Australian Government
Department of Industry, Science and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/14B/20

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 IPW800A Discontinuous Totalising Automatic Weighing Instrument

submitted by Dynamic Weighing Consulting Pty. Ltd.
T/A Dynamic Weighing
Suite 120, 139 Cardigan Street
Carlton VIC 3053

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 107, *Discontinuous Totalising Automatic Weighing Instruments (Totalising Hopper Weighers)*, 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	16/12/10
1	Pattern approved – certificate issued	26/05/11
2	Pattern updated – certificate issued	2/03/12
3	Pattern amended (submittor & brand names) & figure captions & test procedure updated & review date removed – certificate issued	06/06/25

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with approval number ‘NMI 6/14B/20’ and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked ‘NMI P6/14B/20’ may be re-marked ‘NMI 6/14B/20’ but only by persons authorised by the submittor.

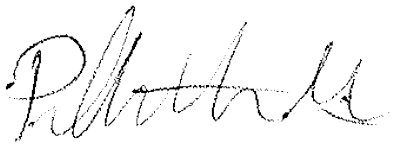
It is the submittor’s responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this 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 Certificates No S1/0/A or 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

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



Phillip Mitchell
A/g Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 6/14B/20

1. Description of Pattern

approved on 25/05/11
amended on 06/06/25

An Active Weighing Solutions model IPW800A Class 0.5 discontinuous totalising automatic weighing (DTAW) instrument (Figures 1 and 2) having a weigh hopper of 300 kg maximum capacity. May also be known as a Dynamic Weighing discontinuous totalising automatic weighing instrument of the same model.

The instrument is installed in a permanently fixed location.

Note: This approval has been granted with reference to document NMI R 107, *Discontinuous Totalising Automatic Weighing Instruments (Totalising Hopper Weighers)*, dated July 2004. The following description is intended to introduce terms used in this Certificate and Technical Schedule which may be additional to those in that document but which are consistent with the terminology in the document.

The system aims to provide a *bulk load delivery* using a particular automatic *delivery sequence* (the term 'delivery' may also be taken to refer to 'receipt').

This sequence involves the totalisation of the results of a number of *discrete load deliveries* or *weighing cycles*, each of which involves the division of the bulk product into *discrete loads*, according to a *target discrete load* the mass of which is then determined by weighing to give the *discrete load delivered* following which the product is discharged to the bulk output. Note that the *target discrete load* may be achieved by stopping or slowing the bulk product delivery prior to the *target discrete load* value being reached according to *discrete load target shutoff adjustments* (such as inflight adjustments or slow flow pre-sets).

Each *discrete load delivered* is totalised (at any time this may be termed the *cumulative totalisation*).

The *target discrete load* is generally a pre-selected value that is the same for most of the *discrete load deliveries* (this may be termed the *pre-selected target discrete load*). However for the final one or two deliveries in the *bulk load delivery* the *target discrete load* may differ (for example to avoid excessively large or small *discrete loads*). In addition, arrangements for stopping or slowing the bulk product delivery prior to the *target discrete load* value being reached may vary for the final discrete deliveries in the delivery sequence according to *target totalised load shutoff adjustments* (such as inflight adjustments or slow flow pre-sets).

The *totalised bulk load delivered* may be intended to be close to a requested amount (*target totalised load*) in which case adjustments and pre-sets as described above may be used to achieve this as closely as possible.

Alternatively the *totalised bulk load delivered* may be the quantity measured without a particular target totalised load.

The *totalised bulk load delivered* is the cumulative totalisation (sum of all discrete loads delivered), in the complete *bulk load delivery*. The transaction is based on the *totalised bulk load delivered* (not the *target totalised load*).

1.1 Details

The IPW800A instrument is a Class 0.5 discontinuous totalising automatic weighing instrument having a weigh hopper with a maximum capacity of 300 kg.

The instrument is approved for use with a minimum totalised load (Σ_{min}) of not less than 1000 kg and a totalisation scale interval of 0.1 kg. The instrument is set to have a *target discrete load* of 200 kg only.

The IPW800A instrument prints the *totalised bulk load delivered* and may also print the net value of each discrete load delivered.

Note: The discrete load values are NOT approved for trade use. The totalised bulk load delivered (a total of the discrete load delivered values) is the value approved for trade use.

