Australian Government

Department of Industry, Science,
Energy and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

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.

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 provisionally approved – interim certificate issued	8/09/15
1	Pattern & variants 1 & 2 approved – interim certificate issued	30/09/15
2	Pattern & variants 1 & 2 approved – certificate issued	7/03/17
3	Variant 3 approved - certificate issued	2/11/18
4	Variant 4 approved - certificate issued	5/11/18
5	Variant 5 provisionally approved – certificate issued	05/08/20
6	Variants 5 & 6 approved – certificate issued	19/07/21

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 P6/14D/16' may be re-marked 'NMI 6/14D/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 variant 5

This approval is limited to two (2) instruments located at 770 Abernethy Road, Forrestfield WA 6058.

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 6/14D/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 weighframe 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 (Figure 2).

1.3 Computing and Totalising Unit

An EMC model Modweigh integrator/totaliser is used (Figure 3a), including being sometimes housed in a field enclosure (e.g. Figure 3b).

The integrator/totaliser comprises:

1)   EMC MD1 display

2)   EMC MT1 transmitter (Figure 3c)

3)   EMC MR1 I/O module (Figure 3d)

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   Verification Provision

Provision is made for the application of a verification mark.

1.6   Sealing Provision

The instrument is sealed by recording the event counters on verification.

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

The instrument automatically increments a configuration and/or calibration value each time the instrument is re-configured and/or calibrated.

The value(s) of these counters shall be recorded on a destructible adhesive label attached to the instrument (e.g. as CVCxxx).

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

The counter(s) can be accessed by pressing and holding the decimal point key from the normal weighing mode.

1.7   Software

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

The software versions and numbers can be seen in the switch-on display sequence (when power is first applied to the instrument).

1.8   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
Type designation (model number) of the instrument	……….
Serial number of the instrument	……….
Pattern approval mark for the instrument	NMI 6/14D/16
Maximum flow rate	Q_{max} =……. kg/h or t/h
Minimum flow rate	Q_{min} =……. kg/h or t/h
Minimum totalised load	$\sum_{min}$ =…….. 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 this Technical Schedule is a set of calculations which should be used to determine the suitability of the load cells in a particular belt weigher.

4.   Description of Variant 3   approved on 2/11/18

The pattern or variants may be installed at an incline of up to 10º from horizontal providing there is no relative movement between the product and the conveyor belt.

5.   Description of Variant 4   approved on 5/11/18

The pattern or variants with a BWTx-yyyy (#) series weighframe fitted with from two to eight idler rollers, where:

   x represents the number of idler rollers; and

   yyyy represents the belt width in mm.

The conveyor may be installed at an incline of -12° to +10° from horizontal providing there is no relative movement between the product and the conveyor belt.

6.   Description of Variant 5   provisionally approved on 05/08/20
                                                                              approved on 19/07/21

The model BWT4-0800 class 1 belt conveyor weigher is installed with the conveyor moving in two directions.

Means shall be provided to ensure that totalisation shall be disabled when the conveyor moves in the reverse direction.

The instrument is provided with an additional remote indicator which is able to display the accumulated total.

This approval is limited to two (2) instruments located at 770 Abernethy Road, Forrestfield WA 6058.

7.   Description of Variant 6   approved on 19/07/21

The pattern or variants may be provided with an additional remote indicator which is able to display the accumulated total.

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 0.5: ±0.25%
Class 1: ±0.5%
Class 2: ±1.0%

CALCULATIONS

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

    Class 0.5: $n_{max} \geq 1500$

    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 0.5: $v_{min} \leq \dfrac{0.00025 \cdot Max}{r \cdot \sqrt{N}}$

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

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

where:

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

Max = Capacity of the weighframe at maximum flow rate

$\qquad = \dfrac{Q_{max} \cdot L}{V}$

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
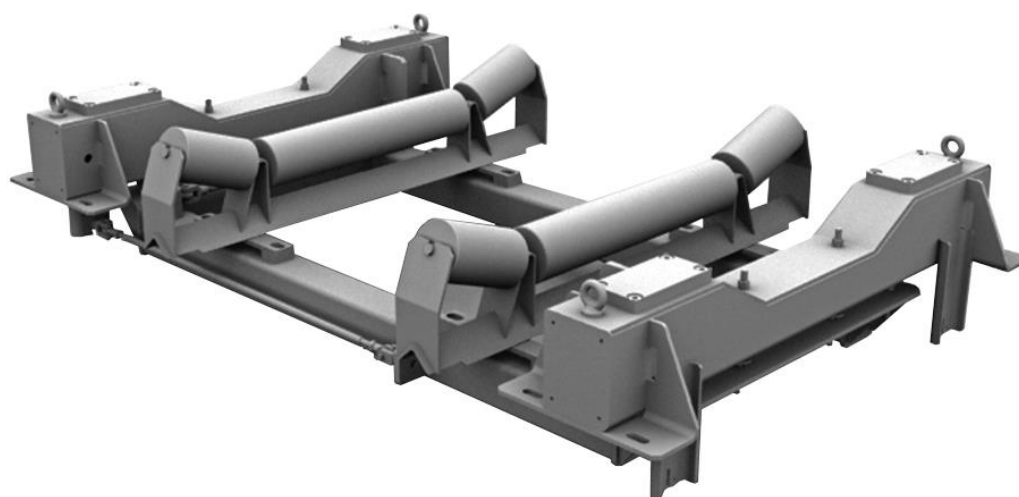
V = Belt speed

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)

FIGURE 6/14D/16 – 1

Active Weighing Solutions Model BWT2-0xxx Weighing Module

FIGURE 6/14D/16 – 2

SICK Model DFS60E Rotary Encoder (Speed Sensor)

FIGURE 6/14D/16 – 3

(a) EMC Modweigh Display Model MD1

(b) EMC Model Modweigh Integrator in a Field Enclosure

(c) EMC Modweigh Transmitter Model MT1 with P Module

(d) EMC Modweigh I/O Module Model MR1

~ End of Document ~