Australian Government
Department of Industry and Science

National Measurement Institute

Certificate of Approval

NMI 6/9C/302

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.

@Weigh Model MBW-150 kg Weighing Instrument

submitted by @Weigh Pty Ltd
Unit 31, 102 Keys Road
Moorabbin VIC 3185

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 July 2004.

This approval becomes subject to review on **1/06/20**, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 10 approved – interim certificate issued	4/05/09
1	Pattern & variants 1 to 10 approved – certificate issued	20/07/09
2	Variant 11 approved – interim certificate issued	30/03/15
3	Pattern & variants 1 to 10 reviewed & updated – variant 11 approved – certificate issued	4/09/15

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/9C/302' 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 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*.

Dr A Rawlinson

TECHNICAL SCHEDULE No 6/9C/302

1. Description of Pattern **approved on 4/05/09**

An @Weigh model MBW-150 kg single interval self-indicating class (III) non-automatic weighing instrument (Figure 1) with a verification scale interval of 0.05 kg and a maximum capacity of 150 kg.

Instruments are NOT FOR TRADING DIRECT WITH THE PUBLIC and shall be so marked.

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

1.1 Basework

The @Weigh model MBW-150 kg basework has the load receptor directly supported by a single load cell. The load receptor has maximum nominal dimensions of 420 × 520 mm.

1.2 Load Cell

A ZEMIC model L6G load cell of 300 kg maximum capacity is used.

1.3 Indicator

An @Weigh model BW digital indicator is used (Figure 1). The indicator is also described in the documentation of approval NMI S520. The indicator may be mounted on a column attached to the base.

1.4 Markings

Instruments carry the following markings:

Manufacturer's mark, or name written in full	@Weigh Pty Ltd	
Indication of accuracy class	(III)	
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	.....	
Pattern approval number for the indicator	NMI 6/9C/302	
Pattern approval mark for other components	.....	#3

#1 These markings shall also be shown near the display of the result if they are not already located there.

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

#3 May be located separately from the other markings.

In addition, instruments not greater than 100 kg capacity shall carry a notice stating NOT TO BE USED FOR TRADING DIRECT WITH THE PUBLIC, or similar wording.

1.5 Levelling

The instrument is provided with adjustable feet and adjacent to the level indicator is a notice advising that the instrument must be level when in use.

1.6 Sealing Provision

Sealing of the instrument is as described in the approval documentation for the indicator used.

1.7 Verification Provision

Provision is made for the application of a verification mark.

2. Description of Variant 1 **approved on 4/05/09**

Certain @Weigh MBW-### kg series instruments, similar to the pattern but having various other capacities and characteristics as listed in Table 1.

3. Description of Variant 2 **approved on 4/05/09**

Certain @Weigh PBW-### kg series instruments of various capacities as listed in Table 2, which are similar to the pattern but which use ZEMIC model L6N load cells.

4. Description of Variant 3 **approved on 4/05/09**

Certain @Weigh SBW-### kg series instruments of various capacities as listed in Table 3, which are similar to the pattern but which use ZEMIC model L6E3 load cells.

5. Description of Variant 4 **approved on 4/05/09**

Certain @Weigh XLBW-### kg series instruments of various capacities as listed in Table 4, which are similar to the pattern but which use ZEMIC model L6G load cells.

6. Description of Variant 5 **approved on 4/05/09**

Certain @Weigh LBW-### kg series instruments of various capacities as listed in Table 5, which are similar to the pattern but which use ZEMIC model L6F load cells.

7. Description of Variant 6 **approved on 4/05/09**

Certain @Weigh KBW-### kg series instruments of various capacities as listed in Table 6, which are similar to the pattern but which use ZEMIC model L6G load cells.

8. Description of Variant 7 **approved on 4/05/09**

Certain @Weigh SPBW-### kg series instruments of various capacities as listed in Table 7, which are similar to the pattern but which use ZEMIC model L6D load cells. Typically these models have a stainless steel type of construction.

9. Description of Variant 8 **approved on 4/05/09**

Certain @Weigh SBWS-### kg series instruments of various capacities as listed in Tables 8 and 9, which are similar to the pattern but which use ZEMIC model L6N load cells or HBM model PW15A load cells. Typically these models have a stainless steel type of construction.

10. Description of Variant 9 approved on 4/05/09

Certain @Weigh SMBW-### kg series instruments of various capacities as listed in Table 10, which are similar to the pattern but which use ZEMIC model L6G load cells or HBM model PW15A load cells. Typically these models have a stainless steel type of construction.

11. Description of Variant 10 approved on 4/05/09

Any @Weigh BW series instruments of this approval using an @Weigh model BWS digital indicator (Figure 2) which is also described in the documentation of approval NMI S520.

