



**Australian Government**  
**Department of Industry, Science,  
Energy and Resources**

**National  
Measurement  
Institute**

36 Bradfield Road, West Lindfield NSW 2070

**Certificate of Approval  
NMI 6/20A/14**

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.

AMCS Model FEL Wheeled Loader Weighing Instrument

submitted by AMCS Ltd  
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Floor 6, Block C  
Ballysimon  
Co. Limerick  
Ireland

**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 becomes subject to review on 1/07/25, and then every 5 years thereafter.

**DOCUMENT HISTORY**

| <b>Rev</b> | <b>Reason/Details</b>                 | <b>Date</b> |
|------------|---------------------------------------|-------------|
| 0          | Pattern approved – certificate issued | 01/06/20    |
|            |                                       |             |

## CONDITIONS OF APPROVAL

### General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/20A/14' 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 (AMCS) 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/14

**1. Description of Pattern** **approved on 01/06/20**

The AMCS model FEL class Y(b) automatic catchweighing instrument (Figure 1) of 2000 kg maximum capacity with a verification scale interval of 20 kg fitted to a waste bin pick-up vehicle. The minimum capacity is 100 kg.

Note: If used for other than the weighing of waste, the minimum capacity is 200 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.

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

**1.1. Weighing Mechanism**

The AMCS model FEL comprises two weigh arms mounted as part of the waste bin lifting mechanism at the front of the vehicle (Figure 1). Each arm uses a Flintec model XT50 extensometer (Figure 2a) of 1000 kg maximum capacity with a protective cover. The strain gauge type extensometers measure the strain of each weigh arm.

The system also includes an inclinometer Type LISD53E mounted on the weighing board to compensate weight values for out-of-level conditions, and a Pewatron Model PEI-Z1360 1-axis inclinometer (Figure 2b) to sense the location of the lifting mechanism and hence determine an appropriate 'weighing window' for the weight determination.

**1.2 Weighing Indication**

The weighing indication comprises AMCS model VDH analogue data processing unit (Figure 3a) and an ifm model CR0452 Programmable Graphics LCD Display (Figure 3b) which provides the system information and weight values of full waste bin, empty waste bin and net payload.

The extensometers and other sensors are connected to an AMCS model VDH analogue data processing unit, 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 (17 - 32 V DC).

**1.4 Additional Information Regarding System**

The following is additional information regarding operation of the system.

- The system utilises information from the LISD53E inclinometer, to compensate weight values for out-of-level conditions in longitudinal and transverse directions, and prevents the weight determination if levels of tilt up to  $\pm 6$  degrees are exceeded.
- The system is intended to only weigh whilst the vehicle is not moving. It is however acceptable for the vehicle to be moved between the zeroing of the

instrument and the weighing of the load. Visual warnings are provided to the operator whilst the load is being lifted.

- 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 also be fitted with a totalisation facility (accumulated net weight). This facility shall not be used for trade use.

### **1.5 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 NMI General Supplementary Certificate S1/0B.

### **1.6 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 RS-232/485 serial data interfaces, CAN, RFID, and digital and analogue inputs/outputs.

### **1.7 Display Check**

A display check is initiated whenever power is applied.

### **1.8 Sealing Provision**

Provision is made for the calibration adjustments to be sealed.

- The Pewatron inclinometer shall be sealed (using AMCS Heat Shrink Tubing (Figure 4a) or similar type seals) to seal against adjustment.
- The extensometers shall be sealed (using AMCS Heat Shrink Tubing or similar type seals) to seal against replacement.
- The VDH process unit shall be sealed by applying destructible labels on opposite sides of a join in the housing (Figure 4b).
- 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 indicator 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 (as Config Count 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.

### 1.9 Verification Provision

Provision is made for the application of a verification mark.

### 1.10 Descriptive Markings and Notices

Instruments carry the following markings:

|  |                |
|--|----------------|
| Manufacturer's mark, or name written in full | AMCS           |
| Indication of accuracy class                 | Y(b)           |
| Pattern approval number for the instrument   | NMI 6/20A/14   |
| Maximum capacity                             | Max ..... kg * |
| Minimum capacity                             | Min ..... kg * |
| Verification scale interval                  | e = ..... 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.

### 1.11 Software

The VDH software is designated version 3.xx.yy and FEL display firmware is designated version 3.xx.yy, where 'xx.yy' represents the identification of non-legally relevant software.

