



Australian Government
Department of Industry,
Science and Resources

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/20A/11

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

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Trimble Model Loadrite E2750 Front Lift Wheeled Loader Weighing Instrument

submitted by Loadrite (Auckland) Limited
(formerly Trimble Europe B.V.)
45 Patiki Road
Avondale 1026
New Zealand

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade 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.

This approval has been granted with reference to document NMI R 51, *Automatic Catchweighing Instruments*, dated August 2009.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern and variant 1 approved – interim certificate issued	25/01/18
1	Pattern amended (validity & load cell) – interim certificate issued	8/05/18
2	Pattern amended (validity) – interim certificate issued	31/08/18
3	Pattern and variant 1 approved – certificate issued	21/11/18
4	Variants 2 & 3 approved – certificate issued	18/04/19
5	Pattern amended (Min) & variant 4 approved – certificate issued	24/06/19

Document History (cont...)

Rev	Reason/Details	Date
6	Submittor name & pattern amended – certificate issued	29/06/22
7	Test procedure amended & pattern amended (Loadrite model added) – certificate issued	29/07/22

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/20A/11' 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.

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

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 within the specified maximum permissible errors may be influenced by characteristics of the vehicle or lifting system to which it is fitted.

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

In the event of unsatisfactory performance this approval may be withdrawn.

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



Darryl Hines
Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 6/20A/11

1. Description of Pattern **approved on 25/01/18**
amended on 24/06/19
amended on 29/06/22
amended on 29/07/22

The Trimble model Loadrite E2750 class Y(b) automatic catchweighing instrument of 2200 kg maximum capacity with a verification scale interval of 10 kg fitted to a waste bin pick-up vehicle (Figure 1). The minimum capacity is 50 kg. Instruments may also be known as Loadrite model E2750.

Note: If used for other than the weighing of waste, the minimum capacity is 100 kg.

The system is intended for the determination of the net weight of the contents of a waste bin picked up by (emptied into) a waste bin pick up vehicle, to which the instrument has been fitted. A transaction will generally be the result of a weighing of the full waste bin, with the result of the weighing of the empty waste bin subtracted from this. The system may also be suitable for other similar applications.

The system operates in dynamic mode and is intended to only weigh whilst the vehicle is not moving, and a sensor/interlock to ensure this is provided.

Instruments may be fitted with output sockets (output interfacing capability) for the connection of auxiliary and/or peripheral devices.

1.1. Weighing Mechanism

The Trimble model Loadrite E2750 comprises two weigh arms mounted as part of the waste bin lifting mechanism at the front of the vehicle (Figure 1). Each arm incorporates a Flintec model PC3H (Figure 2a) load cell of 5000 kg maximum capacity.

In addition the two load cells are connected to an A/D Loadrite model LR980 CAN load cell interface module (Figure 2b).

The lifting mechanism includes a Loadrite model LR970 angle sensor (Figure 2c) to sense the movement and angle of the lifting mechanism and hence determine an appropriate 'weighing window' for the weight determination.

The system also includes a second Loadrite model LR970 angle sensor to compensate weight values for out-of-level conditions.

1.2 Weighing Calculator and Indicator

The Loadrite E2750 electronic computing, keyboard and display unit (Figure 3) has a liquid crystal display (LCD) on which the weighing results as well as instructions, alarm or error messages are displayed.

The load cells and other sensors are connected to a Trimble model E2750 weighing calculator, which utilises data from the sensors to determine the weight value.

1.3 Power Supply

The system is powered from the power supply of the vehicle (12 - 32 V DC).

1.4 Data Storage/Printout

The system may incorporate a data storage device. For each weighing request weighing results together with identification including date and time are stored into the storage device. Alternatively (or in addition) a printer may be provided for printout of a receipt/transaction record.

Any printout shall comply with the requirements of General Supplementary Certificate No S1/0B.

1.5 Interfaces

Instruments may be fitted with interfaces for the connection of auxiliary and/or peripheral devices. Any interfaces shall comply with clause 4.2.4 of document NMI R51 (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 for trade in compliance with Supplementary Certificate No S1/0B (in particular in regard to the data and its format).

Indications other than the indications of measured mass (i.e. gross, tare, net, totals) displayed either on the instrument or on an auxiliary or peripheral device, are not for trade use.

Instruments may be fitted with CAN Bus and a RS-232 serial data interface.

1.6 Additional Information Regarding System

The following is additional information regarding operation of the system.