1.2 Weighing System

The pattern (Figures 1 to 5) comprises components as described below.

(*) For items marked (*) below, 'Compatible and Equivalent' equipment may be used. 'Compatible and Equivalent' refers to equipment of the same or better specifications, requiring no changes to software for satisfactory operation of the complete system including all checking facilities.

(a) A weigh bin with out-feed gate, incorporated into a platform using four A & D Australasia model LCM13K200 load cells of 200 kg maximum capacity, mounted as shown in Figures 1 and 2 (the load cells are also described in the documentation of approval NMI S446). The platform is a modified A & D Australasia model ELP3000 instrument also described in the documentation of approval NMI 6/9C/220B.

(b) An A & D Australasia model AD-4401 digital indicator for the weighing system (the digital indicator is also described in the documentation of approval NMI S362).

(c) An electronics cabinet (Figure 3) which houses the AD-4401 digital indicator and also contains an Omron model ZEN-CP1L (*) logical relay controller (having functionality similar to a programmable logic controller).

(d) A system totalisation computer (model TPC-1070H having a touch screen interface, Figure 3) (*) which utilises the weight readings from the AD-4401 digital indicator to determine the discrete load values and totalises them to determine the *totalised bulk load delivered*.

(e) A printer (to print transaction data), or equivalent record in electronic form.

(f) Actuators and associated position sensors to control the product in-feed and the out-feed gates for the weigh bin.

1.3 Indicator and Computer Control

The Omron logical relay controller, in conjunction with the AD-4401 digital indicator, controls the weighing sequence, including checking of various aspects of the system operation (blocked chutes, gates open or closed as appropriate) and filling of the weigh-bin by starting and stopping of product flow (opening and closing of in-feed and out-feed gates) according to messages from the plant operator's control system.

The Omron logical relay controller and the AD-4401 digital indicator also use inputs from the system to determine when no further product delivery is required (e.g. when the in-feed bin is empty, the out-feed bin is full, or sufficient product has been supplied). In some cases these inputs may be provided by the plant operator's control system (e.g. to indicate that sufficient product has been supplied).

Weight data from the AD-4401 digital indicator is provided to the system totalisation computer when the weigh-bin is full (loaded) and following its emptying as shown in Figure 4. The system totalisation computer uses this information with the Active Weighing/Dynamic Weighing model PCIPW version 1.0 software to determine the discrete load values and totalise them to determine the *totalised bulk load delivered*.

Where sufficient product has been supplied, the system control computer finalises the delivery and totalises the discrete load deliveries to form the *total bulk load delivered* value. The system control computer then formats the output and prints the results (this information is also provided to the plant operator's system).

1.4 Operation

An overview of the sequence of operation of the system is shown in Figure 5.

The system is considered to be a discontinuous totalising automatic weighing instrument as it follows a predetermined program of automatic processes characteristic of the instrument, and weighs the bulk product by dividing it into discrete loads, which are each weighed, and delivers them to bulk.

The system is connected to the plant operator's control system and utilises signals from that system to determine when product is required by the plant operator (known as Product Required or Client System ON signal), and when product is available to be delivered (known as Product Ready or Client Start Signal).

(a) Initially the target discrete load (set-point) is set in the AD-4401 indicator (generally this will be a fixed value and will not vary between deliveries).

When the system receives a signal from the plant operator's control system that product is required by the plant operator, the system performs an initial check that the system is ready to operate (gates are closed, no 'blocked chute' signal, etc).

The system then waits for the Client Start Signal from the plant operator's control system (indicating that product is available to be measured), and a stable signal from the AD-4401.

(b) The system will commence filling the weigh hopper (open in-feed gate) until the set-point (target discrete load value) is reached. However the status of the Client Start Signal from the plant operator's control system is also monitored as absence of this signal will indicate that product is not available for measurement, in which case the set-point cannot be reached, and the delivery will be finalised.

(c) Once the weigh bin is full (or no further product is available), the in-feed gate will be closed and the system waits for a stable weight signal, and takes a weight reading for the loaded weigh bin.

(d) The product is then discharged (out-feed gate opened). Following this the out-feed gate will be closed and the system will wait for a stable weight signal. Weight readings for the empty weigh bin will then be taken.

(e) The gross weight value for the loaded bin at (c), minus the gross weight value for the empty bin at (d) is the discrete load delivered from the weigh bin. This can then be added to values of previous cycles to provide a cumulative totalised load.

