

### **General Certificate of Approval**

### No 6B/0

#### Issued under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations

This is to certify that an approval for use for trade has been granted in respect of variants to the patterns of

#### Weighing Instruments for Static Loads of Not Less Than 100 kg

as described herein.

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

hay

..../2

#### FILING ADVICE

General Certificate of Approval No 6B/0 dated 30/5/88 is superseded by this Certificate, and may be destroyed.

The documentation for this approval comprises only this Certificate.

6B/0 13/3/92

General Certificate of Approval No 6B/0

#### DESCRIPTIVE ADVICE

This approval for use for trade has been granted in respect of variants to the patterns of

Weighing Instruments for Static Loads of Not Less Than 100 kg

as described herein provided that they comply with the descriptions and requirements of this Certificate of Approval, together with those of;

- (i) A Certificate of Approval for an instrument being a non-automatic weighing instrument for weighing static loads of not less than 100 kg, and
- (ii) Supplementary Certificates of Approval as required.

#### CONDITIONS OF APPROVAL

This approval was originally granted on 1/2/88 and re-approved on 14/2/92. This approval will expire in respect of new instruments on 1/3/98.

Instruments purporting to comply with this Certificate of Approval shall be marked NSC No 6B/0 in addition to any other required markings.

It is the applicant's (submittor's) responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the Commission and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with the Commission's Document 106.

All full load cell, lever/load cell or hopper weighing instruments submitted for initial verification (except those specifically excluded by clause 2.1) shall comply with the requirements of this Certificate.

It is the responsibility of the organisation installing or converting the weighing instrument, to supply the relevant documents (drawings, data and calculations), in accordance with the requirements of this Certificate, to the approving authority for the first instrument of each capacity of each design prior to verification to demonstrate that the design criteria of this General Certificate and of the Certificate of Approval for the instrument are met. The approval authorities are the National Standards Commission (in which case a statement of suitability of the instrument will be issued to the applicant) and the Trade Measurement authorities. If the documents are not submitted initially to the Commission, the applicant shall supply copies of the documents to the Commission for its records.

General Certificate of Approval No 6B/0	Pag
---	-----

Installation of a new weighing instrument and responsibility for marking the NSC approval number on the complete instrument prior to verification/certification, shall be by a person authorised by the organisation listed as the applicant (submittor) in the Certificate of Approval.

Responsibility for marking the NSC approval number on the converted instrument prior to verification/certification shall be by a person authorised by the organisation listed as the applicant (submittor) in the Conversion Certificate of Approval.

#### 1. DEFINITIONS

Approved Design - The pattern of the weighing instrument submitted to, and approved by, the Commission as reflected in the Certificate of Approval, and in the drawings and manuals provided at the time of approval or subsequently altered by variant.

Conversion - The process of changing from one category of weighing instrument (as per this General Certificate) to another.

Load Receptor - The part of the instrument designed to receive the load.

Hopper - A load receptor which may be of any shape in which a flowable material is weighed.

Mechanical Weighing Instrument - A weighing instrument in which the load receptor is supported on a mechanical lever system and the primary indication of mass is by a mechanical indicator.

Lever/load Cell Weighing Instrument - A weighing instrument in which the load receptor is supported on a mechanical lever system and the force is converted to an electrical output by a load cell or load cells, with the primary indication of mass being by a digital indicator.

Full Load Cell Weighing Instrument - A weighing instrument in which the load receptor is totally supported on load cells.

Load Cells - A force transducer which, after taking into account the effects of the acceleration due to gravity and air buoyancy at the location of its use, measures mass by converting the measured quantity (mass) into another measurable quantity (output). (NOTE: The force transducer may be electronic, hydraulic or any other form.)

Lever Ratio - The ratio of the load on the load receptor to the load applied to the load cell.

#### 2. SCOPE OF APPROVAL

#### 2.1 Scope

This approval covers those non-automatic weighing instruments, fitted with load cells and electronic indicators, with a maximum capacity of not less than 100 kg and which are designed to weigh static loads on or in a load receptor.