- The system utilises information from a third Loadrite model LR970 angle sensor or Level Development model ETS-4 2-axis tilt switch attached to the vehicle, to prevent the weight determination where the degree of tilt exceeds ± 6 degrees.
- The system is intended to only weigh whilst the vehicle is not moving, and a sensor/interlock to ensure this is provided.
- Additional (optional) sensors may be provided (e.g. GPS location input or RFID tag reader).
- Instruments may be fitted with output sockets (output interfacing capability) for the connection of auxiliary and/or peripheral devices.

The system may have additional features, including a totalisation facility (accumulated net weight). Such features (other than the indications of measured net weight values – displayed either on the instrument's indicator or an auxiliary or peripheral device), are not approved for trade use.

1.7 Display Check

A display check is initiated whenever power is applied.

1.8 Verification Provision

Provision is made for the application of a verification mark.

1.9 Software

The software is designated version V2.xx.y, where xx.y represents the identification of non-legally relevant software.

The software version and number can be seen in the switch-on display sequence when the power is first applied to the instrument.

1.10 Sealing Provision

Provision is made for the calibration adjustments to be sealed.

- The angle sensors shall be sealed by using destructible adhesive labels to restrict any change in position or seal against adjustment (Figure 5a).

The load cells shall be sealed by recording the serials numbers in the E2750 to seal against replacement.

Evidence of alteration of the sensor is provided by an audit trail (Figure 5b).

Access to the audit trail may be obtained by the following procedure:

- ❖ Press the 'Menu' key.
 - ❖ Press an arrow key until the 'Diagnose' is displayed and then press the 'Enter' key to enter the Diagnose menu level.
 - ❖ Press an arrow key until the 'Serial #' is displayed and then press the 'Enter key'. The audit trail is displayed.
- The instrument is sealed by recording the event counter on verification.

Access to allow changing of set-up parameters including calibration parameters must be protected by a passcode.

The instrument automatically increments an event counter number each time the instrument is re-configured or calibrated.

The value of the event counter may be recorded on a destructible adhesive label attached to the instrument (eg, 'Cal No' followed by a number).

Any subsequent alteration to the calibration will be evident as the recorded value and the current counter value will differ.

The event counter number can be seen in the switch-on display sequence when the power is first applied to the instrument.

1.11 Descriptive Markings and Notices

Instruments carry the following markings:

Manufacturer's mark, or name written in full	Loadrite (Auckland) Limited #
Indication of accuracy class	Class Y(b)
Pattern approval number for the instrument	NMI 6/20A/11
Maximum capacity	<i>Max</i> kg *
Minimum capacity	<i>Min</i> kg *
Verification scale interval	<i>e</i> = kg *
Serial number of the instrument

- * These markings shall also be shown near the display of the result if they are not already located there.
- (#) 'Loadrite (Auckland) Limited' may also be shown as 'Trimble Europe B.V.'.

2. Description of Variant 1 **approved on 25/01/18**

The Trimble model Loadrite E2750 system as described for the pattern but having the maximum capacity of 2000 kg with a verification scale interval of 10 kg.

3. Description of Variant 2 **approved on 18/04/19**

The Trimble model Loadrite E2750 class Y(b) automatic catchweighing instrument which is similar to the pattern but fitted with a weighing module incorporating two Flintec model PC2H C3 single-point type load cells (Figure 8a) of 2000 kg maximum capacity mounted as part of the waste bin lifting mechanism at the rear of the vehicle (Figure 6).

The instrument is configured in a multi-interval arrangement with a verification scale interval e_1 of 2 kg up to 250 kg and a verification scale interval e_2 of 5 kg from 250 kg to 500 kg. The minimum capacity is 10 kg.

Note: If used for other than the weighing of waste, the minimum capacity is 20 kg.

3.1. Weighing Mechanism

The system with two load receptors (each with its own load cell) fitted to the same lifting mechanism mounted at the rear of the vehicle (Figure 6). The two load cells are connected to an A/D Loadrite model LR980 CAN load cell interface module (Figure 2b).

The lifting mechanism includes a Loadrite model LR970 angle sensor (Figure 2c) to sense the movement and angle of the lifting mechanism.

The system also includes a Level Development model ETS-4 2-axis tilt switch (Figure 8c) attached to the vehicle, to prevent the weight determination where the degree of tilt exceeds \pm up to 4 degrees.

