2. Constructions

(a) Weighing instruments shall be of such materials, design and construction that under normal conditions of service:

(i) They maintain accuracy.

(ii) They function satisfactorily without the need for frequent adjustment.

(iii) Excessive stresses do not develop in the vital parts.

(b) The pivots, knife-edges and bearings, wherever used shall be of agate or suitable hard material or of suitable quality steel. The steel knife-edges and bearings shall have the hardness specified below:

(i) For beam scale of classes C and D and with capacities 10kg. and below not less than 54 Rockwell C.

(ii) For other weighing instruments-60 to 66 Rockwell C.

(c) The pivots, knife-edges and bearings shall be protected against corrosion and dirt.

3. Marking

(a) All weighing instruments shall carry the following markings:—

(i) manufacturer's name, or his registered trade mark.

(ii) to weight kg, or g as appropriate.

(iii) class, wherever applicable.

Note : The manufacturer's name or registered trade marks shall be such as will not be mistaken for the stamp or seal of the verification authority.

(b) The markings shall be indellble and of a size, shape and clarity allowing easy reading under normal conditions of use of the instruments.

(c) All numerals appearing on weighing instruments shall be international form of Indian numeral.

4. Sealing

All weighing instruments shall be provided by the manufacturers with a plug or stud of soft metal to receive the stamp or seal of the verification authority. Such plug or stud shall be provided in a conspicuous part of the instrument and shall be made in such a manner as to prevent its removal without obliterating the seal.

PART I BEAM SCALES

1. Definitions

(a) Beam Scale—A weighing instrument with equal arms having three knife edges, three bearings, an indicator (pointer) in the centre, and pans suspended from the end knife-edges.

(b) Sensitivity figure—It is expressed in terms of milligrams per division.

(c) Sensitiveness—It is expressed as the least weight, required to be added to or removed from one of the pans, to cause a visible displacement of the pointer from its position of equilibrium.

Note : 1. Sensitivity figures shall be determined only for those beam scales which have a pointer with sector plate. For other beam scales the sensitiveness test shall apply.

2. All class 'A' beam scales shall be provided with a pointer with sector plate or the scale.

(d) Error (Due to inequality of arms)—The error due to inequality of arms of a beam scale under specified load conditions is equal to the mass of the additional weights required to bring to equipoise the balance, carrying weights of equal masses in the pans.

(e) Greatest Error (Due to Inequality of Arms)—The greatest error due to inequality of arms is the error determined with two weights each equal to the capacity (full load) of the balance.

2. Classes and Capacities

(a) Beam scales shall be of any one of the four classes namely, A, B, C or D, based on limits for sensitivity figure/sensitiveness and greatest error specified in Tables 21-A to 21-D, respectively.

(b) Beam scales of the different classes shall be of one of the capacities mentioned in Tables 21-A to 21-D.

(c) The trades for which the different classes of scales may be used are:

Class of Scale	*Use*
A	* Commercial assay and in 'Dharam Kanta' for verifying the weights of bullion and precious stones.
B	Precious stones, jewels, pearls, bullion, precious metals, saffron and similar expensive commodities, chemists and druggists preparations, perfumery, etc.
C	Base metals and commodities such as cereals, tea, coffee, tobacco, jute, cotton, dry fruits, spices, oil seeds, etc.
D	Weighment of cheaper commodities such as scrap iron, fuel, wood, charcoal, vegetables, etc.

** Single pan balances may also be used in place of Class A or B beam scales. (For tests to be conducted on such balances see annexure at the end of this part.)*

TABLE 21 A

LIMITS FOR SENSITIVITY FIGURE AND GREATEST ERROR FOR BEAM SCALES

Class 'A'

Capacity	*Verification*		*Inspection*	
	Sensitivity figure per division of scale at no load and at full load	*Greatest error allowed when fully loaded*	*Sensitivity figure per division of scale at no load and at full load*	*Greatest error allowed when fully loaded*
1	2	3	4	5
	mg	mg	mg	mg
2 g	0.02	0.04	0.06	0.08
5 g	0.05	0.10	0.15	0.20
10 g	0.10	0.20	0.30	0.40
20 g	0.20	0.40	0.60	0.80
50 g	0.50	1	1.5	2
100 g	1	2	3	4
200 g	2	4	6	8
500 g	5	10	15	20
1 kg	10	20	30	40
2 kg	20	40	60	80
5 kg	30	60	90	120
10 kg	50	100	150	200
20 kg	100	200	300	400
50 kg	200	400	600	800

TABLE 21 B

LIMITS FOR SENSITIVENESS AND GREATEST ERRORS FOR BEAM SCALES

Class 'B'

Capacity	*Verification*		*Inspection*	
	Sensitiveness at full load	*Greatest error allowed when fully loaded*	*Sensitiveness at full load*	*Greatest error allowed when fully loaded*
1	2	3	4	5
2 g	1 mg	2 mg	3 mg	4 mg
5 g	2 mg	4 mg	6 mg	8 mg
10 g	3 mg	6 mg	9 mg	12 mg