This approval permits minor changes in the manufacture of new instruments to the approved design, such as modifications to the length, width, material of construction of the load receptor and capacity (within the range/s specified in the Certificate of Approval). Any other modification constitutes a major change in design and therefore requires a variant to the Certificate for the instrument.

The scope of this General Certificate includes:

- . The manufacture of new weighing instruments of different sizes and capacities to the approved pattern.
- . The conversion of weighing instruments by the substitution of components.
- . The conversion of mechanical weighing instruments (including overhead track instruments) to lever/load cell instruments.
- . The compliance of the weighing instrument with its Certificate of Approval.
- . Checking that the components used for the instrument are installed correctly, and are within their approved criteria, in accordance with their Supplementary Certificates of Approval.

The scope of this General Certificate does NOT include:

- . The manufacture of an instrument using this General Certificate and Supplementary Certificates of Approval only, without a Certificate of Approval for a complete weighing instrument.
- . The manufacture of a mechanical weighing instrument.
- . The conversion of a mechanical or lever/load cell weighing instrument to a full load cell weighing instrument.
- . The conversion of a mechanical weighing instrument by change of capacity.

The manufacture or conversion of a full load cell type overhead track weighing instrument.

The manufacture or conversion of a full load cell type platform weighing instrument using a single load cell of the strain gauge or force balance type.

The manufacture, or conversion by change of capacity, of a mechanical indicating device.

#### 2.2 Applicable Categories of Instruments

Instruments submitted for verification/certification shall have an appropriate current Certificate of Approval, being either a Certificate for a complete weighing instrument or a Conversion Certificate (NSC No '6B/...'). There are five categories of weighing instruments which fall within the scope of this General Certificate:

#### 2.2.1 Full Load Cell (see clause 2.1 Scope)

This General Certificate permits the manufacture of new full load cell instruments within the capacity range(s) specified in the Certificate(s) for the instrument.

#### 2.2.2 Lever/load Cell

This General Certificate permits the manufacture of new lever/load cell weighing instruments within the capacity range(s) specified herein.

#### 2.2.3 Hopper (see clause 2.1 Scope)

This General Certificate permits the manufacture of new weighing instruments with a load receptor in the form of a hopper or tank within the capacity range(s) and designs (full load cell or lever/load cell or both) specified herein. Any conversion undertaken to manufacture a hopper from any other type of platform weighing instrument has the effect of creating a new (hopper) weighing instrument.

#### 2.2.4 Mechanical (see clause 2.1 Scope)

This General Certificate permits the conversion of a weighing instrument from mechanical to lever/load cell provided the applicant holds a Certificate of Approval with a variant for a lever/load cell instrument and with the appropriate capacity range(s).

#### 2.2.5 Conversion (see clause 2.1 Scope)

The Conversion Certificate (NSC No '6B/...') permits the conversion of any mechanical weighing instrument to a lever/load cell weighing instrument, or the replacement of load cell(s) or indicator on a lever load cell weighing instrument, or the replacement of an indicator on a full load cell weighing instrument, where the applicant does not possess a Certificate as in 2.2.1 to 2.2.4 above.

#### 2.3 Types of Certificates to be Held

An applicant shall hold a current Certificate of Approval for the pattern of a non-automatic weighing instrument for weighing static loads of not less than 100 kg. This may take the form of a pattern together with any or all of the following variants, as required:

- . a lever/load cell instrument;
- . a full load cell instrument;
- either of the above with a hopper type load receptor;
- various capacity ranges for each of the above, viz.

From 100 kg up to 1499 kg, From 1500 kg up to 14 999 kg, From 15 000 kg up to 149 999 kg, and 150 000 kg and above.

Alternately, the applicant may hold a Conversion Certificate which applies to all ever/load cell conversions of whatever capacity without the need for additional variants, however, this precludes manufacture of new instruments.

#### 2.4 Conversions of Instruments

Instruments for which the Certificate of Approval has been cancelled or which has expired may be converted under the provisions of this General Certificate.

