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भारतीय मानक

धर्म काँटे की विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

WEIGH BRIDGES – SPECIFICATION

(First Revision)

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BUREAU OF INDIAN STANDARDS
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Price Group 2

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Commercial Weights and Measures Sectional Committeè had been approved by the Light Mechanical Engineering Division Council.

This standard is one of a series of Indian Standards relating to commercial weighing instruments. This standard was originally published in 1960. This revision is based on further experience gained in manufacture of commercial weighing instruments and other developments in this field.

The Indian Standard on General Requirements for Weighing Instruments IS 1432 is necessary adjunct to this standard.

This standard is intended chiefly to cover the technical provisions relating to weigh-bridges, and it does not include all the necessary provisions of a contract.

In the preparation of this standard assistance has been derived from the Weights and Measures Rules and Acts on weights and measures prevailing in the country.

Indian Standard

WEIGH BRIDGES – SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard covers the requirements for weigh-bridges.

2 REFERENCES

The following Indian Standards are necessary adjunts to this standards:

IS No.	*Title*
210 : 1978	Grey iron castings (*third revision*)
292 : 1983	Leaded brass ingots and castings (*second revision*)
1432 : 1959	General requirements for weighing instruments

3 TERMINOLOGY

For the purpose of this standard, a weigh-bridge shall mean a weighing instrument constructed with compound levers, with the indicator system carried on foundations separate from the lever systems to weigh loads of capacities 1 000 kg (one tonne) and over, through the medium of proportional weights or indicating mechanism.

4 CAPACITIES

Weigh-bridges shall be of the following capacities:

1 000 kg (1 t). 2 000 kg (2 t), 3 000 kg (3 t), 5 000 kg (5 t), 10 000 kg (10 t), 15 000 kg (15 t), 20 000 kg (20 t), 25 000 kg (25 t), 30 000 kg (30 t), 40 000 kg (40 t), 50 000 kg (50 t), 60 000 kg (60 t), 80 000 kg (80 t), 100 000 kg (100 t), 150 000 (150 t), 200 000 kg (200 t), 250 000 kg (250 t), 300 000 kg (300 t) and 400 000 kg (400 t).

5 GENERAL REQUIREMENTS

5.1 The weighing machines shall comply with the general requirements specified in IS 1432. In addition, the weighing machines shall comply with the requirements given in 5.2 to 5.8.

5.2 Framework

Where the weigh-bridge is fitted with a framework, it shall be built up of mild steel sections or cast iron or cast steel. It shall be rigid structure, suitably strengthened so that it is capable of resisting excessive vibrations, and shall not throw the lever system out of alignment. Brackets shall be provided on the side, and end frames to secure the framework.

5.3 Steelyard

The steelyard of a weigh-bridge shall not have any readily removeable parts except the support for proportional weights. There shall be one or more stops to prevent the sliding poise or poises from travelling behind the zero mark.

5.3.1 The minimum travel of the steelyard in weigh-bridges shall be 10 mm each way.

5.3.2 The top and bottom of the guide and/or steelyard shall be fitted with non-magnetic material.

5.3.3 When the steelyard is provided with notches, the latter shall be suitably protected.

5.3.4 The value of the smallest division on the minor bar shall not exceed the greatest error allowed for that capacity (*see* Table 2).

5.4 Graduation

The value of the smallest graduation on dials or minor steelyards of weighing instruments expressed in units of mass, shall be in the form of 1×10^n, 2×10^n, or 5×10^n, 'n' being a positive or negative whole number or zero.

5.5 Platform

The platform shall be either chequered or plain, and shall be made of cast iron or steel plates or any other suitable material. It shall be rigid and sufficiently strong to carry the maximum load. The foundation of machines above 5 tonnes shall provide for a manhole to facilitate easy access to the pit.

5.5.1 If a movable hutch, barrow, frame or bucket is used with the ordinary platform, it shall form an essential part of the machine without which it is not possible to balance the machine. The movable hutch, barrow, frame or bucket shall be identified with the machine and when in position on the platform, it shall be as central as possible.

5.6 Balancing Arrangement

The balancing arrangement for daily wear and and tear shall have a range not exceeding 0·5 percent of the capacity of the machine and not less than 0·1 percent of the capacity each way (*see* Table 1). The balancing box containing the balancing ball shall be securely attached to the steelyard, preferably by passing a bolt through the steelyard. The balancing ball shall be actuated by a detachable key.