1	2	3	4	5
20 g	5 mg	10 mg	15 mg	20 mg
50 g	10 mg	20 mg	30 mg	40 mg
100 g	20 mg	40 mg	60 mg	80 mg
200 g	30 mg	60 mg	90 mg	120 mg
500 g	50 mg	100 mg	150 mg	200 mg
1 kg	100 mg	200 mg	300 mg	400 mg
2 kg	200 mg	400 mg	600 mg	800 mg
5 kg	300 mg	600 mg	900 mg	1.2 g
10 kg	500 mg	1 g	1.5 g	2 g
20 kg	1 g	2 g	3 g	4 g
50 kg	2 g	4 g	6 g	8 g
100 kg	5 g	10 g	15 g	20 g
200 kg	10 g	20 g	30 g	40g

TABLE 21 C

LIMITS OF SENSITIVENESS AND GREATEST ERRORS FOR BEAM SCALES

Capacity	*Verification*		*Inspection*	
	Sensitiveness at full load	*Greatest error allowed when fully loaded*	*Sensitiveness at fully load*	*Greatest error allowed when fully loaded*
1	2	3	4	5
100 g	100 mg	200 mg	300 mg	400 mg
200 g	200 mg	400 mg	600 mg	800 mg
500 g	500 mg	1 g	1.5 g	2 g
1 kg	1 g	2 g	3 g	4 g
2 kg	2 g	4 g	6 g	8 g
5 kg	3 g	6 g	9 g	12 g
10 kg	5 g	10 g	15 g	20 g
20 kg	10 g	20 g	30 g	40 g
50 kg	15 g	30 g	45 g	60 g
100 kg	25 g	50 g	75 g	100 g
200 kg	50 g	100 g	150 g	200 g
300 kg	75 g	150 g	225 g	300 g
500 kg	100 g	200 g	300 g	400 g
1000 kg	150 g	300 g	450 g	600 g

TABLE 21 D

LIMITS OF SENSITIVENESS AND GREATEST ERRORS FOR BEAM SCALES

Class 'D'

Capacity	Verification		Inspection	
	Sensitiveness at full load	Greatest error allowed when fully loaded	Sensitiveness at full load	Greatest error allowed when fully loaded
kg	g	g	g	g
1	2	3	4	5
5	5	10	15	20
10	10	20	30	40
20	20	40	60	80
50	30	60	90	120
100	50	100	150	200
200	100	200	300	400
300	150	300	450	600
500	200	400	600	800
1000	300	600	900	1200

3. Materials

(a) Material for Class A Beam Scales—Class A beam scales shall be made of non-magnetic materials only, except knife-edges and bearings.

(b) Material for other Class of Beam Scales—Beams and pans shall be made of stainless steel, mild steel, brass or bronze. Aluminium alloy may be used in balances, having a capacity of not more than 50g. The pans of Class B beam scales may be made of glass also. In the case of beam scales of Classes C and D, pans of hard-wood shall be permitted for capacities 100 kg. and above. The pans of beam scales, when made of timber, shall be adequately reinforced and protected against wear.

(c) Suspension—Pans shall be suspended from the beam by metal chains through stirrups, hooks or rings. In the case of Class B beam scales of capacity 100 g or less, the pans may be suspended by silk or nylon threads.

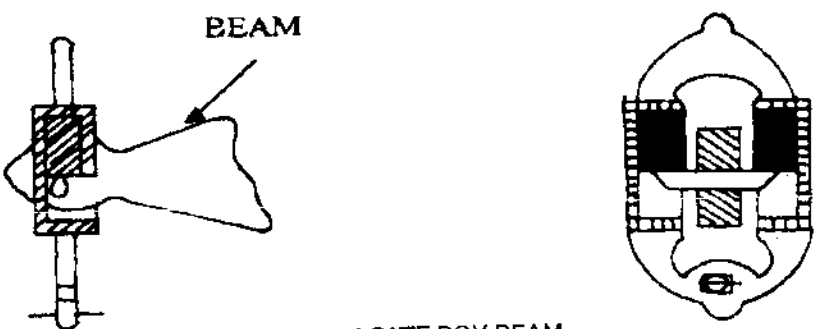
(d) All mild steel parts used in beam scales shall be suitably protected against rust.

4. Construction

(a) *Knife-edges and Bearings*

(i) The knife-edges and bearings used in beam scales shall be of one of the following types:—

Agate-box—Wherein agates bearings are fitted in a brass or iron box, with side holes which permit the projecting ends of the knife-edges to pass into the boxes and rest on or rise to their bearings (See Fig- 33 A).