12. Description of Variant 11 approved on 30/03/15

Certain baseworks of this approval used with a compatible NMI approved (by Supplementary Certificate) indicator provided the conditions set out below are met.

In addition to the markings specified in clause **1.4 Markings**, instruments are marked with the NMI approval number for the indicator used, plus relevant markings (*Max, Min, e)* where appropriate for multi-interval or multiple range instruments together in the same location.

The approved baseworks and their limiting characteristics are given in Tables 1 to 10.

The conditions to be met are given below, and include calculations using the following terms:

Ex = Excitation from indicator (V)

LC_Sens = Load cell sensitivity (mV/V)

E_{max} = Load cell maximum capacity (kg)

Indicator Sensitivity = Minimum sensitivity value per verification scale interval for the indicator (µV)

e = verification scale interval of the instrument (kg). ***In the case of multi-interval or multiple range instruments, any reference to 'e' refers to the smallest verification scale interval (i.e. e_1).***

e_1, e_2, … = verification scale interval of each range for multiple range instruments (or partial weighing ranges for multi-interval instruments), e_1 refers to the smallest verification interval.

Max = the maximum capacity of the instrument. This refers to the maximum capacity of the highest range (i.e. Max_r for multiple range instruments).

Max_r = the maximum capacity of the instrument for a multiple range instrument, i.e. the maximum capacity of the highest range.

Max_1 Max_2 … = the maximum capacity of the various ranges for a multiple range instrument. Max_1 refers to the maximum capacity of the smallest range.

n_{LC} = the maximum number of verification intervals for which the load cell or basework is approved (e.g. 3000 for a 'class C3' load cell).

DR = dead load return value for the load cell. Note: Many load cells do not have a specified DR value.

The conditions are:

- The excitation voltage used is within the range approved for the baseworks.
- The maximum load applied to the basework (live load plus any dead load) does not exceed the load cell maximum capacity.
- The verification scale interval is not less than the minimum value specified. ***In the case of multi-interval or multiple range instruments, the verification scale interval refers to the smallest verification scale interval (i.e. e_1).***
- The number of verification scale intervals is less than or equal to the nmax value specified. ***In the case of multi-interval or multiple range instruments, the number of verification scale intervals refers to the largest number in any weighing range or partial weighing range (i.e. the largest of Max_1/e_1, Max_2/e_2 etc).***
- The signal voltage per verification scale interval is not less than the minimum sensitivity value per verification scale interval for the indicator (as specified in the approval documentation for the indicator), i.e.

$$\text{Indicator Sensitivity} \leq 1000 \times Ex \times LC\_Sens \times e / E_{max}$$

<u>Additional requirement for multi-interval operation:</u>

In the case of indicators which are configured to form a multi-interval weighing instrument the instrument shall comply with one of the following conditions:

(i) The smallest verification scale interval (e_1) shall satisfy the following:

$$e_1 \geq Max/n_{LC}$$

(ii) Or, the smallest verification scale interval (e_1) shall satisfy the following:

$$e_1 \geq 2 \,.\, DR \,.\, Max/E_{max}$$

Of course (ii) cannot apply where a value of 'Deadload return' DR is not given.

The instrument shall also comply with the following condition:

$$Max_i / e_{i+1} \geq 500 \text{ (e.g. } Max_1/e_2 \geq 500 \text{ and } Max_2/e_3 \geq 500 \text{)}$$

<u>Additional requirement for multiple range operation:</u>

In the case of indicators which are configured to form a multiple range weighing instrument the instrument shall comply with one of the following conditions:

(i) The smallest verification scale interval (e_1) shall satisfy the following:

$$e_1 \geq 0.4\ Max_r/n_{LC}$$

(ii) Or, the smallest verification scale interval (e_1) shall satisfy the following:

$$e_1 \geq DR.\ Max_r/E_{max}$$

Of course (ii) cannot apply where a value of 'Deadload return' DR is not given.

TEST PROCEDURE

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

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 the *National Trade Measurement Regulations 2009*.

TABLE 1

Instrument model		**MBW-### kg**				
Basework model		MBW				
Platform size (mm x mm)		420 × 520				
Maximum capacity	kg	60	150	200	250	300
Typical verification scale interval	kg	0.02	0.05	0.1	0.1	0.1
Maximum number of verification scale intervals (n_{max})		3000	3000	2000	2500	3000
Load cell model used		**Zemic L6G**				
Load cell classification		C3	C3	C3	C3	C3
Load cell maximum capacity (E_{max})	kg	100	300	300	300	500
Number of load cells		1	1	1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.0083	0.025	0.025	0.025	0.042
Load cell sensitivity (at E_{max})	mV/V	2	2	2	2	2
Input impedance	Ω	409	409	409	409	409
Excitation voltage (maximum)	V	18	18	18	18	18
Cable length (±0.1m)	m	3	3	3	3	3
Number of leads (plus shield)		4 or 6	4 or 6	4 or 6	4 or 6	4 or 6

