Australian Government

National Measurement Institute

Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

No LM 6/14H/1

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

This is to certify that an approval for use as a legal measuring instrument has been granted in respect of the

Central Weighing Model Supaweigh 4000 Road Vehicle Weighing-In-Motion Instrument

submitted by Accuweigh Pty Ltd
3 Kurrara Street
Lansvale NSW 2166.

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use as a legal measuring instrument only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

Pattern approval has been granted with reference to the OIML Document *Draft Revision R134-1, marked "Draft submitted for CIML postal approval on 2005.02.22"* as the basis for performance testing. Approval of the equipment by overseas authorities has also been taken into account.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 October 2012, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked with approval number 'NMI LM 6/14H/1' and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) 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 document NMI P 106.

…./2

The National Measurement Institute reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

This approval shall NOT be used in conjunction with General Certificate No 6B/0.

Special Conditions of Approval:

For this type of instrument, the ability to perform (and continue to perform) within specified maximum permissible errors can depend substantially on characteristics of the weighing platform alignment and the level, flatness and stability of the approach and departure aprons.

It is the responsibility of the submittor to exercise control over any installation to ensure compliance with this approval and to ensure performance within the appropriate maximum permissible errors.

The ability to perform within specified maximum permissible errors can also depend on characteristics of the road vehicles being weighed (for example differing suspension systems, braking or acceleration during weighing can be detrimental to performance). Consequently instrument owners and users have a responsibility to ensure adequate maintenance of the road vehicles and to ensure that they are used without excessive braking or acceleration (otherwise maximum permissible errors may not be able to be met).

The submittor shall notify the National Measurement Institute in writing of each instrument purporting to comply with this certificate prior to it being installed for use as a legal measuring instrument.

DESCRIPTIVE ADVICE

Pattern: approved 4 September 2007

- A Central Weighing model Supaweigh 4000 road vehicle weighing-in-motion instrument.

Technical Schedule No LM 6/14H/1 describes the pattern.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No LM 6/14H/1 dated 26 November 2008
Technical Schedule No LM 6/14H/1 dated 26 November 2008 (incl. Test Procedure)
Figures 1 and 2 dated 26 November 2008

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

TECHNICAL SCHEDULE No LM 6/14H/1

Pattern: Central Weighing Model Supaweigh 4000 Road Vehicle Weighing-In-Motion Instrument

Submittor: Accuweigh Pty Ltd
3 Kurrara Street
Lansvale NSW 2166

1. Description of Pattern

A Central Weighing model Supaweigh 4000 road vehicle weighing-in-motion instrument (Figures 1 and 2) used to determine the axle loads and total mass of road vehicles when the vehicles are weighed in motion for legal purposes other than for trade measurement.

The Supaweigh 4000 system uses an axle weighing platform with approach and departure aprons which are flat and level. The instrument is approved for class 2 total vehicle weighing and class F axle weighing. The system has a maximum capacity (axle load) of 20 000 kg, minimum capacity (axle load) of 500 kg, and a scale interval for weighing-in-motion of 50 kg. The system provides a message to indicate when the vehicle is travelling above a satisfactory speed; this speed is approximately 3.2 km/h.

1.1 Weighing Platform

The Supaweigh 4000 system uses a SUPA120 Weighing Platform (Figure 1) which is 3000 mm wide and 730 mm long (in the direction of vehicle travel). The SUPA120 Weighing Platform uses four Thames Side – Maywood model T95 Class C3 load cells of 10 t maximum capacity which support the weighing platform.

The maximum capacity of the weighing platform is 20 000 kg.

1.2 Approach and Departure Aprons

The approach aprons to the weighing platform, and the departure aprons from it, can significantly affect the performance of the system – in particular, satisfactory weighing requires the apron surface to be in the same plane as the surface of the deck of the weighing platform and to be level and flat.

The aprons shall be concrete, and shall be level to within ±3 mm for at least 4 m on both the approach and departure sides of the weighing platform in the direction of travel; a transverse slope of up to 1 in 50 is acceptable. In addition to this the aprons shall comply with the manufacturer's recommendations in regard to their construction.

1.3 Indicator

The system uses a Supaweigh 4000 indicator (Figure 2) which receives signals from the weighing platform which it processes to determine the axle loads, and sums the axle loads to determine the total vehicle mass.