AGATE BOX BEAM

FIGURE-33 A

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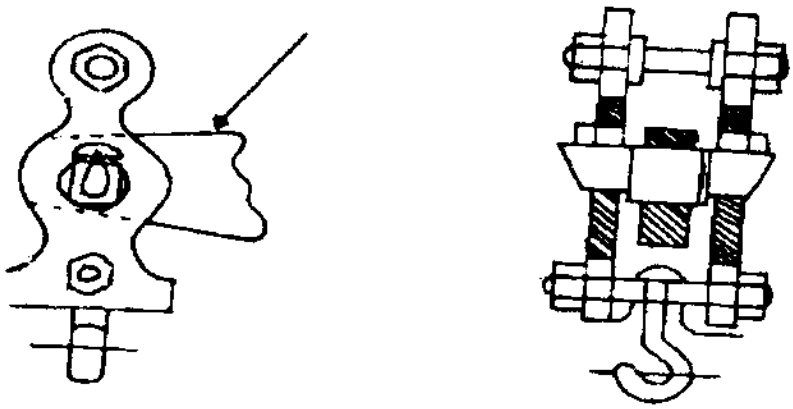
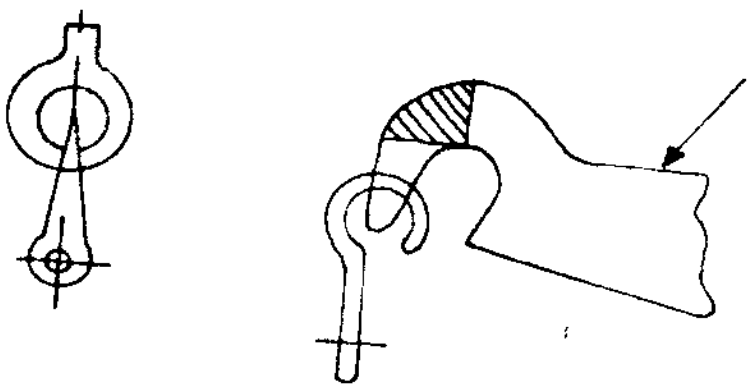
Dutch-end—Wherein the end bearings are fixed inside plates bolted together across the beam to form a shackle (See Figure- 33 B)



DUTCH-END BEAM

FIGURE-33 B

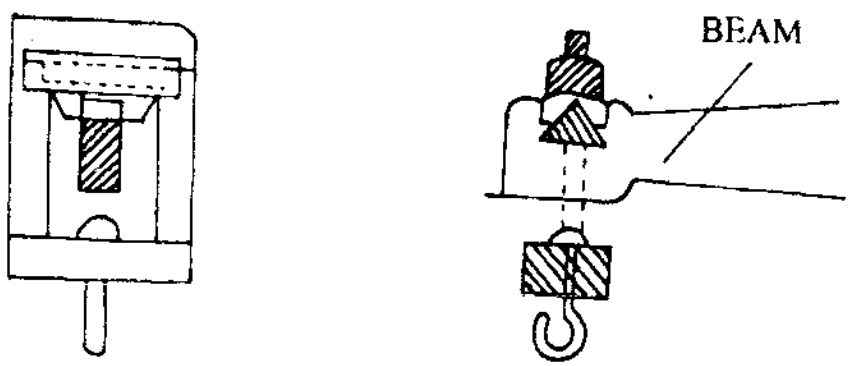
Swan-neck—Wherein the ends are curved and slotted, the bottom of the slot forming a knife-edge, the extremities of the beam being widened in direction at right angles to its length so that the base of the slot is parallel to the central knife-edge (See Figure 55-H).



SWAN NECK BEAM

FIGURE-33 C

Continuous knife-edge—Wherein the knife-edges bear along their whole length (See Fig 33 D)



CONTINUOUS KNIFE

FIGURE 33 D

(ii) Class A beam scales shall have continuous knife-edges and shall be provided with means for relieving all the knife-edges from the bearings.

(iii) Class B, beam scale shall not have swan-neck fittings.

(b) *Glass Case*—

Every beam scale of Class A shall be provided with a glass case. It shall also be provided with bubble or a plumb line and levelling screws to facilitate levelling of the instrument.

(c) *Leading Dimensions*

(i) No dimensions have been specified for Class A beam scales.

(ii) Beam scale of Classes B, C and D shall have the leading dimensions specified in Tables 21 E to 21 I and Figure 33 E to 33 I as applicable to within the tolerances specified in 4(d). For Class C beam scales of capacities 5 kg and below fixed hooks may also be provided.

TABLE 21 E

LEADING DIMENSIONS OF BEAM

Class B (with pointer above the beam)

Capacity	Length between ends (Nominal) L	Depth at the centre (Nominal) D	Thickness of plate at the centre (Nominal) T
1	2	3	4
	mm	mm	mm
	FLAT TYPE		
2 g	70	10	2
5 g	95	12	2
10 g	110	15	2
20 g	120	20	3
50 g	135	22	3
100 g	150	25	4
200 g	170	25	5
500 g	200	30	5
1 kg	250	40	6
2 kg	300	45	6
5 kg	450	50	6
10 kg	500	58	8
20 kg	600	58	10
50 kg	750	100	15
100 kg	1000	110	18
200 kg	1250	125	25
	OPEN PATTERN (BRIDGE) TYPE		
200 g	170	25	5
500 g	260	37	5
1 kg	310	44	5
2 kg	350	48	5
5 kg	450	60	6
10 kg	500	70	8
20 kg	600	80	10
50 kg	750	120	15
100 kg	1000	150	20

TABLE 21 F

LEADING DIMENSIONS OF BEAM

Class B (Flat and Open Pattern Type with pointer below the beam)

