



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

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/9C/323

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.

Cascade Model 23C-WFE-2A-0915 Forklift Weighing Instrument

submitted by Cascade (Australia) Pty. Ltd.
36 Kiln Street
Darra QLD 4076

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 76, *Non-automatic weighing instruments, Parts 1 and 2*, dated October 2015.

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 provisionally approved – interim certificate issued	09/11/21
1	Pattern and variant 1 approved – certificate issued	29/06/22

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/9C/323' and only by persons authorised by the submittor.

Instruments purporting to comply with this approval and currently marked 'P6/9C/323' may be re-marked '6/9C/323' 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.

Special

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*.



Darryl Hines
Manager
Policy and Regulatory
Services

TECHNICAL SCHEDULE No 6/9C/323

1. Description of Pattern **provisionally approved on 09/11/21**
approved on 29/06/22

A Cascade model 23C-WFE-2A-0915 class  self-indicating multi-interval non-automatic weighing instrument with a verification scale interval (e_1) of 1 kg up to 1000 kg and with a verification scale interval (e_2) of 2 kg from 1000 kg up to 2500 kg, and with a minimum capacity of 20 kg fitted to a forklift truck (Figures 1a and 1b and Table 1).

The instrument is intended to operate only whilst the forklift and its carriage are stationary (i.e. not whilst the forklift is in motion, or whilst the load is being moved). It is however acceptable for the forklift or load to be moved between the zeroing of the instrument and the weighing of the load.

Instruments are fitted with an LCD display for displaying weight values.

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

1.1 Load Receptor

The load receptor consists of two lifting forks (Weigh Forks) fitted to a forklift truck as shown in Figure 1a.

The fork has a nominal blade length of 1067 mm.

Each fork has one Cascade model ADTransmitter analogue data processing device (ADPD). The digital weighing signal is transmitted to the indicator by using Bluetooth protocol.

1.2 Load Cells

Two Transcell Technology model SBSF-1800HD C3 shear beam load cells of 1800 kg maximum capacity are connected to the ADPD directly in each fork (Figure 1b).

1.3 Levelling

A STMicroelectronics model AIS328DQ 3-axis accelerometer is fitted within one of two forks, such that it will reflect tilting of the lifting forks, and will detect the degree to which the instrument is tilted from its reference (level) condition.

This level sensing device provides a signal to the indicator. The indicator imposes limits on the level condition, automatically compensates for out of level conditions in longitudinal or transverse directions, and disables the weight determination if acceptable levels of tilt are exceeded $\pm 3^\circ$ tilt from horizontal.

Note: It is possible to determine that the level sensing device is activated by tilting the Weigh Fork marked 1.

If the instrument displays 'L- _ _', the level sensing device is activated. Otherwise the instrument will not display 'L- _ _' in which case the configuration parameter A34 Correction Sensor Setting should be correctly set to '2' (Compensation with legal for trade limits).

1.4 Indicator

A Cascade model WFI digital indicator (Figure 2) is used

1.5 Zero

The initial zero-setting device has a nominal range of not more than 20% of the maximum capacity of the instrument.

The instrument has a semi-automatic zero-setting device with a nominal range of not more than 4% of the maximum capacity of the instrument.

A zero-tracking device may be fitted (however see note below).

Note: There is a risk that the zero-tracking device of an instrument may inappropriately track zero where the instrument load receptor is not actually at zero – resulting in weighing errors. For this type of instrument this risk is heightened (e.g. due to long thin wedge like tines lowering a pallet, leaking of lift cylinder, etc). Hence in most usage situations it is recommended that the zero-tracking device be disabled.

1.6 Tare

A semi-automatic subtractive tare device of up to 1000 kg tare capacity may be fitted.

1.7 Display Check

A display check is initiated whenever power is applied.

1.8 Additional Features

Instruments also have certain additional functions (e.g. pre-set tare, hold, counting and setpoints). These functions and displays are disabled and not approved for trade use.