Where the instrument is unable to determine an axle load with sufficient accuracy according to its operating criteria, an error signal is displayed.

The instrument senses the first axle on the platform and then allows timing periods for weighing of the vehicle. If another axle is not sensed within a set period from the previous axle, the system considers that the last axle of the vehicle has passed and the total vehicle mass is determined by summing the axle loads (it is necessary at installation/commissioning of the instrument to adjust the operating criteria and timing periods to ensure satisfactory performance in the particular installation).

1.4 Display Check

A display check is initiated whenever power is applied.

1.5 Power Supply

The instrument operates from the mains AC power supply.

1.6 Printout

The printout resulting from each weighing shall include a sequence number and/or date and time, the vehicle identification, together with the individual axle load values and the total vehicle mass.

Note that where an error has occurred in the weighing, no axle loads or total vehicle mass may be printed – the vehicle identification may be printed together with an error indication.

1.7 Interfaces

The indicator may be fitted with interfaces for the connection of auxiliary and/or peripheral devices. Any interfaces shall comply with clause 5.3.6 of document NMI R76 (the basic intent of which is that it shall not be possible to alter weighing results via the interfaces).

Any measurement data output from the instrument or its interfaces shall only be used in compliance with Supplementary Certificate No S1/0/A (in particular in regard to the data and its format).

Indications other than the indications of measured mass (i.e. axle loads and total vehicle mass) displayed either on the indicator or on an auxiliary or peripheral device, are not considered to be approved under this certificate.

1.8 Vehicle Guide Devices

The system shall be provided with arrangements (e.g. bollards and kerbing) to ensure that all wheels of the vehicle pass fully over the load receptor (i.e. wheels or parts of the wheel cannot pass to the left or right of the platform).

Barriers or other traffic control methods (e.g. a one-way sign) shall be used to prevent vehicles travelling in the wrong direction (unless the instrument is verified for operation in both directions).

1.9 Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

1.10 Markings

Instruments carry the following markings:

Manufacturer's name or mark	Central Weighing Ltd
Importer's name or mark	Accuweigh Pty Ltd
Model designation	Supaweigh 4000
Serial number of the instrument	…..
Pattern approval mark	NMI 6/14H/1
Usage restrictions (#1)	• Not to be used to weigh liquid products
Accuracy class – Total mass of vehicle	2
Accuracy class – Single-axle load	F
Maximum capacity	*Max* = 20 000 kg
Minimum capacity	*Min* = 500 kg
Scale interval	*d* = 50 kg
Maximum operating speed	s_{max} = …..

(#1) Additional usage restrictions, such as limiting use according to types of vehicle for which the instrument has been verified/certified may also be required (e.g. air suspension vehicles only).

1.11 Sealing Provision

Provision is made for the calibration adjustments to be sealed by means of a 'Calibration Checksum' which changes whenever the calibration or configuration parameters are altered. Additional security is provided by means of a password which restricts access to calibration and configuration settings.

The value of the 'Calibration Checksum' may be accessed by pressing the 'clock' button (located at the top left side of the indicator) four times in quick succession. The display will show the 'Calibration Checksum' in the form "Checksum ….".

At verification/certification the 'Calibration Checksum' value shall be recorded on a destructible adhesive label attached to the instrument. It is therefore possible at any time to determine whether the calibration or configuration has been altered by comparing the 'Calibration Checksum' value with that recorded at the time of verification/certification.

In addition to the above, access within the indicator casing may be sealed by use of a lead and wire (or similar) type seal to restrict removal of one of the four screws which secure the front of the indicator.

TEST PROCEDURE

Note: (a) In the following, various accuracy classes and modes of operation are mentioned, some of which are not included in the Technical Schedule – it is not intended to imply that any additional accuracy classes or modes of operation are approved.

(b) In the following "verification" may be taken to refer to "verification or certification".

Static testing of the instrument shall be carried out in accordance with relevant tests specified in document NMI V 1 *Uniform test procedures for the verification, certification and in-service inspection of non-automatic weighing instruments* (some variations may be necessary due to the small size of the platform – e.g. for eccentricity testing). As can be seen in clause 2 below, the maximum permissible errors for accuracy classes 0.2, 0.5 and 1 correspond to the non-automatic weighing instrument accuracy class (III), and accuracy classes 2, 5 and 10 correspond to the non-automatic weighing instrument accuracy class (IIII).