2.4.1 Provided all other requirements of this Certificate are met, mechanical instruments may be converted to lever/load cell instruments of the same or lower capacity with the performance of the new instrument limited only by the load cell(s) or indicator used, provided that the complete instrument passes a verification test for the number of verification scale intervals specified on the new instrument.

- Instruments shall only be permitted to be converted to a higher capacity
- than that already marked on the data plate if the lever structure and load receptor can be shown to comply with the provisions of its Certificate of Approval for that higher capacity. In each case, explicit approval shall be obtained from the Commission where an increase in capacity is required.

An instrument converted in accordance with this clause is considered to be a new instrument, for which the person or organisation performing the conversion accepts full responsibility for the performance of the instrument at its new capacity.

For the purposes of this Certificate, an instrument marked 'M1' shall be 2.4.3 deemed to be approved under a Cancelled Certificate if it has previously been verified under that number, however, the Commission shall be notified of all such instruments as they come to light so that new '100 series' Certificates can be prepared as required.

242

- DESCRIPTION 3.
- 3.1 Components
- The relevant components which form part of the weighing instrument are: 3.1.1
  - Load receptor (a)
  - (b)
  - Lever mechanism (c)
  - Load cells (d)
  - (e) Indicators
- ) Approved in a Certificate of Lever/load cell mechanism ) Approval for an instrument

  - ) Approved in a Certificate of ) Approval for an instrument, or in a Supplementary Certificate
- instruments submitted for initial Components used in 3.1.2 verification/certification shall be constructed and used within the range(s) specified in the appropriate Certificate of Approval and in accordance with the calculations required by this Certificate.

#### Load Receptor 3.2

The load receptor shall be supported in such a way that it is stable, 3.2.1 whether empty or loaded.

- 3.2.2 Stays and stops may be fitted to limit the movement in any direction.
- 3.2.3 The load receptor may be of any shape or size. However, either;
  - (a) The design shall comply with the approved design in the Certificate of Approval, or
  - (b) Drawings and other details shall be provided, the calculations completed, and the suitability of the instrument determined by either the Trade Measurement authority or by the Commission.
- 3.2.4 The dead load of the load receptor shall be within the limits specified in clause 6.

#### 3.3 Lever/load Cell Mechanism

For lever/load cell instruments, additional transfer levers may be used as required to bring the load applied to the load cell within the limits specified in clause 6.

#### 3.4 Load Cells

The load cells either fully support the load receptor or are fitted to a Commission-approved lever system which supports the load receptor, in a manner approved in an appropriate Certificate of Approval for an instrument or in a Supplementary Certificate of Approval.

#### 3.5 Indicator

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

#### 4. WIND EFFECTS

Instruments which are not protected from the effects of wind on the instrument or on the load, shall have no more than 3000 scale intervals or 3000 scale intervals per platform if the instrument has multiple platforms.

Page 9

#### 5. MARKINGS

- 5.1 Instruments shall be marked as required by the Certificate of Approval, including the instrument serial number. Where components are being used which are covered by Supplementary Certificates, these NSC numbers shall be marked on a nameplate, either separately for each component or on a single nameplate attached to the digital indicator and shall include the marking 'NSC No 6B/0'.
- 5.2 Each component of the weighing instrument, including the load receptor but excluding the lever mechanism, shall be marked with the following information:

Manufacturer's name or mark Model number Serial number Maximum capacity (as applicable)

Additionally, where the component is separately approved in a Supplementary Certificate, and purports to comply with that Certificate, the Supplementary Certificate NSC number shall also be marked.

- 5.3 The load receptor and the instrument shall use the same serial number.
- 5.4 When an instrument is converted using this Certificate, the data from the original nameplate relating to the remaining component(s) shall be retained.
- 5.5 The nameplates shall be attached to the component(s)/instrument in a permanent fashion, or they may be attached by a lead & wire seal.

