



Australian Government
Department of Industry and Science

**National
Measurement
Institute**
**Interim
Certificate of Approval**
NMI 6/14D/16

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.

Active Weighing Solutions Model BWT2-0900 Belt Weighing Instrument

submitted by Total Engineering Systems Pty Ltd
Trading as Active Weighing Solutions
Unit 21, 41-49 Norcal Road
Nunawading VIC 3131

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 50, *Continuous totalising automatic weighing instruments (belt weighers), Parts 1 and 2*, dated July 2004.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern provisionally approved – interim certificate issued	8/09/15
1	Pattern approved – interim certificate issued	30/09/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/14D/16' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'NMI P6/14B/16' may be re-marked 'NMI 6/14B/16' but 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.

The values of the performance criteria (maximum number of scale intervals etc.) applicable to the instrument shall be within the limits specified herein and in any approval documentation for the components where they are approved separately.

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

Special: For the pattern and all variants

Instruments must comply with all calculations provided in the Test Procedure No 6/14D/16 attached herein.

TECHNICAL SCHEDULE No 6/14D/16

1. Description of Pattern provisionally approved on 8/09/15 approved on 30/09/15

An Active Weighing Solutions model BWT2-0900 Class 1 belt conveyor weigher of 20 t/h maximum flow rate, approved for use over a flow rate range of 20% to 100% of maximum flow rate.

The instrument is approved with a weigh length of 1.6 m, a belt width of 0.9 m, and a belt speed of 0.11 m/s.

Means shall be provided to ensure that the conveyor cannot move in the reverse direction.

1.1 Basework (Weighframe)

The model BWT2-0900 weigh frame consists of 2 support members and 1 weighing module suspended at each corner by an AND model LCM13K load cell. The weighing module (Figure 1) carries 2 idler roller frames to transfer the load from the conveyor belt to the weighing module. Load is transferred to the load cells through a flexure at each corner.

Four AND model LCM13K100 load cells of 100 kg capacity are used. The load cells are also described in the documentation of approval NMI S446.

The weighing modules may be installed at an incline of up to 5° from horizontal providing there is no relative movement between the product and the conveyor belt.

1.2 Belt Speed Sensor

Belt speed is sensed by a SICK model DFS60 rotary encoder.

1.3 Computing and Totalising Unit

An EMC model Modweigh integrator/totaliser is used, including being sometimes housed in an additional cabinet.

The integrator/totaliser comprises:

- 1) EMC MD1 display
- 2) EMC MT1 transmitter
- 3) EMC MR1 I/O module
- 4) EMC MW95A/MW96A P module

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

Instruments may be fitted with RS-232/RS485 serial data interface and digital/analogue outputs.

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

1.4 Power Supply

The instrument is powered by a Mean Well model DR-4524 AC/DC, 24 V DC output, mains power supply unit.

1.5 Software

The software is designated 6 xx r yy where xx and yy refer to the identification of non-legally relevant software.

1.6 Descriptive Markings

The instrument carries the following markings, grouped together in a clearly visible Instruments are marked with the following information, on one or more permanently attached nameplates:

Manufacturer's mark, or name written in full
Indication of accuracy class	Class 1 or Class 2
Type designation (model number) of the instrument
Serial number of the instrument
Pattern approval number for the instrument	NMI 6/14D/16
Maximum flow rate	$Q_{max} = \dots \text{ kg/h or t/h}$
Minimum flow rate	$Q_{min} = \dots \text{ kg/h or t/h}$
Minimum totalised load	$\Sigma_{min} = \dots \text{ kg or t}$
Maximum capacity of the weighing unit	Max = kg or t
Totalisation scale interval	d = kg or t
Belt speed	v = m/s
Weigh length	L = m
Temperature range	-10°C / 40°C
Designation of product(s) to be weighed (if not fixed by installation conditions)

In addition to the above markings the instrument shall bear the inscription:

‘Zero testing shall have a duration of at least ... revolutions’.

The number of revolutions in this statement shall be a whole number of revolutions (at least one) and of a duration as close as possible to 3 minutes.

2. Description of Variant 1 **approved on 30/09/15**

The pattern and variants as Class 2 belt weighers.

3. Description of Variant 2 **approved on 30/09/15**

The pattern or variants of Class 1 or 2, with various maximum and minimum flow rates, with weighframes of various capacities using NMI approved load cells of various capacities.

Instruments may be of various weigh lengths, and with various belt speeds.

The minimum flow rate shall be not less than 20% of the maximum flow rate.

Included in the Test Procedure below is a set of calculations which should be used to determine the suitability of the load cells in a particular belt weigher.

TEST PROCEDURE No 6/14D/16

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*.

The maximum permissible errors for belt weighers are:

Class 1:	±0.5%
Class 2:	±1.0%

CALCULATIONS

1. Load cell(s) – number of verification intervals

Class 1:	$n_{\max} \geq 1000$
Class 2:	$n_{\max} \geq 500$

2. Load cell(s) – capacity

$$E_{\max} \geq \frac{Max + DL}{N \cdot r}$$

3. Temperature effect on the minimum load on the load cell(s)

Class 1:	$v_{\min} \leq \frac{0.0005 \cdot Max}{r \cdot \sqrt{N}}$
Class 2:	$v_{\min} \leq \frac{0.001 \cdot Max}{r \cdot \sqrt{N}}$

where:

E_{\max} = Maximum capacity of the load cell(s)

Max = Capacity of the weighframe at maximum flow rate

$$= \frac{Q_{\max} \cdot L}{V}$$

DL = Dead load of weighframe

N = Number of load cells supporting weighframe

r = Lever ratio ($r = 1$ if system does not use levers)

L = Weigh length

V = Belt speed

Q_{\max} = Maximum flow rate

v_{\min} = Minimum value of verification interval for the load cell(s)

n_{\max} = Maximum number of verification intervals for the load cell(s)

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



Dr A Rawlinson

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