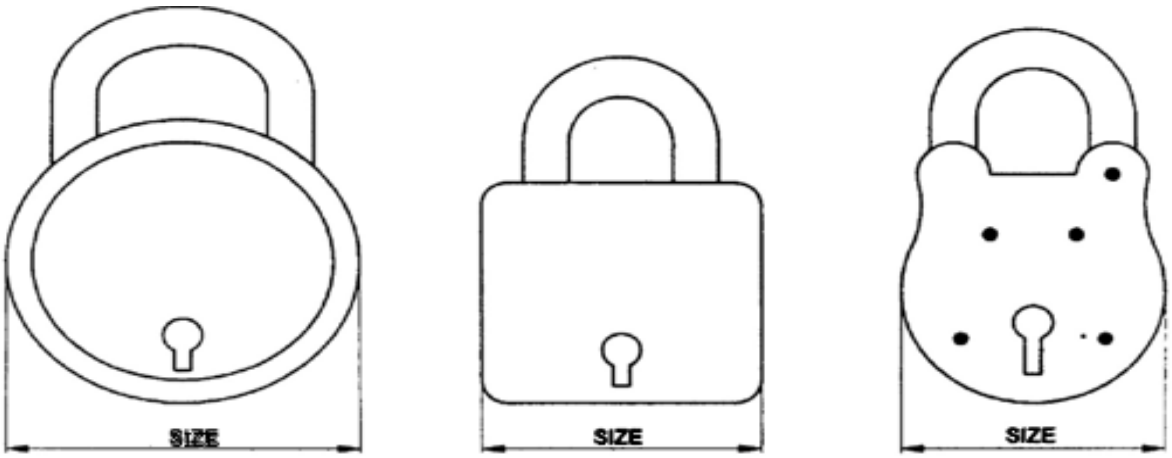


**Figure 4 — Typical shapes of lever padlocks**

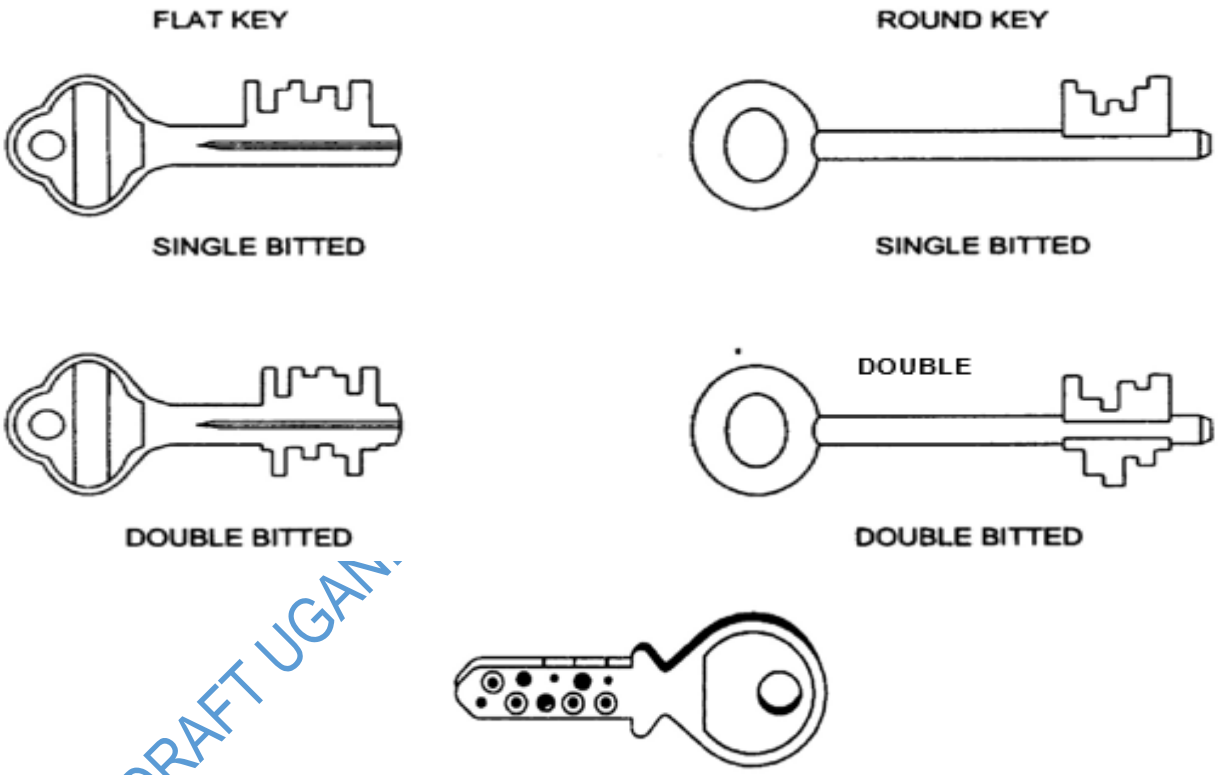


**Figure 5 — Key with indents**

# 6 Sampling and inspection

## 6.1 Sampling

### 6.1.1 Lot

In any consignment, all the locks of the same type, same size, and manufactured from the similar materials under similar conditions of manufacture shall be grouped together to constitute a lot.