(f) If the Product Required (Client System ON signal), and Product Ready (Client Start Signal) are present – indicating that further product is required, and is available to measure – the system will repeat the sequence from (b) to (e).

(g) If either the Product Required (Client System ON signal), or Product Ready (Client Start Signal) are NOT present – indicating that no further product is required, or that no further product is available to measure – the system will finalise the delivery and print a delivery report, or provide an equivalent electronic record. Figure 4b shows typical reports.

Note: The operation sequence incorporates a facility to ensure that the totalised bulk load delivered value does not change whilst delivery of product to the instrument is interrupted.

1.5 Verification Provision

Provision is made for the application of a verification mark.

1.6 Sealing Provision

Provision is made for the calibration adjustments in the AD-4401 indicator to be sealed by means of the sealing screw and pin on the front panel of the indicator (as described in the documentation of approval NMI S362).

1.7 Descriptive Markings and Notices

(a) Instruments carry the following markings, grouped together in a clearly visible place on the instrument, either on a descriptive plate fixed near the indicating device or on the indicating device itself:

Manufacturer's mark, or name written in full	Dynamic Weighing Consulting Pty. Ltd. #
Indication of accuracy class	0.5
Pattern approval mark for the instrument	NMI 6/14B/20
Model number	IPW800A
Serial number	.....
Maximum capacity	*Max* = 300 kg *
Minimum capacity	*Min* = 200 kg *
Minimum totalised load	Σ_{min} = 1000 kg *
Totalisation scale interval	d_t = 0.1 kg
Serial number of the instrument	.....
Material to be measured	.....

(*) These markings shall also be shown near the display of the result if they are not already located there.

(#) 'Dynamic Weighing Consulting Pty. Ltd.' may also be known as 'Total Engineering Systems Pty Ltd', 'Active Weighing Solutions', or 'Dynamic Weighing'.

(b) Instruments carry a notice visible to the operator stating TARGET DISCRETE LOAD SHALL BE 200 kg ONLY, or similar wording.

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

Where a specific National Instrument Test Procedure for DTAWI does not exist, an appropriate test procedure (e.g., Inspectors Handbook Test Procedure No 22) shall be used and a copy of Test Procedure No 22 should be requested from NMI.

Maximum Permissible Errors

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

Application of Inspectors Handbook Test Procedure No 22 Clause 5.2

Weighing Performance Tests

The following test procedure assesses the weighing performance of the DTAWI with the type of material that it is intended to weigh. The performance tests shall be carried out in accordance with *separate verification method* only.

A minimum of 3 material weighing tests is required as specified below.

Maximum Target Discrete Load

This test procedure assesses the weighing performance operating with maximum target discrete loads.

1. Determine the number of weighing cycles required to deliver the minimum totalised load (Σ_{min}) when operating with maximum target discrete loads (Max_T) as follows:

$$N_{Max} = \frac{\Sigma_{min}}{Max_T}$$

where N_{Max} is rounded up to the next integer.

2. Perform a weighing test with a target discrete load of Max_T and a target totalised load of Σ_{min}.
3. If N_{Max} is less than 5, perform an additional material weighing test with a target discrete load of Max_T and a target totalised load of $5 \times Max_T$.

Minimum Target Discrete Load

This test procedure assesses the weighing performance operating with minimum target discrete loads.

1. Determine the number of weighing cycles required to deliver the minimum totalised load when operating with minimum target discrete loads (Min_T) as follows:

$$N_{Min} = \frac{\Sigma_{min}}{Min_T}$$

where N_{Min} is rounded up to the next integer.

2. Perform a weighing test with a target discrete load of Min_T and a target totalised load of Σ_{min}.

3. If N_{Min} is less than 5, perform an additional weighing test with a target discrete load of Min_T and a target totalised load of $5 \times Min_T$.

Additional Test

In some cases the above procedure may indicate only two tests to be performed. To achieve three material tests in total, perform an additional weighing test with target totalised load of Σ_{min} and a target discrete load value which is standard or typical for the installation. If it is difficult to arrive at a standard value then use Min_T.

Note: For some types of instruments the quantity delivered (target totalised load) must be an integer multiple of the discrete load. In this case unless the minimum totalised load is an integer multiple of the discrete load, it may be necessary to use the next larger possible test load (which is an integer multiple of the discrete load).