1.9 Power Supply

The Cascade model WFI digital indicator may be powered by 12 - 24 V DC power source or 12 V DC road vehicle power supply or 4 x 1.5 V AA size dry battery.

Each fork is powered by a 7.4 V rechargeable battery pack as shown in Figure 3.

1.10 Interfaces

Instruments may be fitted with interfaces for the connection of auxiliary and/or peripheral devices. Any interfaces shall comply with clause 5.3.6 of document NMI R76 (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 General Supplementary Certificate of Approval No S1/0B (in particular in regard to the data and its format).

Instruments may be fitted with Laird Connectivity model BISMS02BI Bluetooth module, RS232 and WiFi interfaces.

1.11 Verification Provision

Provision is made for the application of a verification mark.

1.12 Descriptive Markings and Notices

Instruments are marked with the following data:

Manufacturer's mark, or name written in full	Cascade Corporation USA
Name or mark of manufacturer's agent	Cascade (Australia)
Indication of accuracy class	Ⓜ
Pattern approval number for the instrument	NMI 6/9C/323
Maximum capacity	Max / kg # 1
Minimum capacity	Min kg # 1
Verification scale interval	e = / kg # 1
Maximum subtractive tare	T = - kg #2
Serial number of the instrument
ADPD software version number	CA19.10

#1 These markings are also shown near the display of the result.

#2 This marking is required if *T* is not equal to *Max*.

1.13 Software

The legally relevant embedded software is designated 19.xxxx, where xxxx represents the identification of non-legally relevant software. Version numbers 19.2045 or later (Figure 4) are acceptable.

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

ADPD embedded software version is designated CA19.10 and is marked on the nameplate.

1.14 Sealing Provision

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

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

In addition, the instrument automatically increments a configuration and/or calibration value each time the instrument is re-configured and/or calibrated (Figure 5a and 5b).

The values of the event counters can be seen in the switch-on display sequence (when the power is first applied to the instrument), and the values at the time of verification shall be recorded on a destructible adhesive label attached to the instrument (e.g. as CA followed by a number, CF followed by a number).

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

2. Description of Variant 1 **provisionally approved on 09/11/21** **approved on 29/06/22**

Certain other models and capacities of the Cascade multi-interval forklift instruments as listed in Table 1 below (the pattern is shown in **bold**).

TABLE 1

Model	Maximum Capacity <i>(Max₁ / Max₂)</i>	Minimum Capacity <i>(Min)</i>	Verification Scale Interval <i>(e₁ / e₂)</i>	Maximum Subtractive Tare Capacity <i>(T = - ...)</i>	Transcell Technology Model SBSF C3 Load Cells
23C-WFE -2A-09yy (*)	1000/2500 kg	20 kg	1/2 kg	1000 kg	4 x SBSF-1800HD 1800 kg
28C-WFE-3A-09yy (*)	1000/3000 kg	20 kg	1/2 kg	1000 kg	4 x SBSF-1800HD 1800 kg
23C-WFG-2A-09yy (*)	1000/2500 kg	20 kg	1/2 kg	1000 kg	6 x SBSF-1500LA 1500 kg
23C-WFR-2A-09yy (*)	1000/2500 kg	20 kg	1/2 kg	1000 kg	6 x SBSF-1800HD 1800 kg
28C-WFR-3A-09yy (*)	1000/3000 kg	20 kg	1/2 kg	1000 kg	6 x SBSF-1800HD 1800 kg
50C-WFE-3A-09yy (*)	2000/4500 kg	40 g	2/5 kg	2000 kg	4 x SBSF-4500HD 4500 kg
50C-WFE-3A-09yy (**) (yy > 1300 mm)	2000/4500 kg	40 g	2/5 kg	2000 kg	6 x SBSF-4500HD 4500 kg
50C-WFR-3A-09yy (**)	2000/4500 kg	40 kg	2/5 kg	2000 kg	6 x SBSF-4500HD 4500 kg

(*) Where yy represents fork blade length up to and including 1300 mm.