For ascertaining the conformity of the lot to the requirements of this standard, the sample of padlocks shall be and tested separately for each lot.

**6.2** The number of sample locks to be selected at random from a lot shall depend upon the size of the lot and shall be in accordance with Table 5.

**6.2.1** The padlocks in the samples shall be selected at random from the lot. In order to ensure the randomness of selection, procedures given in ISO 24153 may be followed.

**6.2.1.1** In case padlocks are packed in boxes, 20 percent of the boxes, subject to a minimum of two, shall be opened and equal number of padlocks shall be taken from each box so as to constitute the required sample size.

## 6.3 Number of tests and criteria for conformity

### 6.3.1 For dimensions and finish

The padlocks selected according to 6.2 shall be inspected for dimensions, workmanship and finish. The lot shall be considered as conforming these requirements if the number of padlocks failing in any one or more of the requirements does not exceed the permissible number of defective padlocks given in Table 5.

### 6.3.2 For load test and soundness test

From the lot found conforming under 6.3.1 a subsample shall be drawn in accordance with Table 5 and tested for load test and soundness test consecutively.

The lot shall be considered as conforming to the requirement of load and soundness test if the number of sample padlocks failing in any of the two tests does not exceed

**Table 6 — Sample size and criteria for conformity**

| Lot Size | Dimensions and Finish | | Tests | |
|---|---|---|---|---|
| | Sample Size | Permissible No. of Defective Padlocks | Sub-sample | Permissible No. of Defective Locks |
| up to 50 | 8 | o | 2 | 0 |
| 51 to 150 | 13 | 0 | 2 | 0 |
| 151 to 300 | 20 | 0 | 2 | 0 |
| 301 to 500 | 32 | 1 | 3 | 0 |
| 501 to 1000 | 50 | 2 | 5 | 0 |
| I 001to 3000 | 80 | 3 | 10 | 0 |
| 3001 to 10000 | 125 | 5 | 15 | 1 |
| 10001 and above | 200 | 7 | 20 | 2 |



 

# 7 Packing and marking

## 7.1 Packing

Each padlock shall be so packed as to be protected from damage during normal handling, transportation and storage. Only padlocks of the same type, grade and nominal size shall be packed together in a bulk container

## 7.2 Marking

### 7.2.1 Padlocks

Each padlock shall be legibly and indelibly marked with the following information:

a) manufacturer's name, or trade name or trade mark,

b) year of manufacture (if specified by the purchaser),

c) grade,

d) nominal size of the padlock, and

e) serial number of the padlock.

### 7.2.2 Keys

Each key shall bear the following information in legible and indelible marking:

a) the manufacturer's name or trade name or trade mark; and

b) the country of origin.

6.2.3 Containers

Each bulk container of padlocks shall bear the following information in legible and indelible marking:

a) the manufacture's name or trade name or trade mark;

b) the type of padlock;

c) the grade of padlock;

d) where applicable, an indication that the padlock is suitable for use in severe conditions, i.e. that stainless steel or some non-corrodible material has been used for the padlock;

e) the nominal size of the padlock; and

f) any other information required



 

# Annex A
(normative)

## Notes to purchasers

The following requirements shall be specified in tender invitations and in each order or contract

a) the type and grade of padlock;

b) the nominal size of padlock;

c) the type of case;

d) the type of shackle;

e) the design of padlock;

f) whether the keys are to be removable or non-removable in the unlocked position of the shackle;

g) whether the padlocks are to be individually keyed or keyed alike;

h) whether the padlock are to be master keyed;

i) the number of padlocks to be controlled by an individual master key;

j) if the keys are to be supplied in duplicate ;

k) the finish of the padlock;

l) whether the padlock are for use in standard conditions or in severe conditions; and

m) additional makings required.



 

# Annex B
(Informative)

## Quality verification of padlocks

When a purchaser requires quality verification on an ongoing basis of shade netting, it is suggested that, rather than to the evaluation of the final product only, he also direct his attention to the quality management system applied by the manufacturer. In this connection it should be noted that ISO 9001 covers the provision of an integrated quality management system

# Bibliography

[1] SANS 1533, Padlocks.

[2] IS 15275:2003, Padlocks — Specification).

[3] ASTM F883 – 13, Standard Performance Specification for Padlocks



 

## Certification marking

Products that conform to Uganda standards may be marked with Uganda National Bureau of Standards (UNBS) Certification Mark shown in the figure below.

The use of the UNBS Certification Mark is governed by the Standards Act, and the Regulations made thereunder. This mark can be used only by those licensed under the certification mark scheme operated by the Uganda National Bureau of Standards and in conjunction with the relevant Uganda Standard. The presence of this mark on a product or in relation to a product is an assurance that the goods comply with the requirements of that standard under a system of supervision, control and testing in accordance with the certification mark scheme of the Uganda National Bureau of Standards. UNBS marked products are continually checked by UNBS for conformity to that standard.

Further particulars of the terms and conditions of licensing may be obtained from the Director, Uganda National Bureau of Standards.




 

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