Capacity	Length between the ends (Nominal)	Depth at the centre (Nominal)	Thickness of plate at the centre knife edge (Nominal)
A	L	D	T
1	2	3	4
	mm	mm	mm
2 g	70	3	2
5 g	95	3	2
10 g	110	4	2
20 g	120	20	3
50 g	135	20	3
100 g	150g	20	4
200 g	200	20	6
500 g	235	25	8
1 kg	300	30	8
2 kg	320	30	8
5 kg	350	32	10
10 kg	400	40	12
20 kg	500	50	14
50 kg	700	70	18
100 kg	800	80	20
200 kg	1250	125	25

TABLE 21 G

LEADING DIMENSIONS OF BEAM

Class C (Swan Neck Type)

Capacity	Length between the ends (Nominal)	Depth at the centre (Nominal)	Thickness of plate at the centre knife edge (Nominal)
	L	D	T
1	2	3	4
	mm	mm	mm
100 g	150	30	4
200 g	200	40	5
500 g	300	40	6
1 kg	350	45	6
2 kg	400	45	6
5 kg	550	70	6
10 kg	600	80	6
20 kg	750	108	8
50 kg	900	116	8
100 kg	1200	138	14
200 kg	1350	148	16
300 kg	1650	154	18
500 kg	1800	178	25
1000 kg	2000	200	32

TABLE 21 H

LEADING DIMENSIONS OF BEAM

Class C (Dutch End Type)

Capacity	Length between end knife-edges (Nominal) L	Depth at the centre (Nominal) D	Thickness of plate at the knife-edge (Nominal) T
1	2	3	4
	mm	mm	mm
100 g	150	35	4
200 g	200	40	5
500 g	300	40	6
1 kg	350	45	6
2 kg	400	45	6
5 kg	450	70	6
10 kg	450	75	8
20 kg	600	75	8
50 kg	750	80	8
100 kg	900	120	14
200 kg	900	133	16
300 kg	1050	142	16
500 kg	1350	192	20
1000 kg	1650	203	25

TABLE 21 I

LEADING DIMENSIONS OF BEAM

Class 'D'

Capacity	Length between the end knife-edges (Nominal) L	Depth at the centre (Nominal) D	Thickness of plate at the centre (Nominal) T
1	2	3	4
kg	mm	mm	mm
	SWAN-NECK WITH FIXED FLAT HOOKS		
5	550	70	6
10	600	80	6
20	750	108	6
50	900	116	8
100	1200	138	14
200	1350	148	16
300	1650	154	18
	DETACHABLE FLAT HOOKS		
500	1800	178	25
1000	2000	200	32

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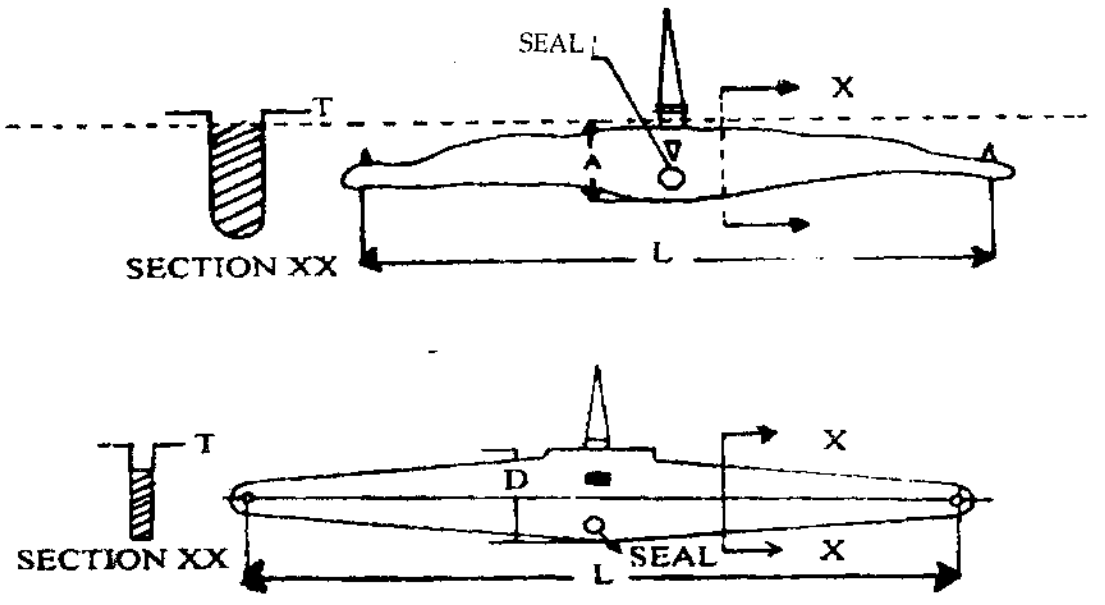
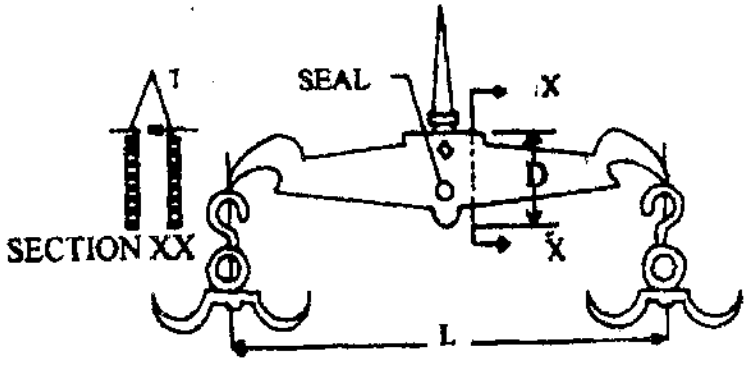
BEAM SCALE CLASS B (FLAT TYPE)