In-motion testing shall be carried out in accordance with the procedures included in OIML Document *Draft Revision R134-1, marked "Draft submitted for CIML postal approval on 2005.02.22"*. If required a copy of this document may be obtained from the National Measurement Institute. The National Measurement Institute may also be able to provide additional material (e.g. a spreadsheet implementing calculations) to assist in carrying out testing.

The limits of error which apply are specified below. Note that this is closely based on the OIML Document *Draft Revision R134-1, marked "Draft submitted for CIML postal approval on 2005.02.22"* and that document shall be referred to for details regarding the application of the limits of error.

Limits of error

In the following, the maximum permissible errors and deviations specified apply as appropriate for the accuracy class of the instrument.

The maximum permissible errors and deviations specified for initial verification also apply to subsequent verification.

1. Weighing-in-motion

1.1 Single-axle load and axle-group load

The requirements in this sub-clause are only applicable to instruments to be used in applications where the single-axle load or axle-group load is required.

The limits of error applicable to single-axle loads and, if required, axle-group loads are as follows:

(a) For static reference single-axle loads of the two-axle rigid reference vehicle, the applicable limits of error are as specified in 1.1.1.

(b) For all other reference vehicle single-axle loads and axle-group loads, the applicable limits of error are as specified in 1.1.2.

1.1.1 Maximum permissible error for two-axle rigid reference vehicle

For the two-axle rigid reference vehicle, the maximum difference between the indicated single-axle load for in-motion tests and the conventional true value of the static reference single-axle load shall not exceed one of the following values, whichever is greater:

(a) the value from Table 1 rounded to the nearest scale interval; or

(b) 1*d* in the case of initial verification,
2*d* in the case of in-service inspection.

TABLE 1

Accuracy Class Single-axle load	Percentage of conventional true value of the static reference single-axle load	
	Initial verification	In-service inspection
A	±0.25%	±0.50%
B	±0.50%	±1.00%
C	±0.75%	±1.50%
D	±1.00%	±2.00%
E	±2.00%	±4.00%
F	±4.00%	±8.00%

1.1.2 Maximum permissible deviation (MPD) for all reference vehicle types except the two-axle rigid reference vehicle

For all reference vehicle types except the two-axle rigid reference vehicle, the maximum difference between any indicated single-axle load or, if required, any axle-group load recorded during in-motion tests and the corrected mean single-axle load or the corrected mean axle-group load, respectively, shall be one of the following values, whichever is greater:

(a) the value from Table 2 rounded to the nearest scale interval; or

(b) 1*d* × n in the case of initial verification,
2*d* × n in the case of in-service inspection.

Where n is the number of axles in the group, with n = 1 for single axles.

TABLE 2

Accuracy Class Single-axle load and axle-group load	Percentage of the corrected mean single-axle load or corrected mean axle-group load	
	Initial verification	In-service inspection
A	±0.50%	±1.00%
B	±1.00%	±2.00%
C	±1.50%	±3.00%
D	±2.00%	±4.00%
E	±4.00%	±8.00%
F	±8.00%	±16.00%

Note that for axle-group load, the deviation for automatic weighing shall be calculated:

(a) For weighing-in-motion instruments which determine and indicate the axle loads independent of single-axles or axle-groups:

− by summation of individual axle load errors in the particular axle-group.

(b) For weighing-in-motion instruments which automatically determine and indicate single-axle loads and axle-group loads separately:

− by the indicated axle-group load observed and recorded as appropriate, minus the corrected mean axle-group load as appropriate.

1.2 Maximum permissible error (MPE) for total mass of the vehicle

The maximum permissible error for total mass of the vehicle determined by in-motion weighing (the indicated total mass of the reference vehicles observed and recorded as appropriate, minus the conventional true value of the mass of the reference vehicle), shall be one of the following values, whichever is greater:

(a) the value calculated according to Table 3, rounded to the nearest scale interval; or

(b) 1d × the number of axles in the totalisation in the case of initial verification,
2d × the number of axles in the totalisation in the case of in-service inspection.