The instrument may operate in weighing a single smaller bin using either of load receptors, or weighing a single larger bin utilising both load receptors (Figure 6).

4. Description of Variant 3 **approved on 18/04/19**

The Trimble model Loadrite E2750 class Y(b) automatic catchweighing instrument of 500 kg maximum capacity with a verification scale interval of 5 kg fitted to a waste bin pick-up vehicle (Figure 7a). The minimum capacity is 25 kg.

Note: If used for other than the weighing of waste, the minimum capacity is 50 kg.

4.1. Weighing Mechanism

The system having two Flintec model PC5H C3 single-point type load cells (Figure 8b) of 2000 kg maximum capacity mounted at the rear of the vehicle (Figure 7b).

The two load cells are connected to an A/D Loadrite model LR980 CAN load cell interface module (Figure 2b).

The lifting mechanism includes a Loadrite model LR970 angle sensor (Figure 2c) to sense the movement and angle of the lifting mechanism.

The system also includes a Level Development model ETS-4 2-axis tilt switch (Figure 8c) attached to the vehicle, to prevent the weight determination where the degree of tilt exceeds \pm up to 4 degrees.

5. Description of Variant 4

approved on 24/06/19

The Trimble model Loadrite E2750 class Y(b) automatic catchweighing instrument of 400 kg maximum capacity with a verification scale interval of 2 kg fitted to a waste bin pick-up vehicle (Figure 7a). The minimum capacity is 10 kg.

Note: If used for other than the weighing of waste, the minimum capacity is 20 kg.

5.1. Weighing Mechanism

The system having four Flintec model PC7H C2 single-point type load cells (Figure 10) of 1000 kg maximum capacity mounted at the rear of the vehicle (Figure 9a).

The four load cells are connected to an A/D Loadrite model LR980 CAN load cell interface module (Figure 2b).

The lifting mechanism includes a Loadrite model LR970 angle sensor (Figure 2c) to sense the movement and angle of the lifting mechanism.

The system also includes a Level Development model ETS-4 2-axis tilt switch (Figure 8c) attached to the vehicle, to prevent the weight determination where the degree of tilt exceeds \pm up to 6 degrees.

TEST PROCEDURE No 6/20A/11

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Note:

Instruments provide two individual weighings in 'Cal Test' mode; and gross and payload in 'Trade Approved' mode.

The maximum permissible errors apply to each individual weighing, gross and payload displayed and/or printed and/or recorded.

Application of National Instrument Test Procedure (NITP) 6.8 for Waste Bin Pick-Ups

Access to the 'Cal Test' mode is as follows:

- Press the 'Menu' key.
- Press an arrow key until the 'Diagnose' is displayed and then press the 'Enter' key to enter the Diagnose menu level.

- Press an arrow key until the 'Cal Test' is displayed and then press the 'Enter key'. The 'Cycle Test Bin' is displayed.

Loading Cycle in 'Cal Test' Mode

The loading cycle is applicable to all tests described in NITP 6.8 with the exception of zero setting and transaction record test and is comprised of two parts, a weighing on the way up and a weighing on the way down without emptying the load. The vehicle must remain stationary during the lifting and loading cycle.

The test load shall include a bin (of known weight) and standard weights or test objects (of known weight).

1. Set the instrument to zero.
2. Place the test load on the load receptor.
3. Lift the test load.
4. Lower the test load, and obtain indications up and down.
5. Record the indications up and down on the test report and determine if they are within MPE.
6. Repeat steps 2 to 5 four more times.

Note: For the tilting test only repeat steps 2 to 5 twice more.

Additional Weighing Performance Test in 'Trade Approved' Mode Other Than Variant 2

This test is mandatory and a standard loading cycle described in NITP 6.8 Clause 5.2 shall be followed. It can be completed in conjunction with the transaction record test described in NITP 6.8.

The test load shall include a bin (of known weight) and standard weights or test objects (of known weight).

1. Set the instrument to zero.
2. Place a load of 1/2 Max on the load receptor and complete a loading cycle at the normal lifting speed.
3. Record the gross and payload indications on the test report and determine if they are within MPE.
4. Repeat steps 2 to 3 four more times.
5. Place a load of between 1/2 Max and Max on the load receptor and complete a loading cycle at the normal lifting speed. If practical the load shall include the MPE change points (i.e. 50 e and 200 e).
6. Record the gross and payload indications on the test report and determine if they are within MPE.
7. Repeat steps 5 to 6 four more times.
8. Determine whether the instrument has **PASSED** or **FAILED**.

