Anhang 1 zu Ergebnisbericht Nr. T16-1157 über die Labortests der SW zum kontinuierlichen Totalisieren der Bauart "F-EBW"

Mai - November 2018

INTERNATIONAL RECOMMENDATION

OIML R 50-3

Edition 2014 (E)

Continuous totalizing automatic weighing instruments (belt weighers).

Part 3: Test report format

Instruments de pesage totalisateurs continus à fonctionnement automatique (peseuses sur bande).

Partie 3: Format du rapport d'essais

OIML R 50-3 Edition 2014 (E)

ORGANISATION INTERNATIONALE DE MÉTROLOGIE LÉGALE

INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY

Identification of the instrument

Application no.:	BEV-13.414/0016-NB/2017	Type designation:	F-EBW
Identification no.:	00100	Manufacturer:	Kukla Waagenfabrik
Software version:	W 02.00.02		
Report date:			

Documentation from the manufacturer

(Record as necessary to identify the equipment under test)

System or module name	Drawing number or software reference	Issue level	Serial no.
Waage	Kukla DWC-7B		00100
Wägezelle	HBM, Z6FC3, 20 kg		31444990
Impulsgeber	Keysight "33500 B"		MM004006
Labornetzteil	Elektro-Automatik GmbH "STT 2000 B"		2512200477
Thermo-Hygrometer	Lufft "OPUS 10"		MM003615
Gewichtsstücke	1 g bis 10 kg	MM003551, MM003552, MM003553	

Simulator documentation

System or module name	Drawing number or software reference	Issue level	Serial no.
Dokumentationsstand vom Jänner 2019:			
- Betriebsanleitung zu DWC-7B, v02 aus 2017			
- Parameter Handbuch zu DWC-7, v1 aus 2016			
- erweiterte Softwaredokumentation zu DWC-7B, v05 aus 2016			
- Bedienungsanleitung für Frequenzgenerator Keysight 33500 B			
- Prüfschein TC 2207 für die verwendete Wägezelle HBM Z6			

General information concerning the type

Application no.:	BEV-13.414/0016-NB/2017	Manufacturer:	Kukla Waagenfabrik
Type designation:	F-EBW	Applicant:	Kukla Waagenfabrik
Instrument category:	SW zum kont. Totalisieren		

Testing on: [ ] Complete instrument [X] Module*

Accuracy class:	[ ] 0.2		[X] 0.5		[X] 1		[X] 2		
Q_{min} =	20	t/h	Q_{max} =	100	t/h	Σ_{min} =	8000	kg	
Speed, v =	1,0	m/s	v_{min} =	0,1	m/s	v_{max} =	1,1	m/s	
Max =	5	kg	d =	1	kg	W_L =		m	

U_{nom}** = 230 V U_{min} = 195,5 V U_{max} = 253 V f = 50 Hz Battery, U = -- V

Zero-setting device: [ ] Non-automatic [X] Semi-automatic [ ] Automatic

Temperature range: - 10 °C bis + 40 °C

Printer: [ ] Built-in [ ] Connected [X] Non present but connectable [ ] No connection

Instrument submitted:		Load sensor:	Z6F C3
Identification no.:	siehe Seite 3	Manufacturer:	HBM
Software version:		Type:	Z6
Connected equipment:		Capacity:	20 kg
		Number:	31444990
		Classification symbol:	
Interfaces (number, nature):		OIML R 60 Certificate of conformity. Please tick. If "Yes" supply certificate number.	Yes: X / No:
Evaluation period:		Certificate number:	TC 2207
Date of report:			
Observer:			

* The test equipment (simulator or part of a complete instrument) connected to the module shall be defined in the test form(s) used

** The voltage U_{nom} shall be as defined in IEC 61000-4-11 section 5

Summary of the checklist

For each test, the "Summary of the checklist" below and the "Checklist" in clause 3 shall be completed according to this example:

	Passed	Failed
When the instrument has passed the test:	X	
When the instrument has failed the test:		X
When the test is not applicable:	/	/

Summary of the checklist:

Requirement	Passed	Failed	Remarks
Metrological requirements R 50-1 clause 3	X		
Technical requirements R 50-1 clause 4	X		
Additional requirements for electronic belt weighers R 50-1 clause 5	X		
Metrological controls R 50-1 clause 6	X		
Test procedures R 50-2	X		
Overall result	X		

Application no.:		Type designation:	
Report date:		Manufacturer:	