FIGURE-33 E



BEAM SCALE CLASS C (DUTCH END TYPE)

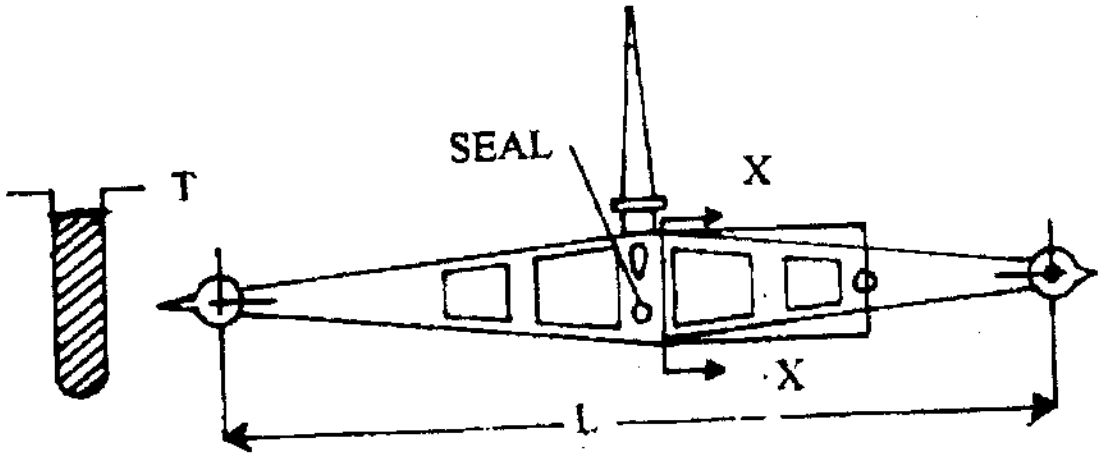
FIGURE-33 F



BEAM SCALE CLASS C (SWAN NECK WITH SEPARABLE FLAT HOOKS

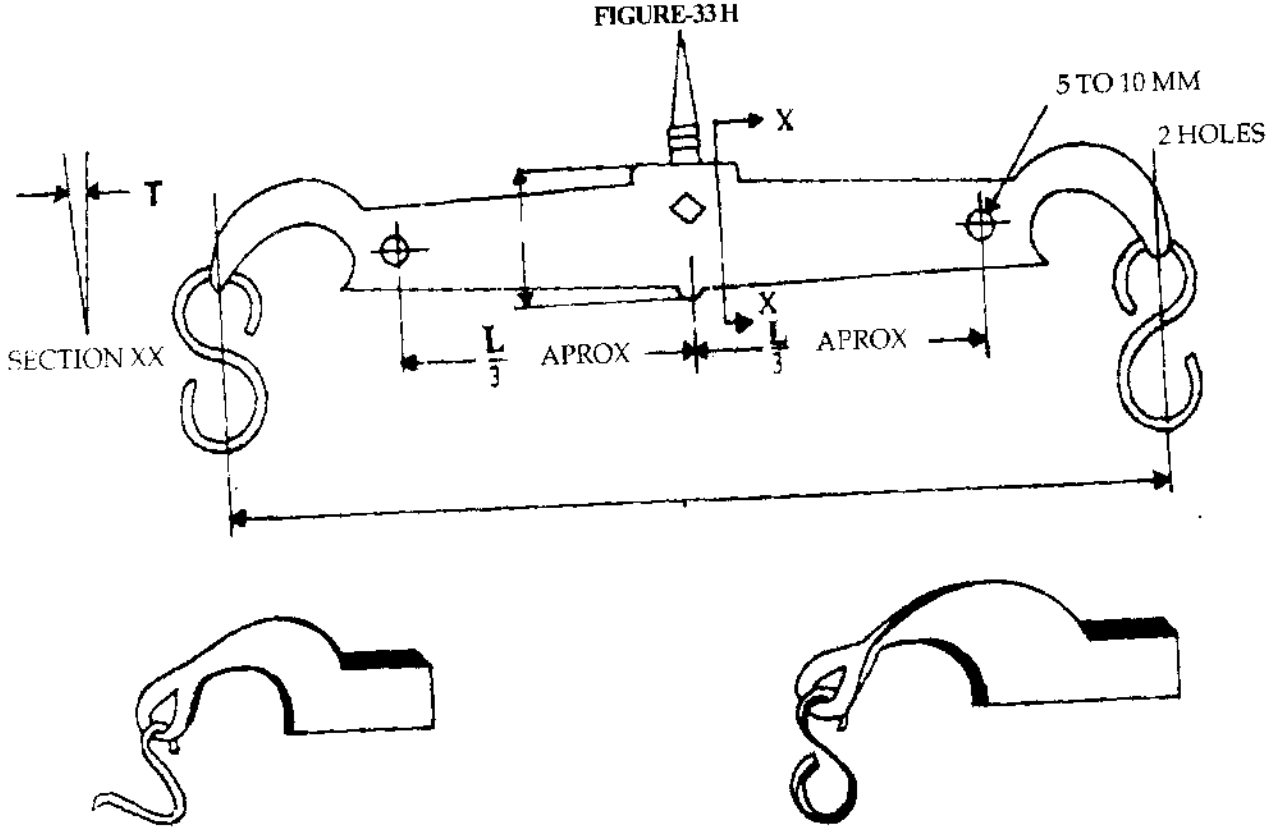
FIGURE 33 G

FIGURE-33 G



BEAM SCALE CLASS B (OPEN PATTERN TYPE)