Additional Weighing Performance Tests for Variants 2 in 'Trade Approved' Mode

This test is mandatory and a standard loading cycle described in NITP 6.8 Clause 5.2 shall be followed. It can be completed in conjunction with the transaction record test described in NITP 6.8.

The test load shall include a bin (of known weight) and standard weights or test objects (of known weight).

1. Set the instrument to zero.
2. Place a load of $50 e_1$ on the load receptor and complete a loading cycle at the normal lifting speed.
3. Record the gross and payload indications on the test report and determine if they are within MPE.
4. Repeat steps 2 to 3 four more times.
5. Place a load of $1/2 \text{ Max}$ on the load receptor and complete a loading cycle at the normal lifting speed.
6. Record the gross and payload indications on the test report and determine if they are within MPE.
7. Repeat steps 5 to 6 four more times.
8. Place a load of between $1/2 \text{ Max}$ and Max on the load receptor and complete a loading cycle at the normal lifting speed. If practical the load shall include the MPE change points (i.e. $50 e_i$ and $200 e_i$).
9. Record the gross and payload indications on the test report and determine if they are within MPE.
10. Repeat steps 8 to 9 four more times.
11. Determine whether the instrument has **PASSED** or **FAILED**.

FIGURE 6/20A/11 – 1



Trimble model Loadrite E2750 Wheeled Loader Weighing Instrument (Pattern)