Additional tests with other products

Where the instrument is used with products of different characteristics, additional tests shall be carried out for the range of products used.

Test with interrupted delivery

Carry out a test in which the delivery of product to the system is interrupted (e.g. by manually ceasing delivery of product to the system). The instrument shall be left operational during this interruption, with the time period of the interruption being 5 minutes. During this interruption the indications of the instrument shall be observed to ensure that the totalised bulk load delivered does not change whilst the product delivery is interrupted.

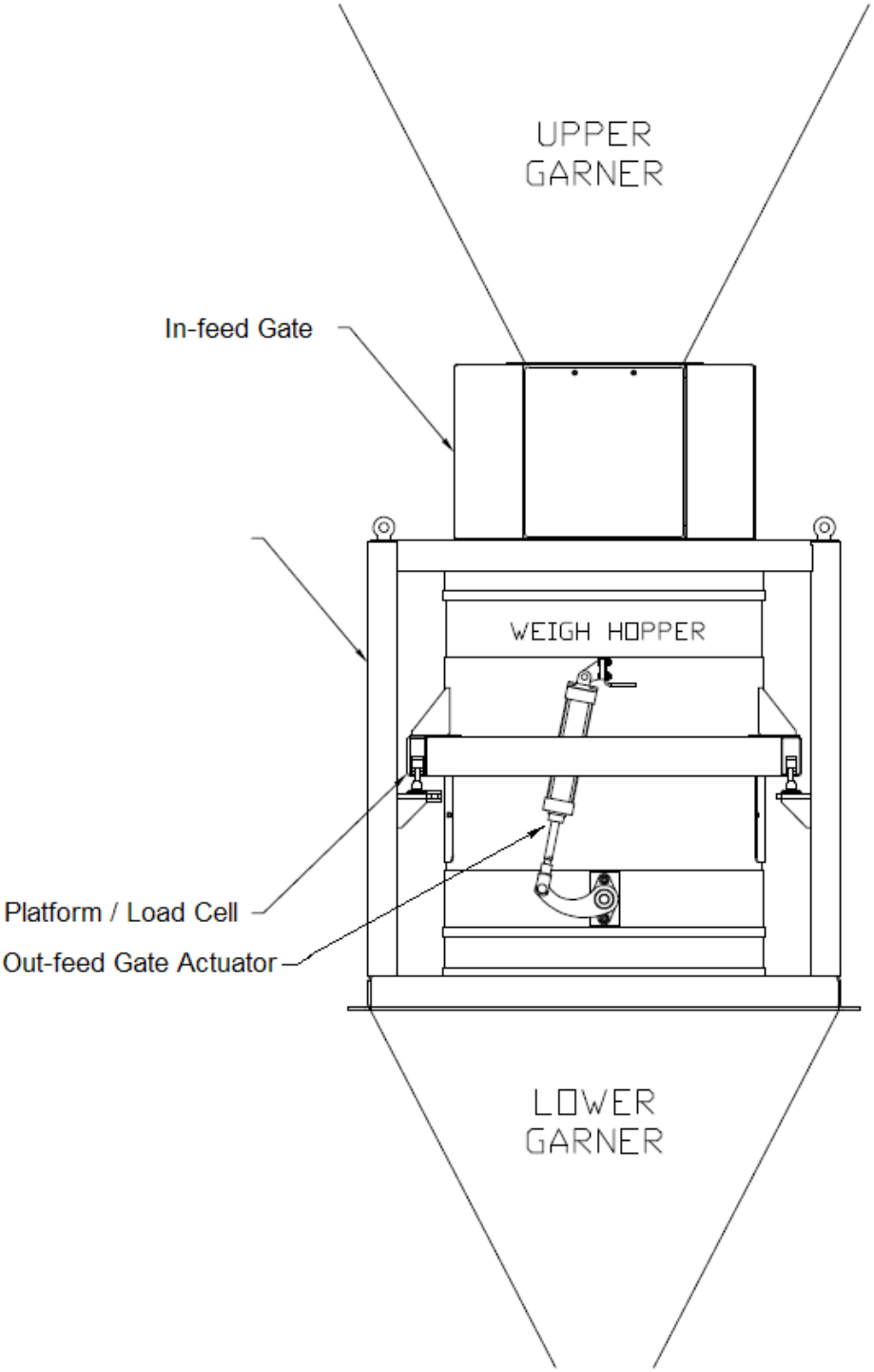
FIGURE 6/14B/20 – 1

(a) Hopper/Weigh-bin

(b) Load Cell Mounting

Active Weighing Solutions/Dynamic Weighing Model IPW800A Weighing Instrument

FIGURE 6/14B/20 – 2

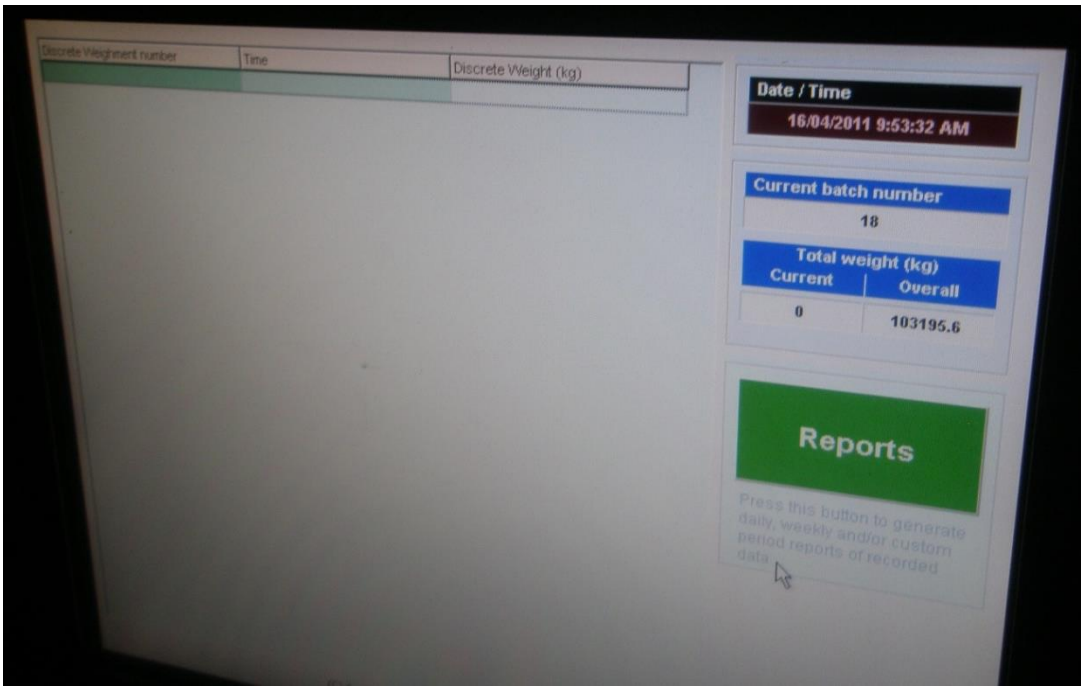