TABLE 3

Accuracy Class Total mass	Percentage of conventional value of total mass of the vehicle	
	Initial verification	In-service inspection
0.2	±0.10%	±0.20%
0.5	±0.25%	±0.50%
1	±0.50%	±1.00%
2	±1.00%	±2.00%
5	±2.00%	±4.00%
10	±5.00%	±10.00%

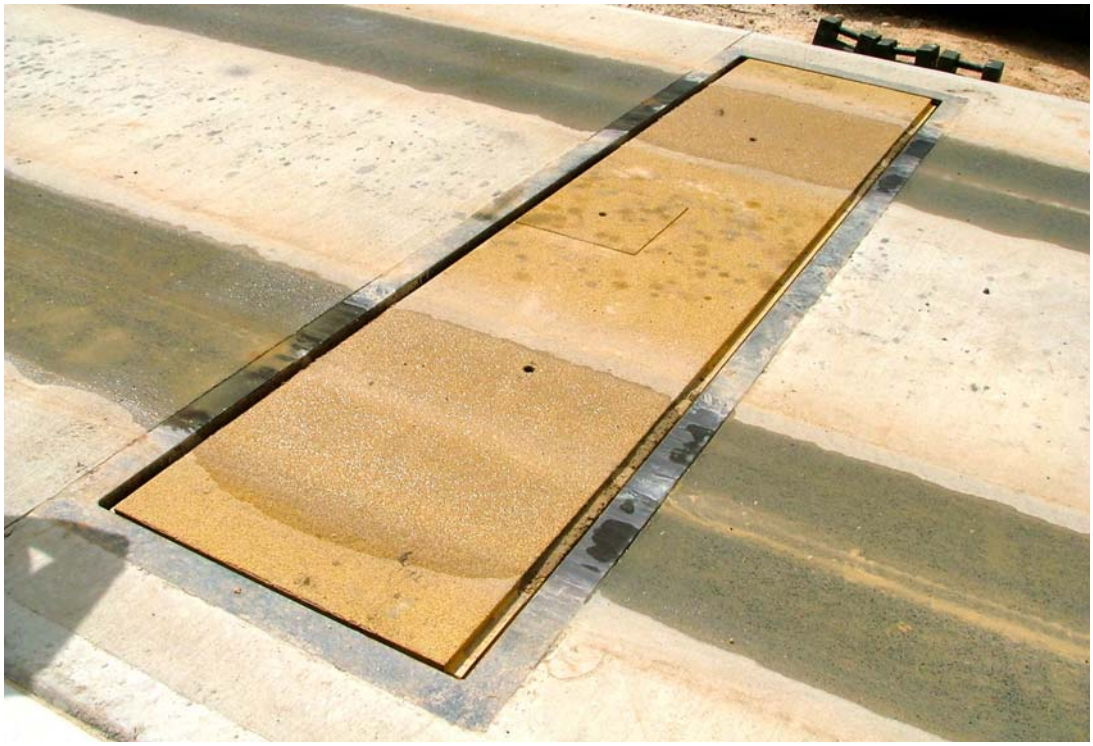
2. Static Weighing

The maximum permissible errors on static weighing for increasing or decreasing loads shall be the appropriate values in Table 4.

TABLE 4

Accuracy Class Total Mass	Load (m), expressed in scale intervals	Maximum permissible errors	
		Initial verification	In-service inspection
0.2 0.5 1	$0 \le m \le 500$	±0.5d	±1.0d
	$500 < m \le 2000$	±1.0d	±2.0d
	$2000 < m \le 5000$	±1.5d	±3.0d
2 5 10	$0 \le m \le 50$	±0.5d	±1.0d
	$50 < m \le 200$	±1.0d	±2.0d
	$200 < m \le 1000$	±1.5d	±3.0d

FIGURE LM 6/14H/1 – 1



(a) Platform

(b) Platform removed, showing load cell mounting arrangement

Central Weighing Model Supaweigh 4000 Weighing-In-Motion Instrument – Weighing Platform (SUPA120)

FIGURE LM 6/14H/1 – 2

Central Weighing Model Supaweigh 4000 Indicator