FIGURE-33 H



BEAM SCALE CLASS D (SWAN-NECK WITH FIXED FLAT HOOKS)

FIGURE 33 I

Note : Class D beam scales shall be distinguished from Class C scale by the existence of two identical holes 5 to 10 mm in diameter through the beam, one on either side of the central knife-edge.

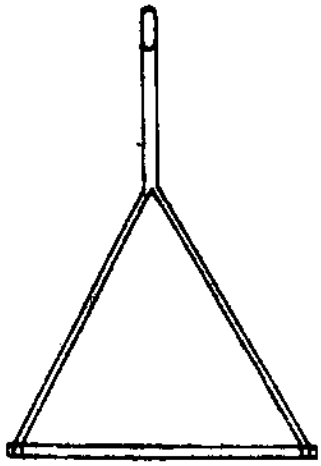
(d) *Permissible variation in Dimensions*—The dimensions of the beam scales shall not vary by more than 10 per cent of the dimensions prescribed in Tables 21 E to 21 I.

(e) *Attachment for Adjusting the Balance of a Beam scale*—Beam scales of Classes B, C and D may be provided with a balance ball or balance box securely attached to one of the suspended chains or pans in such a manner that it is not possible to alter it easily. The balance ball or balance box shall not be so large as to contain more loose material

than an amount exceeding one percent in weight of the capacity of beam scales under 100 kg or an amount exceeding 1 kg for beam scale of capacity 100 kg and above.

(f) *Arrangement adjusting sensitivity figure*—Beam scales of Class A shall be provided with an attachment for adjusting the sensitivity figure. Beam scales of other classes shall not be provided with an attachment to adjust their sensitiveness.

(g) For the purposes of postal transactions Class C beam scales may be provided with an open type pan as illustrated in Figure 33 J.



OPEN TYPE PAN

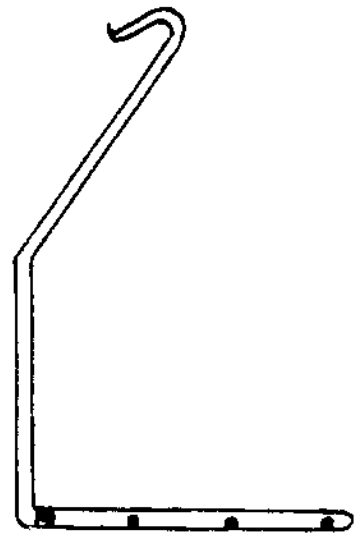


FIGURE 33 J

5. Tests

(a) Test for sensitivity figure or sensitiveness Only —Class 'A' beam scales shall be tested for sensitivity figure. The sensitivity figure shall be determined at zero and full loads and shall comply with the requirements specified in Table 43-B, Beam scales other than Class 'A' shall be tested for sensitiveness at full load only and shall comply with the requirements specified in Tables 43-C to 43-E.

(i) *Class A Beam Scales*—For determining the sensitivity figure of a Class A beam scale at no load, the beam scale shall be properly balanced without any load in the pans. A small weight whose mass is accurately known shall be put on one of the pans. This small weight shall be so chosen that the turning points of the pointer remain within the reading index. The rest point shall be determined by the usual oscillation method. The weight shall then be transferred to the other pan and the second rest point shall be determined. If the rest points shift by 'n' divisions on the scale and if the mass of the test weight is 'w' mg., the sensitivity figure 's' in milligrams per division, at no load, is given by the relation:

$$s = 2w/n.$$

A similar test with appropriate weights in each pan representing the full capacity of the beam scale, shall be performed to determine the sensitivity figure of the beam scale at full load.

(ii) *Class A beam scales 2g to 20g*—As it is not practicable to make weights of denominations smaller than one milligram, the sensitivity figure of beam scales of smaller capacities, that is, from 2 g to 20 g shall be determined by means of a pair of weights, each weight having a mass of approximately 5 mg. The difference in the masses of the two weights of the pair shall be adjusted to be of the order of 0.05 mg, 0.12 mg., 0.25 mg, or 0.5 mg depending on the beam scale under test, that is, for testing 2 g, 5 g, 10 g or 20 g, beam scale, respectively. This difference should be known accurately. After balancing the beam scale at zero load, one of the two weights in the pair shall be put on the right pan and the other weight on the left pan. The rest point shall be determined. The two weights shall then be inter-changed and the second rest point shall be similarly determined. If the rest point shifts by 'n' divisions and if the

difference between the masses of the two test weight is 'w' mg., the sensitivity figure 's' of the beam scale in milligrams per division at zero load is given by the relation:

$$s = 2w/n.$$

To determine the sensitivity figure of the beam scale at full load a similar test shall be performed with weights equal to the maximum capacity of the beam scale in each pan.