Weigh Bin (Hopper) Arrangement

FIGURE 6/14B/20 – 3

Active Weighing Solutions/Dynamic Weighing Model IPW800A Electronics Cabinet

FIGURE 6/14B/20 – 4



(a) Active Weighing Solutions/Dynamic Weighing Model IPW800A System Totalisation Computer

Detailed Report

Load No	Discrete Weighment No	Date / Time	Discrete Weighment
1	0	1/03/2011 2:22:33 PM	203.80
1	1	1/03/2011 2:22:53 PM	203.80
1	2	1/03/2011 2:23:12 PM	203.70
1	3	1/03/2011 2:23:33 PM	203.90
1	4	1/03/2011 2:23:51 PM	203.80
1	5	1/03/2011 2:24:10 PM	203.80
1	6	1/03/2011 2:24:30 PM	203.40
1	7	1/03/2011 2:24:49 PM	203.50
1	8	1/03/2011 2:25:12 PM	203.80
1	9	1/03/2011 2:25:32 PM	203.70
1	10	1/03/2011 2:25:51 PM	203.80
1	11	1/03/2011 2:26:11 PM	203.70
1	12	1/03/2011 2:26:30 PM	203.90
1	13	1/03/2011 2:26:51 PM	204.10
1	14	1/03/2011 2:27:09 PM	203.80
1	15	1/03/2011 2:27:29 PM	203.70
1	16	1/03/2011 2:27:59 PM	203.50
Accumulated Total			3463.70
Report Total			3463.70