Where the nameplates on the components are not readily visible, without removing or dismantling a section of the instrument, a supplementary nameplate shall be provided on the instrument and shall bear the following additional information:

> Component identification, e.g. Load Cell, L/C, or similar NSC approval number Maximum capacity (as applicable)

#### 6. CALCULATIONS

To ensure compliance of the design of the instrument with the performance criteria of the Certificate of Approval of the components used, the following calculations are required to be made. Whenever there are any doubts over the results of the calculations, they should be sent to the Commission for advice. When multiples or submultiples of SI units are used, care should be taken to ensure that the correct conversion factor is also used.

#### 6.1 Dead Load

First determine the receptor dead load, e.g. length x dead load per unit length.

- (i) The dead load supported by each load cell in a full load cell instrument (i.e. receptor dead load/number of load cells) shall be not less than 1% of the capacity of that load cell.
- (ii) The force applied by the dead load to the load cell(s) of a lever/load cell instrument shall be not less than 2% of the capacity of the load cell(s). (Note that this force includes a contribution due to the mass of the levers (effective lever mass). While this value can be calculated, it is better to measure the force at the nose end of the lever system using a force balance. The larger of the values (measured or calculated) shall be used in subsequent calculations.)

6		
		-
C	~	_

#### 6.2 Loaded Capacity of the Load Cell(s)

The maximum capacity of the load cell(s) shall be greater than the load determined as follows:

(i) For 6 or more load cells: (\*)

Max. cap. of load cell <a>max. cap. of instrument + dead load K</a>

where K = (N-2)H/J (see Figure 1), where N = number of load cells



(ii) For up to 5 load cells or for hopper weighing instruments: (\*)

Max. cap. of load cell <a> max. cap. of instrument + dead load N</a>

where N = the number of load cells

(iii) For a lever/load cell instrument: (\*)

Max cap of load cell > max. cap. of instrument + dead load force to R the load cell (#) where R = the lever ratio

- (\*) For instruments where there is more than one load cell at each load support point, the maximum capacity of the "load cell" is the sum of the capacities of the load cells at the support point.
- (#) The larger of the values (measured or calculated) found in 6.1 (ii) shall be used.

6B/0 13/3/92

General Certificate of Approval No 6B/0

#### 6.3 Number of Verification Scale Intervals for the Instrument

This number is determined by dividing the maximum capacity of the instrument by the value of the verification scale interval marked on the instrument.

For a multiple-range or multi-interval instrument, the maximum capacity and the value of the verification scale interval of each individual weighing range or partial weighing range, are used.

The number of verification scale intervals for the instrument shall be not greater than the smallest of those specified in the appropriate Certificates of Approval for the various components and shall be not less than the minimum for the relevant class of instrument, see appropriate table in Document 100.

For a multiple-range or multi-interval instrument, special requirements apply between the minimum dead load output return for the load cell and the scale interval of the first range. Details of such instruments shall be submitted to the National Standards Commission for analysis.

#### 6.4 Minimum Value of Verification Scale Interval for the Load Cell

The minimum value of the verification scale interval (VSI) is given in the appropriate Certificate for the load cells, and shall satisfy the following:

Min. value of VSI < VSI for the instrument for the load cell  $R \sqrt{N}$ 

where N = the number of load cells R = the lever ratio of a lever/load cell type (Note: for a full load cell type, R = 1)

Page 13

#### 6.5 Minimum Sensitivity of the Digital Indicator (\*)

The approved minimum sensitivity (#) of the digital indicator shall satisfy the following:

excitation volts x load cell sensitivity x load ratio Minimum sensitivity (#) number of verification scale intervals for the instrument

where load ratio = maximum capacity of the instrument R x N x load cell capacity

> where N = the number of load cells used R = the lever ratio of a lever/load cell type (Note: for a full load cell type, R = 1)

- Certificates of Approval issued before 1/3/88, did not include the figures (\*) required for this parameter. They may either be obtained from the applicant's (submittor's) specifications or supplied by the applicant (submittor). In either case, the figures specified should be confirmed with the Commission.
- The units of voltage used for minimum sensitivity of the indicator and load (#) cell sensitivity should be the same i.e. either mV or  $\mu$ V.
- 6.6 Load Cell Impedance (\*)

The load cell impedance shall satisfy the following:

(a) Load cell impedance > min. load impedance to the indicator x N

Alternately, where the maximum excitation current is given;

(b) Load cell impedance > \_ excitation voltage x N maximum excitation current

where N = the number of load cells

Certificates of Approval issued before 1/3/88, did not include the figures (\*) required for this parameter. They may either be obtained from the applicant's (submittor's) specifications or supplied by the applicant (submittor). In either case, the figures specified should be confirmed with the Commission.