5.7 In the case of weigh-bridges provided with dials:

a) racks and pinions shall be of suitable wear resistant material finished smooth;

b) the extremity of the pointer shall in no position, be at a greater distance than 5 mm from the graduated surface of the dial. If the pointer is on a different plane the extremity of the pointer shall be on the graduated portion of the dial, and it shall be so made as not to obscure the graduation marks or make them difficult to read any graduation marks; and

c) the dial shall be graduated into reasonably equal parts and the minimum width between graduations shall be not less than 2 mm.

Table 1 Range of Balancing Arrangement

(*Clause* 5.6)

Capacity	Range of Balancing Arrangement	
	Maximum 0·5 Percent of Capacity	Minimum 0·1 Percent of Capacity Each Way
(1)	(2)	(3)
	kg	kg
1 000 kg (1 t)	5	1·0
2 000 kg (2 t)	10	2·0
3 000 kg (3 t)	15	3·0
5 000 kg (5 t)	25	5·0
10 000 kg (10 t)	50	10·0
15 000 kg (15 t)	75	15·0
20 000 kg (20 t)	100	20·0
25 000 kg (25 t)	125	25·0
30 000 kg (30 t)	150	30·0
40 000 kg (40 t)	200	40·0
50 000 kg (50 t)	250	50·0
60 000 kg (60 t)	300	60·0
80 000 kg (80 t)	400	80·0
100 000 kg (100 t)	500	100·0
150 000 kg (150 t)	750	150·0
200 000 kg (200 t)	1 000	200·0
250 000 kg (250 t)	1 250	250·0
300 000 kg (300 t)	1 500	300·0
400 000 kg (400 t)	2 000	400·0

5.8 For no-loose weight steelyard machines, the total capacity shall be that which is indicated on the major index on the steelyard.

5.9 Proportional Weights

5.9.1 All loose proportional weights shall be identified with the machine by a number or any other suitable mark of identification which shall be indelible. They shall be marked with their equivalent weights as shown in Fig. 1.

5.9.2 Proportional weights shall be hexagonal in shape with a slot of suitable size to allow their being placed on the counter balance (*see* Fig. 1). The counter balance shall be identified with the machine.

5.9.3 The proportional weights shall be made of cast iron, preferably of Grade FG 150 of IS 210 : 1978 or brass of Grade LCB 2 of IS 292 : 1983.

5.9.4 The proportional weights shall have one rectangular loading hole which shall be undercut or tapering outwards so as to hold lead securely for adjustment. The undercut hole shall be reasonably large to accommodate the lead required for adjustment. The surface of the lead in the loading hole of a new proportional weight shall be at least 3 mm inside from the bottom surface of the weight.

5.9.5 The smallest denomination of the proportional weight shall be equivalent to the weight represented by the maximum graduation on the minor bar.

5.9.6 The denominations of the proportional weights shall be chosen from the series of weights conforming to 1, 2, 5 and their decimal multiples. Further, any number of proportional weights in any one of the aforesaid denominations may be included provided the total equivalent of all the proportional weights does not exceed the capacity of the weighing instrument.

NOTE — While arriving at the capacity of the weigh-bridge, the maximum graduation shown on the steelyard in the case of 'loose-weight' weigh-bridges and on the minor bar in the case of 'no-loose' weight type weigh-bridges shall not be taken into account.

5.9.7 The total capacity of the machine shall include the capacity of graduated tare bar or bars wherever provided.

NOTE — When tare bars are used and are not graduated except with a zero mark only, they shall not be taken into account when calculating the capacity of the machines. Ungraduated tare bars shall be marked with zero.

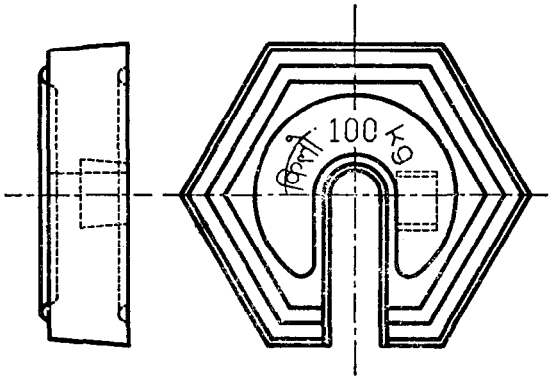

FIG. 1 PROPORTIONAL WEIGHTS

6 MARKING

All weighing machines shall be prominently, legibly and indelibly marked with source of manufacture or his registered trade-mark, model, capacity and class (wherever applicable).