Approved MBW-### kg series instruments using ZEMIC model L6G load cells

TABLE 2

Instrument model		**PBW-### kg**			
Basework model		PBW			
Platform size (mm x mm)		320 × 360			
Maximum capacity	kg	3	6	15	30
Typical verification scale interval	kg	0.001	0.002	0.005	0.01
Maximum number of verification scale intervals (n_{max})		3000	3000	3000	3000
Load cell model used		**Zemic L6N**			
Load cell classification		C3	C3	C3	C3
Load cell maximum capacity (E_{max})	kg	5	10	20	50
Number of load cells		1	1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.0004	0.0008	0.0017	0.0042
Load cell sensitivity (at E_{max})	mV/V	2	2	2	2
Input impedance	Ω	409	409	409	409
Excitation voltage (maximum)	V	18	18	18	18
Cable length (±0.1m)	m	3	3	3	3
Number of leads (plus shield)		4 or 6	4 or 6	4 or 6	4 or 6

Approved PBW-### kg series instruments using ZEMIC model L6N load cells

Notes: ### represents maximum capacity of the instrument.

The load cell cable length supplied with the basework shall not be shortened.

TABLE 3

Instrument model		**SBW-### kg**		
Basework model		SBW		
Platform size (mm x mm)		300 × 400 or 350 × 450		
Maximum capacity	kg	30	60	150
Typical verification scale interval	kg	0.01	0.02	0.05
Maximum number of verification scale intervals (n_{max})		3000	3000	3000
Load cell model used		**Zemic L6E3**		
Load cell classification		C3	C3	C3
Load cell maximum capacity (E_{max})	kg	50	100	200
Number of load cells		1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.007	0.014	0.029
Load cell sensitivity (at E_{max})	mV/V	2	2	2
Input impedance	Ω	406	406	406
Excitation voltage (maximum)	V	18	18	18
Cable length (±0.1m)	m	2	2	2
Number of leads (plus shield)		4	4	4

Approved SBW-### kg series instruments using ZEMIC model L6E3 load cells

TABLE 4

Instrument model		**XLBW-### kg**		
Basework model		XLBW		
Platform size (mm x mm)		450 × 600		
Maximum capacity	kg	60	150	300
Typical verification scale interval	kg	0.02	0.05	0.1
Maximum number of verification scale intervals (n_{max})		3000	3000	3000
Load cell model used		**Zemic L6G**		
Load cell classification		C3	C3	C3
Load cell maximum capacity (E_{max})	kg	100	300	500
Number of load cells		1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.008	0.025	0.042
Load cell sensitivity (at E_{max})	mV/V	2	2	2
Input impedance	Ω	409	409	409
Excitation voltage (maximum)	V	18	18	18
Cable length (±0.1m)	m	3	3	3
Number of leads (plus shield)		4 or 6	4 or 6	4 or 6

Approved XLBW-### kg series instruments using ZEMIC model L6G load cells

Notes: ### represents maximum capacity of the instrument.

The load cell cable length supplied with the basework shall not be shortened.

TABLE 5

Instrument model		**LBW-### kg**		
Basework model		LBW		
Platform size (mm x mm)		600 × 800		
Maximum capacity	kg	150	300	600
Typical verification scale interval	kg	0.05	0.1	0.2
Maximum number of verification scale intervals (n_{max})		3000	3000	3000
Load cell model used		**Zemic L6F**		
Load cell classification		C3	C3	C3
Load cell maximum capacity (E_{max})	kg	100	500	1000
Number of load cells		1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.036	0.071	0.143
Load cell sensitivity (at E_{max})	mV/V	2	2	2
Input impedance	Ω	409	409	409
Excitation voltage (maximum)	V	18	18	18
Cable length (±0.1m)	m	3	3	3
Number of leads (plus shield)		4 or 6	4 or 6	4 or 6

Approved LBW-### kg series instruments using ZEMIC model L6F load cells

TABLE 6

Instrument model		**KBW-### kg**	
Basework model		KBW	
Platform size (mm x mm)		400 × 500	
Maximum capacity	kg	60	150
Typical verification scale interval	kg	0.02	0.05
Maximum number of verification scale intervals (n_{max})		3000	3000
Load cell model used		**Zemic L6G**	
Load cell classification		C3	C3
Load cell maximum capacity (E_{max})	kg	100	300
Number of load cells		1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.0083	0.025
Load cell sensitivity (at E_{max})	mV/V	2	2
Input impedance	Ω	409	409
Excitation voltage (maximum)	V	18	18
Cable length (±0.1m)	m	3	3
Number of leads (plus shield)		4 or 6	4 or 6

Approved KBW-### kg series instruments using ZEMIC model L6G load cells

Notes: ### represents maximum capacity of the instrument.