#### NOTIFICATION OF CHANGE

#### GENERAL CERTIFICATE OF APPROVAL No 6B/0

#### CHANGE No 1

The following change is made to the approval documentation for

Weighing Instruments for Static Loads of Not Less Than 100 kg.

In General Certificate No 6B/0 dated 13/3/92, clause **2.1** Scope is amended by replacing the first 'bullet' point on page 5 (which refers to overhead track weighing instruments) with the following:

The manufacture or conversion of a full load cell type overhead weighing instrument (with the exception that substitution of compatible digital indicators is allowed).

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

Sam-



#### NOTIFICATION OF CHANGE

#### GENERAL CERTIFICATE OF APPROVAL No 6B/0

#### CHANGE No 2

The following change is made to the approval documentation for

Weighing Instruments for Static Loads of Not Less Than 100 kg.

In General Certificate No 6B/0 dated 13 March 1992, section 2. SCOPE OF APPROVAL is amended by adding the following new subsection:

#### 2.5 Repair of instruments

For the repair of existing instruments, a load cell for which the approval has expired or has been cancelled in respect of new instruments may be replaced by a load cell of the same make, model and capacity, and marked with the original approval number, provided that that load cell and approval number appear on an appropriate list issued from time to time by the Commission.

Load cells for which the approval has been WITHDRAWN in respect of all instruments shall not be used as replacements and such cells shall be removed from use for trade.

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

( they



## **Notification of Change**

# General Certificate of Approval No 6B/0

## Change No 3

The following change is made to the approval documentation for

Weighing Instruments for Static Loads of Not Less Than 100 kg.

In General Certificate of Approval No 6B/0 dated 13 March 1992, the Condition of Approval referring to the expiry of the approval should be deleted.

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

6B/0 1 December 2000



### **National Standards Commission**

12 Lyonpark Road, North Ryde NSW

### **Notification of Change**

### **General Certificate of Approval No 6B/0**

### Change No 4

The following change is made to the approval documentation for

Weighing Instruments for Static Loads of Not Less Than 100 kg.

In General Certificate of Approval No 6B/0 dated 13 March 1992, clause **2.3 Types** of **Certificates to be Held** should be amended by changing the last paragraph to read, in part;

"... all lever/load cell or full load cell conversions of whatever capacity ..."

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.

6B/0 30 August 2002





## **National Standards Commission**

12 Lyonpark Road, North Ryde NSW

### **Notification of Change**

### **General Certificate of Approval No 6B/0**

### Change No 5

The following change is made to the approval documentation for the

Weighing Instruments for Static Loads of Not Less Than 100 kg.

In General Certificate of Approval No 6B/0 dated 13 March 1992, clause **6.1 Dead Load** does not need to be applied when the conversion comprises the replacement of a digital indicator on an overhead track weighing instrument.

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.

moSemett

6B/0 4 August 2006



Australian Government

National Measurement Institute

Bradfield Road, West Lindfield NSW 2070

# Notification of Change General Certificate of Approval No 6B/0 Change No 6

Issued by the Chief Metrologist under Regulation 60 of the National Measurement Regulations 1999

The following changes are made to the approval documentation for

Weighing Instruments for Static Loads of Not Less Than 100 kg.

In General Certificate of Approval No 6B/0 dated 13 March 1992, where the formulas or requirements in clauses 6.2, 6.4, 6.5 and 6.6 indicate a less than ('<') or greater than ('>') condition, these shall be changed to indicate less than or equal to (' $\leq$ ') or greater than or equal to (' $\geq$ ') condition, respectively.

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the *National Measurement Regulations 1999.*