NATIONAL STANDARDS COMMISSION

WEIGHTS AND MEASURES (PATTERNS OF INSTRUMENTS) REGULATIONS

REGULATION 9

GENERAL CERTIFICATE OF APPROVAL No 6/10B/0 CANCELLED 0/2

This is to certify that an approval has been granted that patterns of

Electronic Weighbridges

as described herein are suitable for use for trade provided they comply with the following descriptions and requirements, and associated Certificates of Approval of a Pattern and Supplementary Certificates of Approval.

The approval was granted on 23/12/83 and is subject to review on or after 31/1/89.

Signed

Executive Director

1. SCOPE OF APPROVAL

Weighbridges are those weighing instruments of capacity 3 tonnes or more, with platforms designed to weigh road or rail vehicles.

There may be one or more platforms.

The platforms may be fixed or transportable.

Mass indication is via a Commission-approved electronic indicator whose input is provided by one or more Commission-approved load cells.

The load cells are installed in a Commission-approved manner, directly supporting the platform (known as a full load cell weighbridge).

From the date of issue of this Certificate, all full load cell weighbridges presented for (initial) verification must comply with its provisions. Compliance with this Certificate does not replace the need to obtain Certificates of Approval of a Pattern for weighbridges, nor for Supplementary Certificates of Approval for load cells and indicators incorporated in them. This Certificate aims at ensuring the correct design of weighbridges and the use of components within their approved criteria without the need for numerous variants to a weighbridge Certificate of Approval.

This Certificate is to be used by weighbridge designers and by Weights and Measures officials in assessing instruments at verification.

2. CRITERIA RELATING TO LOAD CELLS IN FULL LOAD CELL WEIGHBRIDGES

Load cells approved in either a Certificate of Approval of a Pattern or a Supplementary Certificate of Approval may be used in any Commission-approved weighbridge provided the load cells are used within the load cell limitations specified in their Technical Schedule. The Schedule will show the correct method for mounting the load cells as well as the following information:

- Capacity
- Minimum dead load
- Maximum number of verification scale intervals
- Minimum verification scale interval

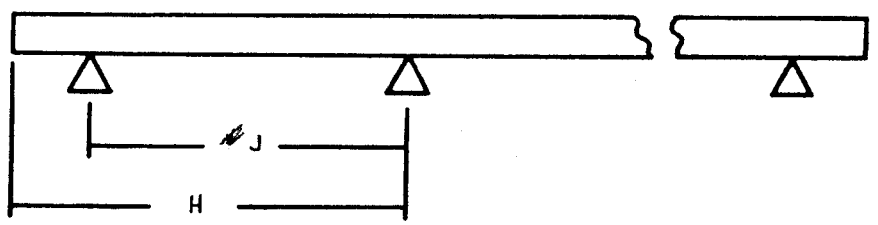
Where the Technical Schedule does not provide all of the above information, which may be the case in some older approvals, the Commission may be consulted for these details (If the minimum measuring range is specified, the minimum verification scale interval may be calculated by dividing the minimum measuring range by the maximum number of verification scale intervals).

The minimum dead load for each load cell shall be taken as 5% of the maximum capacity of the load cell irrespective of the value stated in the Schedule except where that value is less than 5%.

The Schedule for the approved weighbridge will specify the dead load of the platform, for example in tonnes per metre for a standard width of 3 m.

Details of the indicator are given in the Schedule for the approved weighbridge or, if appropriate, the Supplementary Certificate for the indicator.

2.1 Load Cell Loadings



¶ The approximate proportion of dead load and live load (assuming uniform loading) on each cell for various numbers of cells is as follows:

4 load cells:	1/4 x load (for each cell)
6 load cells:	H/8J x load (for end cells) J/4H x load (for middle cells)
8 load cells:	H/12J x load (for end cells) J/6H x load (for middle cells)
10 load cells:	H/16J x load (for end cells) J/8H x load (for middle cells)

¶ The proportions of load for each cell are close approximations, given in a simple form for ease of calculation.

If the load cell's specified limits are exceeded slightly by use of the simple formula, the loads must be calculated exactly.

* The ratio H/J must also be selected so that the weighbridge satisfies the stability test specified in Test Procedure No 6/108/0 when loaded beyond the end cells.

For a multiple platform instrument, the loadings and calculations are applied separately to each platform. In such cases substitute "each platform" for "instrument" in the appropriate clause.

For an approved load cell to be suitable for a particular instrument, the following conditions must apply:

(i) Capacity

The capacity of each load cell shall not be less than the marked capacity of the instrument (Max) + dead load, divided by:

4 for a 4 cell instrument
4H/J for a 6 cell instrument
6H/J for an 8 cell instrument
8H/J for a 10 cell instrument

(ii) Dead Load * NC #1 - 29/1/85

The minimum dead load for each load cell shall not exceed the dead load of the instrument divided by:

4 for a 4 cell instrument
8J/H for a 6 cell instrument
12J/H for an 8 cell instrument
16J/H for a 10 cell instrument

(iii) Number of Verification Scale Intervals

The number of verification scale intervals of the instrument shall not exceed the maximum number of verification scale intervals for each load cell or the indicator. The number shall also be not less than the minimum value specified in Table 1 of Document 103 (included in the Inspection Manual and the Inspector's Handbook) or similarly Table 1 of Document 100 of Design Manual No 1.