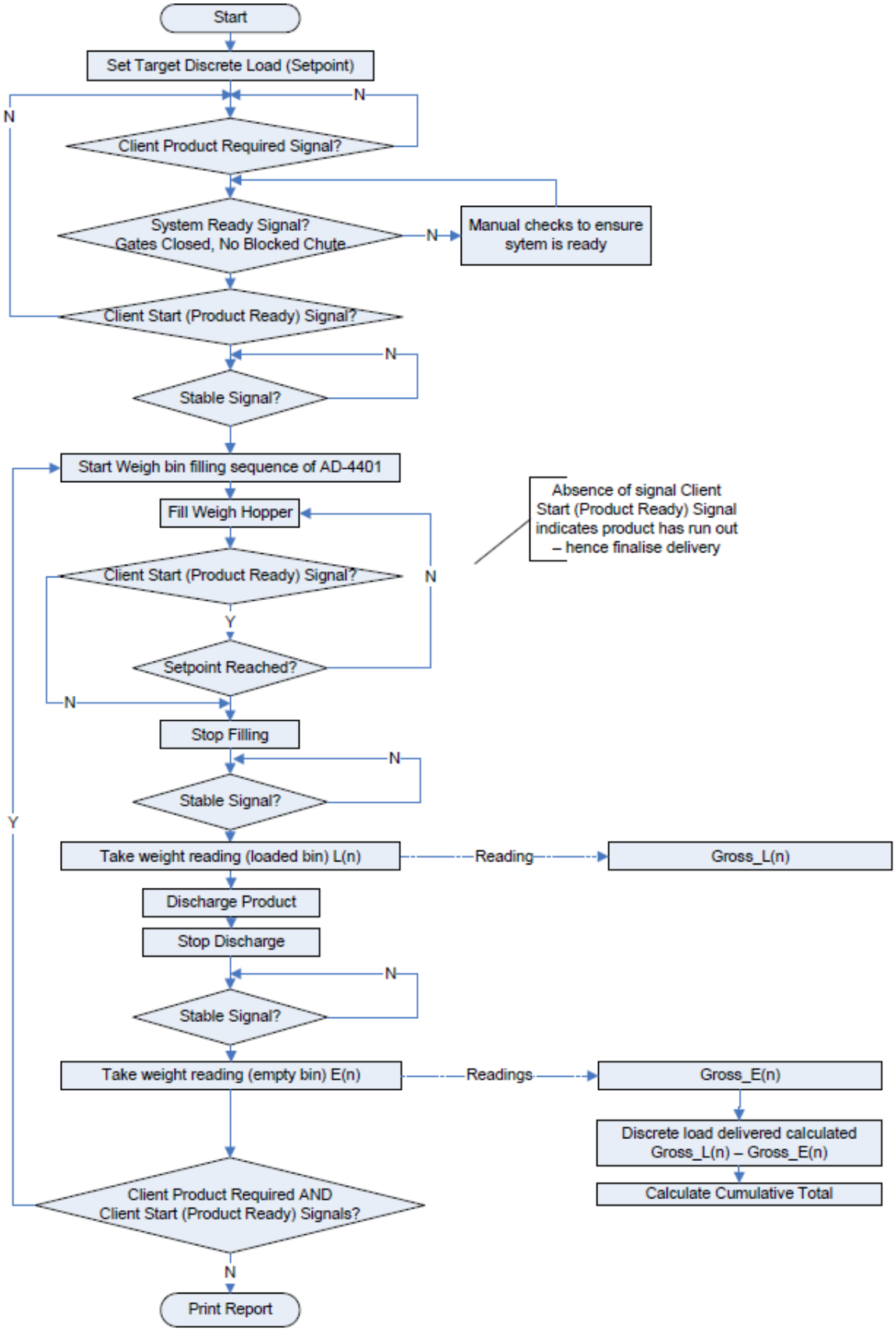
These values are not for trade use. See **1.1 Details**

Summary Report

BatchNo	BatchStartTime	Batch Totals
1	1/03/2011 2:22:33 PM	3463.70
Report Total		3463.70

(b) Typical Printouts

FIGURE 6/14B/20 – 5



Weighing Sequence Flowchart (overview)

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