

TESTING MANUAL FOR NON SELF INDICATING (NSI) COUNTER MACHINES

1.0 DEFINITION

A counter machines is an equal arm weighing instruments of a capacity not exceeding 50kg, the pans of which are above the beam

2.0 TYPES OF COUNTER MACHINES

There are three main types of counter machines NSI namely

- Roberval
- Barrengar
- Phanzeder
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3.0 CAPACITIES

The machine may be of the following maximum capacities: 500g, 1kg, 2kg, 3kg, 5kg, 10kg, 15kg, 20kg, 25kg, 30kg and 50kg.

4.0 GENERAL REQUIREMENTS:

- (a) When the beam of body has two sides, they shall be connected further to not less than two cross-bars. The supports for the pans shall be of a suitable rigid structure such as cross members strengthened by straps. Central pieces or forks shall be fixed so that they are not twisted or dislocated.
- (b) Bearing surface, knife-edges and points of contact of all stays, hooks and loops shall be of hard steel or agate. The knife-edges and bearings shall be so fitted as to allow the beam to move freely. The knife-edges shall rest upon the bearings along the whole length of their working part.
- (c) A counter machine may have a balance box for minor adjustments. In such a case, the balance box shall be permanently fixed beneath the weight pan and shall be large enough to contain loose material to an

- amount up to one per cent of the capacity of the machines. No other adjusting contrivance shall be used.
- (d) The pans may be made of any suitable material such as mild steel, stainless steel, brass or bronze, aluminium or its alloys, porcelain, enamel coated steel, glass or plastic material. They may be of any convenient shape.

5.0 EXAMINATION AND TESTING

5.1 Examination

Before testing for accuracy, the counter scale (NSI) like any other weight, measure measuring or weighing instrument, shall be visually inspected to metrological characteristics in order to see if they comply with the basic requirements as per Tanzania Weights and Measure laws and other regulations made under.

The following are general requirements:

5.1.1. Recognition

Recognize the counter machine under test in order to establish whether or not it is

- of approved pattern;
- complete;
- its maximum capacity;
- it is denominated properly as far as the, trade mark, model are concerned;
- if it is provided with the stamping plug;
- if it has any mark which may be co fused with the verification or certification mark;
- last stamp or rejection mark;

Note that:

Each machine should be provided with a plug or stud of soft metal on a conspicuous part of the beam or body to receive the stamp or seal of the verification authority.

Such a plug or stud shall be made irremovable by undercut or by some suitable method.

Examine the materials used for different parts if they are of approved type and if the machine in general can withstand wear and tear in normal use

5.2 TESTS

5.2. TEST REQUIREMENTS

The machine shall be tested on a horizontal level plane

It has to be balanced at zero load

5.2.1. sensitivity and error

5.2.1.1. Test for error

5.2.1.1.1. Half load test

When the goods pan is not in the form of a scoop, the counter machine shall indicate the same weight within half the prescribed limits of error when load equal half the capacity is placed on the centre of goods pan and any where within a distance from the centre equal to one third of the length of the pan;

When the goods pan is in the form of a scoop, the counter machine shall be correct to the prescribed limits of error if half the full load is placed against the middle of the back of the scoop and the other half at any position on the scoop.

5.2.1.1.2. test of error at full load

The error is that weight which is required to bring the beam of the instrument to the horizontal or equilibrium

state when fully loaded with weights each equal to its maximum capacity on both pans (goods and weights pans) the additional weight (error) should not exceed the limits specified in the Table of Tolerance

5.2.1.1.3. Shift / Eccentric test

When the goods pan is in the form of a scoop the counter machine shall be correct to the prescribed limits of error if half the full load is placed against the middle of the back of the scoop and the other half at any position on the scoop.

When the goods pan is not in the form of a scoop, the counter machine shall indicate the same weight within half the capacity is placed on the goods pan anywhere within a distance from the centre equal to one third of the length of the pan, in the direction the load is moved or if the pan has a vertical side against the middle of that side, the weights being entirely on the weight pan, but in any position on it.

5.2.1.1.4. test for sensitivity

The machine shall be tested for sensitivity at maximum load.

This is the additional small weight which is required to be added in order to cause appreciable fall of the beam of the counter machine from its equilibrium state.

This additional small weight should not exceed the prescribed limits of sensitivity.

6.0 DECISION

Subject to the results of Examination and testing; the following are possible decision

- decision to reject
- decision to pass the counter machine as fit for trade use

6.1. Decision to reject

If the scale fails in examination and/or on tests then it shall be rejected and it may be referred for repair

The machine shall be stamped with a six mark star and can be accompanied with the rejection note

The reason and period for repair should be written in the rejection note by an Assizer (inspector).

Half verification fee shall be charged for rejecting a counter machine which was repaired by the scale mechanics before subjected for examination and testing.

6.2. Decision to pass as fit for use

If the counter machine passes examinations and tests, it shall be passed and stamped. The certificate of correctness may be written in addition to stamping.

Testing/certification fees shall be charged and derived form the owner or user of the instrument.

**LIMITS OF SENSITIVITY AND ERROR FOR NSI COUNTER
MACHINES**

NSI COUNTER MACHINES CAPACITY	SENSITIVITY when new or after repair (g)	SENSITIVITY On re- verification or inspection (g)	ERROR When new or after repair (g)	ERROR On re- verification or inspection (g)
Not exceeding 500g	1.5	3	2	4
1kg	2	4	3	6
2kg	2	4	4	8
3kg	4	8	5	10
4kg	4	8	5	10
5kg not ex. 10kg	5	10	10	20
11kg not ex. 20kg	10	20	15	30
21kg not ex. 25kg	15	30	20	40
26kg not ex. 30kg	15	30	20	40
31kg not ex. 50kg	20	35	30	60

TEST FORM FOR COUNTER SCALES

1. OWNER'S NAME AND ADDRESS.....
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2. GENERAL EXAMINATION:

Type Model

Serial No.

Stamping plug (provided/not provided)

Maximum capacity Last stamped

Note other features of non-compliance with the Act and Regulations

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3. ACCURACY TEST:

(a) Balance at zero

(b) Eccentricity Test

Load applied (half load) maximum permissible error

Test No.	Error	Remark
1.
2.
3.
4.
5.
6.
7.
8.

All indications are within / not within* the maximum permissible errors or / and*

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4. ACCURACY PERFORMANCE FOR SELF-INDICATING AND SEMI-SELF-INDICATING COUNTER SCALES:

FORWARD TEST					BACKWARD TEST				
Load Applied	Indicated Mass	Error	MPE	PASS/ FAIL	Load Remained	Indicated Mass	Error	MPE	PASS / FAIL

5. Test for error at maximum capacity for non-self-indicating counter scales

Load applied maximum permissible error

Error at maximum

Error within the limits Yes / No*

6. Test for sensitivity at maximum load

Load applied Maximum permissible error

Sensitivity on goods pan weights pan

Average sensitivity

Average sensitivity within the limits - Yes / No*

7. DECISION

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Signature of Assizer **Date**

Signature of Owner / User **Date**