(iv) Verification Scale Interval

The minimum verification scale interval of each load cell shall not exceed the value of the verification scale interval of the instrument divided by:

4 for a 4 cell instrument
8J/H for a 6 cell instrument
12J/H for an 8 cell instrument
16J/H for a 10 cell instrument.

2.2 Sample Calculation

(i) Load Cell Data (from Technical Schedule for weighbridge or load cell)

Capacity	20 t
Minimum dead load	1.6 t
Maximum number of verification scale intervals	3000
Minimum verification scale interval	1.7 kg

(ii) Indicator Data (from Technical Schedule for weighbridge or indicator)

Maximum number of verification scale intervals	3000

* See NC change No 1 - 29/1/85

(iii) Weighing Instrument Data (from instrument and/or instrument nameplate and Technical Schedule for weighbridge)

Maximum capacity of weighbridge, (t)	Max = 60
Verification scale interval, (t)	e = 0.02
Length of load receptor, (m)	L = 20
Number of load cells	8
Dead load of load receptor, (t/m)	D_L = 1.6
Ratio H/J	= 1.07

(iv) Calculation

(a) Capacity

Actual maximum load on one load cell $= \frac{\text{Max} + L\ D_L}{6\ H/J}$

$= \frac{60 + 20 \times 1.6}{6 \times 1.07}$ = 14.3 t

Capacity of load cell = 20 t

(b) Dead Load

Actual minimum load on one load cell $= \frac{L\ D_L}{12\ J/H}$

$= \frac{20 \times 1.6}{12 \times 1/1.07}$ = 2.85 t

Minimum dead load of load cell = 1.6

(c) Number of Verification Scale Intervals

Actual number of verification scale intervals $= \frac{\text{Max}}{e}$

$= \frac{60}{0.02}$ = 3000

Allowable maximum number for load cells = 3000

Allowable maximum number for indicator = 3000

Allowable minimum for class III (e = 0.02 t) = 750

(d) Verification Scale Interval

Actual minimum proportion of the scale interval for one load cell

$= \frac{e}{12\ J/H}$

$= \frac{0.02}{12 \times 1/1.07}$ = 0.00178 t = 1.78 kg

Minimum verification scale interval of load cell = 1.7 kg

The instrument therefore complies with the load cell and indicator approval data.

30/1/84

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3. BLANKING OF INDICATION ON MULTIPLE PLATFORM WEIGHBRIDGES

Blanking of indication or a display of non-numerical characters is required for each platform of a multiple platform weighbridge when the load on an individual platform is in excess of that platform's marked maximum capacity (*) if:

(a) any one platform is intended for individual use in its normal application, or

(b) if the weighbridge is designed to indicate the load on separate platforms ie with multiple indicators or indications on a VDU or a basework selector etc.

(c) Irrespective of (a) or (b) where any one platform is of a maximum capacity less than 30 t, the indication should blank or show non-numerical characters (*).

Note: The above applies whether the weighbridge is one traditionally known as a 'tandem' or as a 'combination' system.

3.1 Marking

Where it is determined that the weighbridge does not fall into the categories (a), (b) or (c) then adjacent to the mass indications either on the indicator or close by, should be affixed a notice advising that 'Individual Baseworks are NOT To Be Used Separately'.

4. WIND EFFECTS

Weighbridges which are not protected against the effects of wind on the mechanism or the load, shall have no more than 3000 scale intervals or 3000 scale intervals for each platform if the instrument has multiple platforms.

*Note: The indicated maximum capacity may exceed the marked maximum capacity by up to 10 scale intervals.

TEST PROCEDURE No 6/108/0

1. All weighbridges should be tested in accordance with any test procedures specified in their approval documents.

2. Stability Test

Using a rolling test load corresponding to the heaviest and most concentrated load intended for use on the weighbridge, tests should be carried out by loading the platform longitudinally and where appropriate, transversely.

Each load bearing point should remain in contact and there should be no tilting of the structure.

2~~3~~. Multiple Platform Instruments

Where the weighbridge is comprised of more than one platform, each platform should be separately tested to its maximum capacity for 1 and 2 above.

3~~4~~. Additional Functions

Where the weighbridge has facilities for adding mass readings from separate platforms and/or performing other functions which produce an indication or ticket that is in use for trade then this equipment should be checked in accordance with General Certificate No S1/0.

6/10B/0
29/1/85

NATIONAL STANDARDS COMMISSION

Cert. No. 2

NOTIFICATION OF CHANGE

GENERAL CERTIFICATE OF APPROVAL No 6/10B/0

CHANGE No 1

The following changes are made to the approval documentation for

Electronic Weighbridges.

1. In the General Certificate dated 30/1/84:

   (a) On page 2, delete the asterisk (*) from the diagram and also the corresponding footnote.

   (b) On page 3, add an asterisk (*) adjacent to the heading "(ii) Dead Load ", and add the following footnote:

   * The design of the weighbridge shall ensure that the application of the maximum axle load at either end, or at transverse edges where applicable, shall not result in the loading on any cell being less than the minimum dead load.

2. In the Test Procedure dated 30/1/84, delete the Stability Test and renumber paragraphs 3 and 4 as 2 and 3 respectively.

Signed

Executive Director