(iii) *Beam scales other than class A*—Pans of a beam scale other than Class A, shall be loaded with weights representing its full capacity and the scale is balanced. Weights of such mass shall then be added on one of the pans as may move the tip of the pointer from its equilibrium position by an appreciable distance. After removing these weights the same test shall be repeated on the other pan and the weights required for moving the tip of the pointer by the same distance on the other side of the equilibrium position shall then be added. If these weights are denoted by 'w1' and 'w2' respectively, the sensitiveness "s" of the beam scale is given by the relation:

$$s = \frac{w_1 + w_2}{2}$$

(b) *Inequality of Arms Test*

(i) Class A Beam Scale—The error due to inequality of arm of Class A beam scale shall be determined by the following method. The beam scale shall be properly balanced without any load in the pans. The rest point (R_0) shall be determined by the usual oscillation method. After arresting the beam both the pans shall be loaded with equal weights of same material and representing the full capacity of the beam scale. The beam scale shall then be properly balanced by adding small weights. The rest point (R_1) shall be determined by the oscillation method. After arresting the beam, the loads, including the small weights, shall be interchanged and scale balanced again by putting additional weights (m), if necessary on one of the pans. The rest point (R_2) shall again be determined. The error (E) caused due to inequality of the arms of the scale is given by

$$E = \frac{m}{2} + \frac{[R_1 + R_2 - 2R_0]s}{2}$$

where S is the sensitivity figure of the beam scale.

(ii) *Beam scales other than Class A*—In the case of beam with fixed hooks the beam with hooks but without chains and pans shall be checked for balance. If detachable hooks are provided the beam alone shall be checked. The loose hooks shall then be attached and the assembly checked for balance. The chains and pans shall then be attached in the case of both the types of balances and checked again for balance.

After checking at no load, each of the pans shall be loaded with weights equal to the maximum capacity of the beam scale and the scale shall be balanced.

The loads thereon shall then the interchanged and the beam scale balanced again by adding necessary weights on one of the pans. The additional weight shall be equal to twice the error due to inequality of arms of the beam.

In the case of beams with attached hooks, the loads shall be interchanged along with the chains, and pans and in the case of beams with detachable hooks the loads shall be interchanged along with the hook chains and pans.

(iii) The figure so obtained shall be halved to determine the error at full-load. These should be within the limits specified in Tables 43-B to 43-E.

(c) Shift Test—Beam scales other than Class A—With the pans loaded to half the capacity, no appreciable difference in the accuracy of the instrument shall result from moving the knife-edges or bearings laterally or backwards and forwards within their limits of movement.

Similarly when the above load is moved to any position on the pan, the difference shown shall not be appreciable.

Note : The words 'appreciable difference' shall mean 'a difference which can be detected', but the Legal Metrology Officer should exercise his discretion in each particular case.

6. Sealing

All beam scales shall be provided by the manufacturer with a plug/plugs or stud/studs of soft metal to receive the stamp or seal of the verification authority. Such plug/plugs or stud/studs shall be provided in a conspicuous position and shall be made in such a manner as to prevent its removal without obliterating the seal/seals.

ANNEXURE

Tests for single pan balances.

1. *Sensitiveness*—The balance shall be tested for sensitiveness near zero, middle and extreme position of the projection scale under three conditions

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of loading namely no load, half load and full load. The balance shall be such so as to record the change in mass of the order of 1 sub-division of the projection scale accurately within the limits of the value equivalent to the least count of the vernier or micrometre scale if provided, otherwise within half a division of the projection scale.

2. *Accuracy of projection scale*—The accuracy of the projection scale shall be examined at 10 points of the scale under three different conditions of loading namely at no load, half load and full load. The maximum error at any point shall not exceed the value of the one half-sub-division of the projection scale, if no vernier or micrometer scale is provided or two divisions of the vernier or micrometre scale.

3. *Consistency of performance*—Ten consecutive readings shall be noted by releasing and arresting the balance in the unloaded condition followed by another ten readings when the balance is in fully loaded condition. The standard deviation from the mean of the rest point shall be calculated separately for each condition, which in no case shall exceed half the division of the projection scale if no vernier or micrometer scale is provided or two divisions of the vernier or micrometer scale.

PART II - COUNTER MACHINES

1. Definition

A counter machine is an equal arm weighing instrument of capacity not exceeding 50 kg, the pans of which are above the beam. Figure 33 K illustrates a typical counter machine.