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

## TEST PROCEDURE No 6/20A/14

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

### **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 and net payload in a loading cycle.

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

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

#### **Loading cycle**

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, down and net payload.
5. Record the indications up, down and net payload on the test report.
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**

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). Note: The bin weight shall be equal to or greater than  $\text{Min} + 3e$ .

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 indications up and down and determine if they are within MPE.
4. Ensure the net indication is equal to the difference between the up and down indications.
5. Repeat steps 2 to 4 four more times.
6. 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).
7. Record the indications up and down and determine if they are within MPE.
8. Ensure the net indication is equal to the difference between the up and down indications.
9. Repeat steps 6 to 8 four more times.
10. Determine whether the instrument has **PASSED** or **FAILED**.

FIGURE 6/20A/14 – 1



AMCS Model FEL Wheeled Loader Weighing Instrument



FIGURE 6/20A/14 – 2

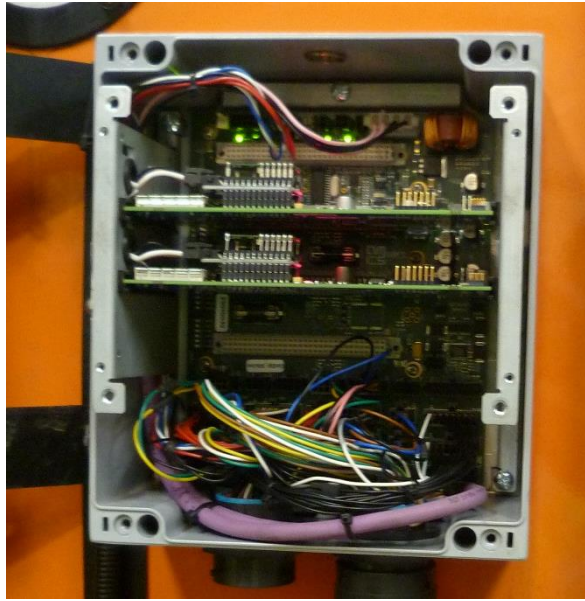


(a) Flintec Model XT50 Extensometer



(b) Pewatron Model PEI-Z1360 1-axis Inclinator

FIGURE 6/20A/14 – 3



(a) AMCS Model VDH Weighing Processing Unit

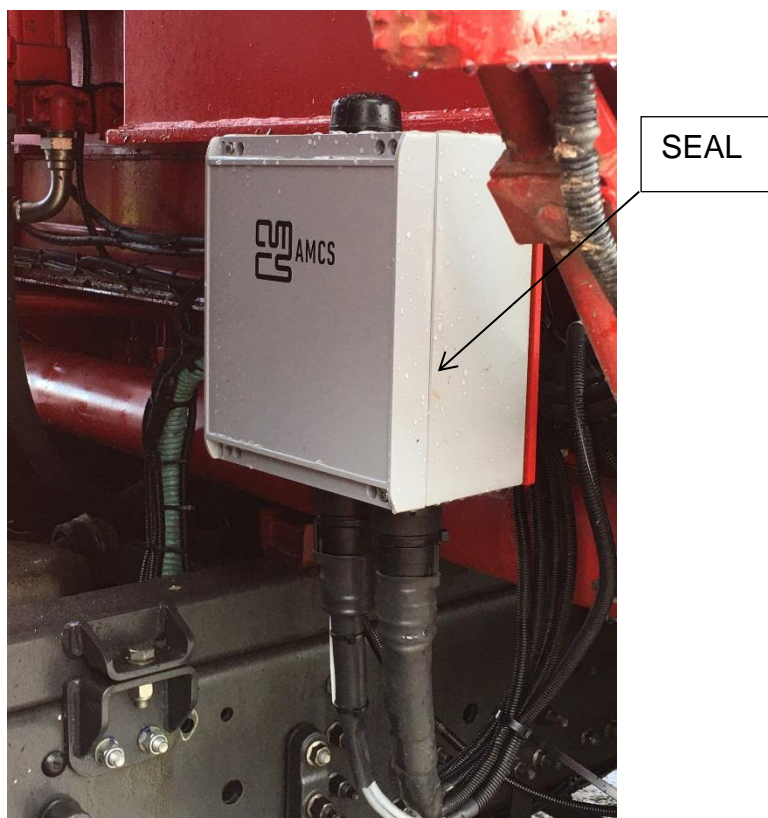


(b) ifm Model CR0452 Programmable Graphics LCD Display

FIGURE 6/20A/14 – 4



(a) AMCS Heat Shrink Tubing Type Seal



(b) Seal of AMCS Model VDH Processing Unit

Sealing Arrangements

~ End of Document ~