The load cell cable length supplied with the basework shall not be shortened.

TABLE 7

Instrument model		**SPBW-### kg**			
Basework model		SPBW			
Platform size (mm x mm)		280 × 280			
Maximum capacity	kg	3	6	15	30
Typical verification scale interval	kg	0.001	0.002	0.005	0.01
Maximum number of verification scale intervals (n_{max})		3000	3000	3000	3000
Load cell model used		**Zemic L6D**			
Load cell model used		Zemic L6D 6 kg	Zemic L6D 10 kg	Zemic L6D 20 kg	Zemic L6D 50 kg
Load cell classification		C3	C3	C3	C3
Load cell maximum capacity (E_{max})	kg	5	10	20	50
Number of load cells		1	1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.001	0.002	0.005	0.010
Load cell sensitivity (at E_{max})	mV/V	2	2	2	2
Input impedance	Ω	406	406	406	406
Excitation voltage (maximum)	V	18	18	18	18
Cable length (±0.1m)	m	3	3	3	3
Number of leads (plus shield)		4	4	4	4

Approved KBW-### kg series instruments using ZEMIC model L6G load cells

TABLE 8

Instrument model		**SBWS-### kg**			
Basework model		SBWS			
Platform size (mm x mm)		320 × 360			
Maximum capacity	kg	6	15	30	60
Typical verification scale interval	kg	0.002	0.005	0.01	0.02
Maximum number of verification scale intervals (n_{max})		3000	3000	3000	3000
Load cell model used		**Zemic L6N**			
Load cell classification		C3	C3	C3	C3
Load cell maximum capacity (E_{max})	kg	10	20	50	100
Number of load cells		1	1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.0008	0.0017	0.0042	0.0083
Load cell sensitivity (at E_{max})	mV/V	2	2	2	2
Input impedance	Ω	409	409	409	409
Excitation voltage (maximum)	V	18	18	18	18
Cable length (±0.1m)	m	3	3	3	3
Number of leads (plus shield)		4 or 6	4 or 6	4 or 6	4 or 6

Approved SBWS-### kg series instruments using ZEMIC model L6N load cells

Notes: ### represents maximum capacity of the instrument.

The load cell cable length supplied with the basework shall not be shortened.

TABLE 9

Instrument model		**SBWS-### kg**			
Basework model		SBWS			
Platform size (mm x mm)		320 × 360			
Maximum capacity	kg	6	15	30	60
Typical verification scale interval	kg	0.002	0.005	0.01	0.02
Maximum number of verification scale intervals (n_{max})		3000	3000	3000	3000
Load cell model used		**HBM PW15A**			
Load cell classification		C3	C3	C3	C3
Load cell maximum capacity (E_{max})	kg	7.5	20	50	100
Number of load cells		1	1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.001	0.0027	0.0067	0.0133
Load cell sensitivity (at E_{max})	mV/V	2	2	2	2
Input impedance	Ω	380	380	380	380
Excitation voltage (maximum)	V	15	15	15	15
Cable length (±0.1m)	m	1.5	1.5	1.5	1.5
Number of leads (plus shield)		6	6	6	6

Approved SBWS-### kg series instruments using HBM model PW15A load cells

TABLE 10

Instrument model		**SMBW-### kg**			
Basework model		SMBW			
Platform size (mm x mm)		500 × 400			
Maximum capacity	kg	60	150	60	150
Typical verification scale interval	kg	0.02	0.05	0.02	0.05
Maximum number of verification scale intervals (n_{max})		3000	3000	3000	3000
Load cell model used		**Zemic L6G**	**Zemic L6G**	**HBM PW15A**	**HBM PW15A**
Load cell classification		C3	C3	C3	C3
Load cell maximum capacity (E_{max})	kg	100	300	100	200
Number of load cells		1	1	1	1
Minimum value of verification scale interval for basework (v_{min} of load cell)	kg	0.008	0.025	0.013	0.027
Load cell sensitivity (at E_{max})	mV/V	2	2	2	2
Input impedance	Ω	409	409	380	380
Excitation voltage (maximum)	V	18	18	15	15
Cable length (±0.1m)	m	3	3	1.5	1.5
Number of leads (plus shield)		4 or 6	4 or 6	6	6

Approved SMBW-### kg series instruments using certain ZEMIC or HBM load cells

Notes: ### represents maximum capacity of the instrument.

The load cell cable length supplied with the basework shall not be shortened.

FIGURE 6/9C/302 – 1

@Weigh Model MBW-150 kg Instrument Using an @Weigh Model BW Indicator

FIGURE 6/9C/302 – 2

@Weigh Model SBWS Instrument Using an @Weigh Model BWS Indicator

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