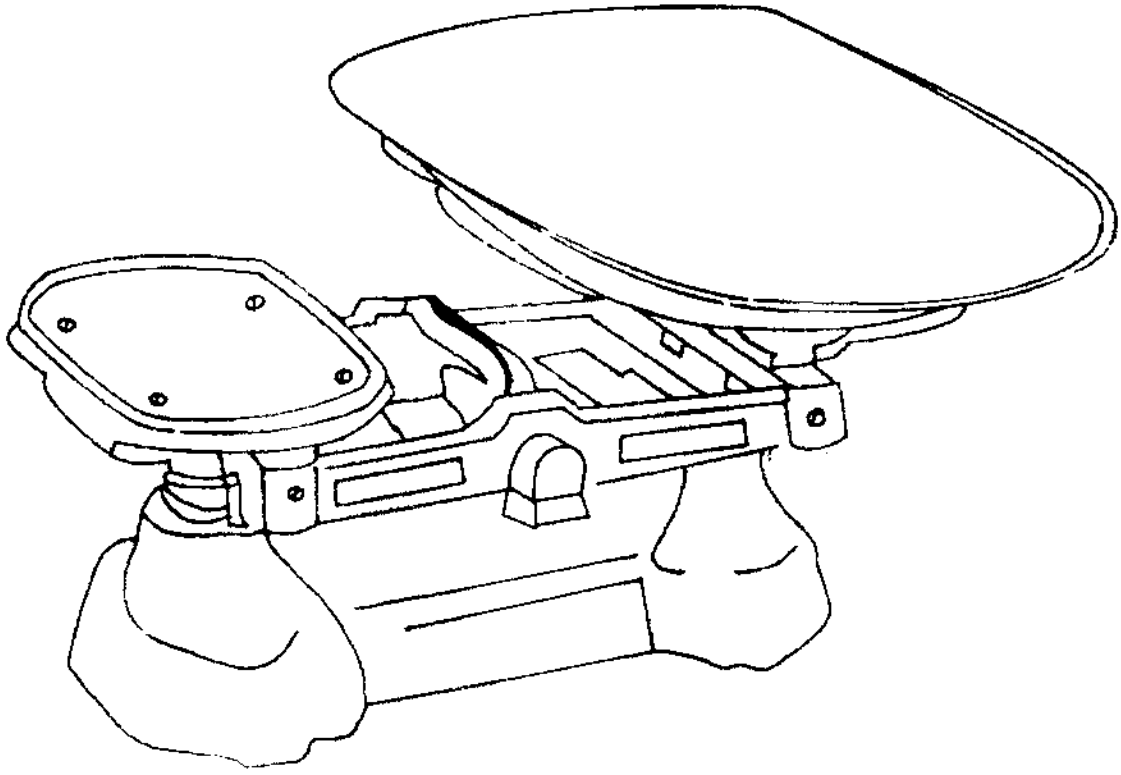

FIGURE 33 K

2. Capacities

The machines may be of the following maximum capacities:—

500g, 1kg, 2kg, 3kg, 5kg, 10kg, 15kg, 20kg, 25kg, 30kg and 50kg.

3. General Requirements

(a) When the beam of body has two sides, they shall be connected further by 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 surfaces, 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 knee-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 upto one per cent of the capacity of the machine. 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.

(e) The minimum fall of the extremities of the beam, either way, of counter machines shall be as follows:—

Capacity	*Minimum fall*
500 g, 1 kg and 2 kg	6 mm
3 kg, 5 kg, 10 kg, 15 kg	10 mm
20 kg, 25 kg and 30 kg	12 mm
50 kg	13 mm

4. Tests

(a) The machine shall be tested on a horizontal level plane.

(b) *Sensitiveness and Error*

(i) The machine shall be tested for sensitiveness at full load with the beam in a horizontal position. The addition of the weight specified in col. 2 or 4 as the case may be of Table 21 J shall cause the pointer to have a displacement corresponding to the minimum limits specified in paragraph 3(e).

(ii) The error that is the weight required to bring the beam of the instrument to horizontal position when fully loaded with weights each equal to its capacity on both pans shall not exceed the limits specified in cols. 3 and 5 as the case may be of Table 21 JK.

(c) *Shift Test*

(i) 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.

(ii) 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, if the centre of a load equal to half the capacity placed on the goods pan is moved any where within a distance from the centre equal to one-third of the length of the pan. If the pan has a vertical side against the middle of that side, the weight being entirely on the weight pan, but in any position on it.

TABLE 21 J

SENSITIVENESS AND MAXIMUM PERMISSIBLE ERRORS FOR COUNTER MACHINES

	Verification		Inspection	
Capacity	Sensitiveness when fully loaded	Maximum permissible error, in excess or deficiency, when fully loaded	Sensitiveness when fully loaded	Maximum permissible error in excess or deficiency, when fully loaded
1	2	3	4	5
500 g	1.5 g	2.2 g	4.5 g	4.5 g
1 kg	2.0 g	3.0 g	6.0 g	6.0 g
2 kg	3.0 g	4.5 g	9.0 g	9.0 g
3 kg	4.0 g	6.0 g	12.0 g	12.0 g
5 kg	6.0 g	9.0 g	18.0 g	18.0 g
10 kg	7.0 g	10.5 g	21.0 g	21.0 g
15 kg	8.0 g	12.0 g	24.0 g	24.0 g
20 kg	9.0 g	13.5 g	27.0 g	27.0 g
25 kg	10.0 g	15.0 g	30.0 g	30.0 g
30 kg	11.0 g	20.0 g	33.0 g	40.0 g
50 kg	15.0 g	30.0 g	45.0 g	60.0 g