(**) Where yy represents fork blade length up to and including 1400 mm.

TEST PROCEDURE No 6/9C/323

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures (NITP), taking into account the following notes.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Errors

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

Notes:

Levelling Arrangements and Stability of Ground

The site chosen for weighing should be firm and within 1.5 degrees of level – the level sensing device imposes limits on the level condition, however the stability of the ground surface should also be considered as well as safety concerns.

Gravity Variation

Where the instrument is verified in one location and subsequently moved to another location, the effects of differences in the acceleration of gravity at each location may need to be considered.

Note: The Trade Measurement Section should be consulted regarding any special arrangements which may be necessary in regard to operation of a mobile weighing instrument of this type.

Testing shall be carried out with the forks with which the instrument is to be used in normal operation, and also with the load applied in a manner similar to normal operation (e.g. for an instrument used for weighing pallets, fit the weighing instrument to a forklift truck, place an empty standard size (1200 × 1200 mm, nominal) hardwood/plastic pallet on the forks and raise above the ground.

Testing shall be carried out with the instrument having zero set using an initial zero-setting or semi-auto zero-setting device with a pallet on the forks and having the forks tilted to their reference (level) condition.

Tests (in addition to those in the NITP)

1) Eccentricity

Using a known load of approximately $\frac{1}{3}$ *Max*, carry out tests to determine whether operation is within the maximum permissible errors with this load at the left, right, front and rear of the pallet.

2) Tilting

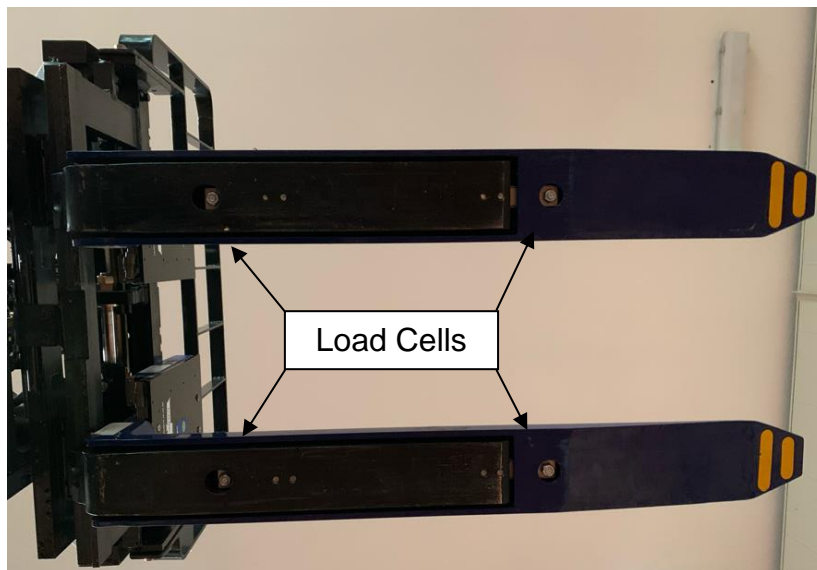
Carry out tests to determine whether operation is within the maximum permissible errors, with loads of $\frac{1}{2}$ *Max* and close to *Max* by having the forks tilted to their reference (level) condition and then having the forks tilted forward until the instrument is disabled (weighing display showing 'L- _ _') and gradually reducing the degree of tilt until a weight value is reacquired.

Repeat the test with the forks tilted backward.

FIGURE 6/9C/323 – 1



(a) From Above



(b) From Underneath

Cascade Model 23C-WFE-2A-0915 Weighing Instrument

FIGURE 6/9C/311 – 2



Cascade Model WFI Digital Indicator

FIGURE 6/9C/311 – 3



Weigh Fork Truck Carriage and Rechargeable Battery Pack

FIGURE 6/9C/323 – 4



Software Version Number

FIGURE 6/9C/323 – 5



(a) CA Event Counter



(b) CF Event Counter

~ End of Document ~