NOTE — The source of manufacture of the registered trade-mark shall be such as will not be mistaken for the stamp or the seal of the verification authority.

6.1 Weighing instruments shall have inscribed on them their maximum weighing capacity in the following manner as may be appropriate:

'To weigh.....t' 'To weigh.....kg'
'.... टन के लिए ....' '.... किलो के लिए ....'
'To weigh.....g'
'.... ग्राम के लिए ....'

6.2 All numerals appearing on weighing instrument shall be indicated in international form of Indian numeral.

7 IDENTIFICATION OF PARTS

Detachable parts which may affect the accuracy of the weigh-bridge shall be indelibly numbered or marked so as to facilitate identification.

8 SEALING

Dial machines shall be fitted with a soft metal plug for receiving the seal of the verification authority and wherever practicable, this plug shall be passed through the dial and frame. The plug or stud fitted on the dial shall be so supported as to allow no risk of damage to the instrument.

8.1 On weigh-bridges other than dial machines, a plug or stud shall be provided in a conspicuous position on the indicating lever or steelyard.

9 TESTS AND TEST REQUIREMENTS

9.1 The steelyard of a weigh-bridge shall remain horizontal at no-load.

9.2 Weigh-bridges shall be tested to verify the accuracy of graduations or notches up to the total capacity.

9.3 All loose proportional weights, where these are provided, shall be tested and then suitably sealed to prevent tampering.

9.4 The error, plus or minus, for loads up to half of the maximum capacity, shall be not more than half the maximum permissible error prescribed at full load; for loads between half and full capacity, the error shall not exceed the maximum permissible error prescribed at full load.

9.5 With one quarter of the maximum load (or as near thereto as practicable) placed in the middle or at any of the corners of the platform, the weigh-bridge other than railway weigh-bridge shall indicate the same weight within half the limits of error prescribed in Table 2 in col 3 for non-dial type machines and in col 4 for dial type machines. In case of railway weigh-bridge the test shall be carried out by placing in the middle or at any of the end of the platform.

9.6 Weigh-bridges with steelyard arrangement shall be tested for sensitiveness and error at full load or as near as practicable to it. The sensitiveness and permissible error shall not exceed the limits prescribed in col 2 and 3 respectively of Table 2.

9.6.1 The machines shall be tested by adding loads equal to the major divisions or notches and then ascertaining that an additional load equal to the value of one notch or division is correctly indicated.

9.7 With the exception of sensitiveness test (*see* **9.6**), the other tests mentioned in **9.1** to **9.6.1** shall be carried out in a similar manner on dial type machines also. These machines shall comply with the requirements prescribed in col 4 of Table 2.

Table 2 Tolerances for Weigh-Bridges

(*Clauses* 5.3.4, 9.5, 9.6 *and* 9.7)

Capacity	Sensitiveness when Fully Loaded	Greatest Error Allowed in Excess or Deficiency when Fully Loaded (for Non Dial Type Machines)	Greatest Error Allowed in Excess or Deficiency when Fully Loaded (for Machined Fitted with Dial)
(1)	(2)	(3)	(4)
1 000 kg (1 t)	1·0	1·2	
2 000 kg (2 t)	1·5	1·4	
3 000 kg (3 t)	1·5	1·6	
5 000 kg (5 t)	1·5	2·0	
10 000 kg (10 t)	2·0	3·0	
15 000 kg (15 t)	2·5	4·0	
20 000 kg (20 t)	3·0	5·0	A weight corresponding to one half the interval between consecutive minimum graduation
25 000 kg (25 t)	3·5	6·0	
30 000 kg (30 t)	4·0	7·0	
40 000 kg (40 t)	5·0	7·0	
50 000 kg (50 t)	5·5	8·0	
60 000 kg (60 t)	5·5	8·5	
80 000 kg (80 t)	6·0	10·0	
100 000 kg (100 t)	6·5	11·5	
150 000 kg (150 t)	8·0	15·0	
200 000 kg (200 t)	9·0	19·0	
250 000 kg (250 t)	12·0	25·0	
300 000 kg (300 t)	15·0	30·0	
400 000 kg (400 t)	20·0	40·0	

NOTES

1 Tolerances given in Table 2 are for the initial verification of the new machines.

2 For tolerances on weigh-bridges which are in use, reference may be made to the relevant standards of Weights and Measures (General) Rules, 1987.

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Review of Indian Standards

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