FIGURE 6/20A/11 – 2



(a) Flintec Model PC3H Load Cell



(b) Loadrite LR980 CAN Load Cell Interface

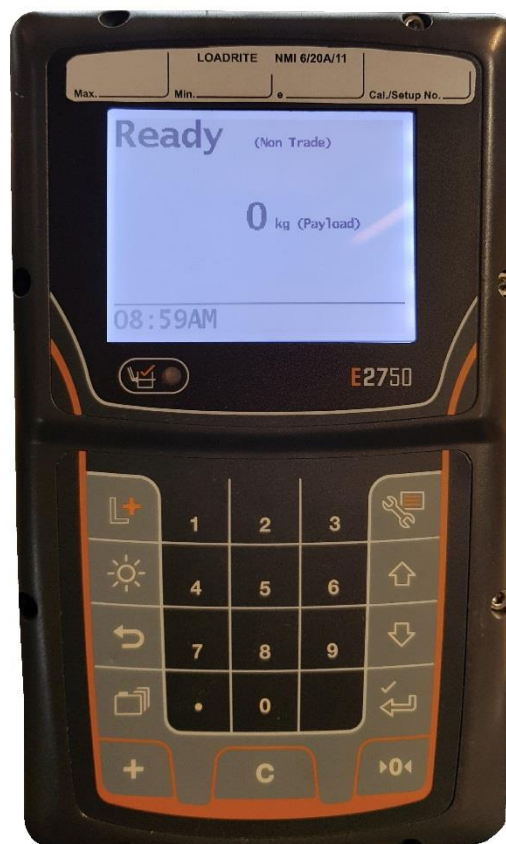


(c) Loadrite LR970 Angle Sensor



(d) Level Development Model ETS-4 Tilt Switch

FIGURE 6/20A/11 – 3



Loadrite E2750 Electronic Computing, Keyboard and Display Unit

FIGURE 6/20A/11 – 4



(a) Angle Sensor Located to Define Measuring Window



(b) Load Cell Installation

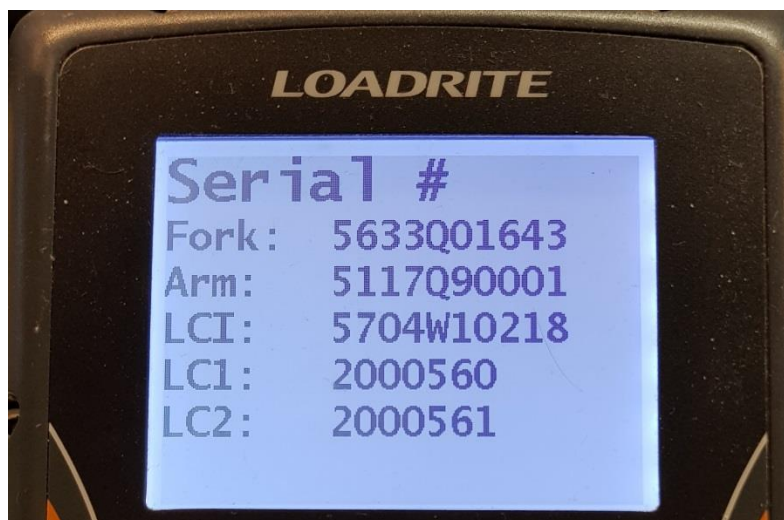


(c) Angle Sensor Located to Detect Out-of-Level Conditions

FIGURE 6/20A/11 – 5



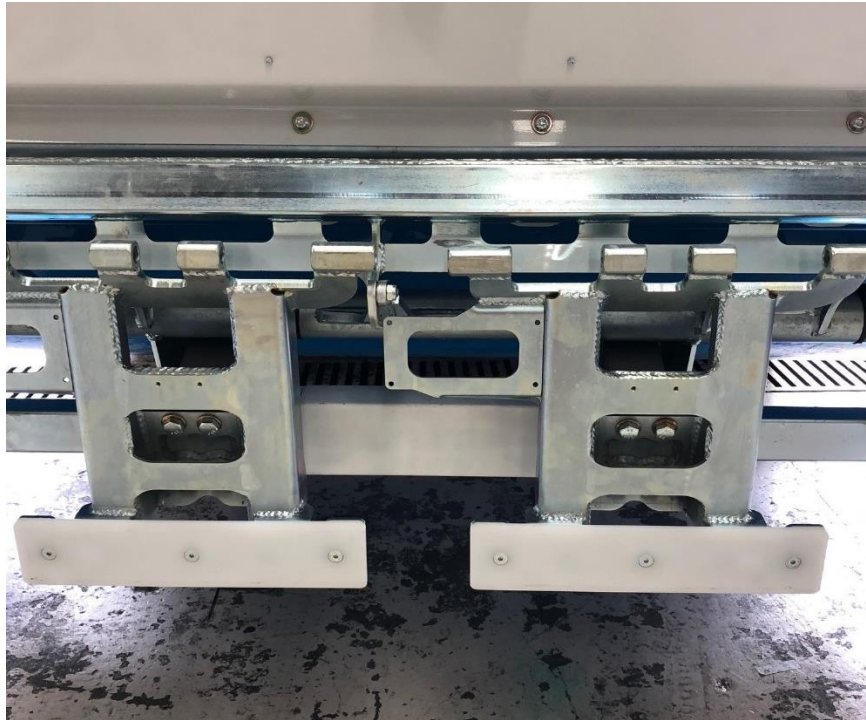
(a) Lead and Wire Type Seal



(b) Audit Trail

Sealing Arrangements

FIGURE 6/20A/11 – 6



Trimble model Loadrite E2750 Rear Lift Wheeled Loader Weighing Instruments
(Variant 2)

FIGURE 6/20A/11 – 7

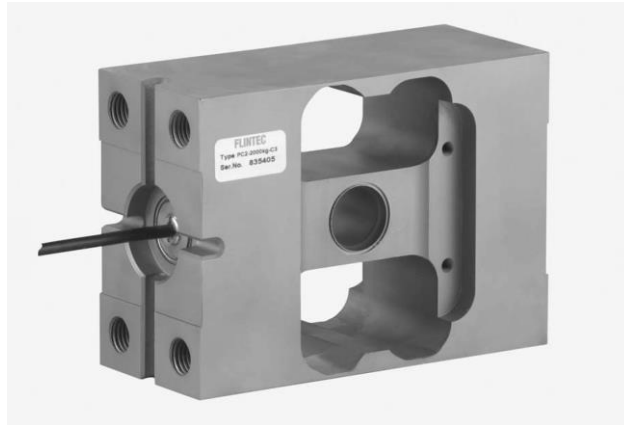


(a) Trimble model Loadrite E2750 Rear Lift Wheeled Loader Weighing Instruments (Variant 3)



(b) Load Cell Installation

FIGURE 6/20A/11 – 8



(a) Flintec Model PC2H Load Cell



(b) Flintec Model PC5H Load Cell



(c) Level Development model ETS-4 Tilt Switch

FIGURE 6/20A/11 – 9



(a) Trimble model Loadrite E2750 Rear Lift Wheeled Loader Weighing Instruments (Variant 4)



(c) Load Cell Installation

FIGURE 6/20A/11 – 10



Flintec Model PC7H Load Cell

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