Use this page to detail remarks from the summary of the checklist

Summary of type evaluation tests

Application no.: BEV-13.414/0016-NB/2017 Type designation: F-EBW

Report date: 2019-01-30 Manufacturer: Kukla Waagenfabrik

R 50-3	Tests	Report page	Passed	Failed	Remarks
1	Simulation tests		X		
1.1	Warm-up time				siehe Teil 3
1.2	Variation of simulation speed		X		
1.3	Eccentric loading				nicht anwendbar
1.4	Zero-setting device		X		
1.4.1	Zero-setting (range)		X		
1.4.2	Zero-setting (semi-automatic and automatic)		X		
1.5	Influence quantities		X		siehe Teil 2
1.5.1	Static temperatures				siehe Teil 2
1.5.2	Temperature effect at zero flowrate				siehe Teil 2
1.5.3	Damp heat		X		siehe Teil 2
1.5.3.1	Damp heat, steady state (non-condensing)				siehe Teil 2
1.5.3.2	Damp heat, cyclic (condensing)				nicht anwendbar
1.5.4	Mains voltage variation		X		
1.5.4.1	AC mains voltage variation		X		
1.5.4.2	DC mains voltage variation				siehe Teil 3
1.5.5	Battery voltage variation, not mains connected (DC)				nicht anwendbar
1.6	Disturbances		X		
1.6.1	AC mains voltage dips, short interruptions and reductions				nicht anwendbar
1.6.2	Bursts (fast transient tests) on:		X		siehe Teil 4
1.6.2.1	- AC and DC mains power lines				siehe Teil 4
1.6.2.2	- signal, data and control lines				siehe Teil 4
1.6.3	Surges on:				nicht anwendbar
1.6.3.1	- AC and DC mains power lines				nicht anwendbar
1.6.3.2	- signal, data and control lines				nicht anwendbar
1.6.4	Electrostatic discharge		X		siehe Teil 4
1.6.4.1	Direct application				siehe Teil 4

1.6.4.2	Indirect application (contact discharges only)				nicht anwendbar
1.6.5	Immunity to electromagnetic fields:		X		
1.6.5.1	- radiated electromagnetic fields				siehe Teil 4
1.6.5.2	- conducted electromagnetic fields				nicht anwendbar
1.7	Metrological characteristics		X		
1.7.1	Repeatability		X		
1.7.2	Discrimination of the totalization indicating device		X		
1.7.3	Discrimination of the totalization indicating device used for zero totalization				siehe Teil 2
1.7.4	Short- and long-term stability of zero				siehe Teil 2
1.8	In-situ tests		X		
1.8.1	Maximum permissible errors on checking of zero		X		siehe Teil 5
1.8.2	Discrimination of the indicator used for zero-setting		X		siehe Teil 5
2	In-situ product tests		X		siehe Teil 5
2.1	Accuracy of control instrument		X		
2.2	Repeatability		X		
	MPE for type evaluation		X		
	MPE for initial verification and in-service inspection		X		

1 Simulation tests (R 50-1, 7.3, R 50-2, 5.4)

Application no.: BEV-13.414/0016-NB/2017 Type designation: F-EBW

Report date: Mai 2018 Observer:

Simulation tests

Data	Derivation	Ref	Value	Units
Maximum flowrate	Max at maximum speed	Q_{max}	100	t/h
Totalization scale interval		d	0,01	t
Zero-setting scale interval			--	
Simulator resolution*		d	0,001	t
Max load receptor capacity	To obtain Q_{max}	Max	20	kg
Weigh length		W_L	1	m
Pulses per weigh length			50	
Nominal speed or range of speeds		v =	1,0	m/s
		v = .../.....	--	m/s
Other relevant data**		Q_{min}	20	t/h

* Where: Simulator resolution, d, is obtained in line with R 50-2, 7.1 and/or R 50-2, 3.7.1. Whichever means are used, they should be noted below in description of simulator.

** Insert other relevant data as necessary.

Detailed formula for calculating totalized load for simulation tests:

$$T = \frac{\text{Pulses transmitted} \times L}{\text{Pulses per weigh length}} =$$

Where L is the static load used for the simulation test

DESCRIPTION OF SIMULATOR:

(Shall include details of any deviations from actual instruments when installed, including the accuracy determining parameters)

1.2 Variation of simulation speed (R 50-1, 3.7.1 & R 50-2, 5.4.1)

Application no.: BEV-13.414/0016-NB/2017

Type designation: F-EBW

Observer: Ströck

Resolution during test: (smaller than *d*) 1 kg

	At start	At end	
Temp.:	23,1	23,3	°C
Rel. h.:	--		%
Date:	2018-05-28	2018-05-28	yyyy-mm-dd
Time:	11:00	14:00	hh:mm:ss

Belt speed, v = ... m/s or speed range, v = 0,1 / 1,1 m/s

Load, *L* (kg)	Speed (m/s)	Flowrate (t /h)	Revolutions* or pulses** (-)	Calculated totalization, *T*** (kg)	Indicated totalization, *I*	Difference *I* – *T* (kg)	Error, *E* %****
5	0,1	100	14400	8000	7998	-2	-0,025
5	0,3	100	14400	8000	7998	-2	-0,025
5	0,5	100	14400	8000	7998	-2	-0,025
5	0,7	100	14400	8000	7998	-2	-0,025
5	0,9	100	14400	8000	7998	-2	-0,025
5	1,1	100	14400	8000	7998	-2	-0,025

[X] Passed [ ] Failed

EFG = +/- 0,126 %
= +/- 10 kg

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause 1 for the simulated totalization calculation formula
*** See the "explanatory notes" section for the *E* % calculation formula

Remarks:

Include information that affect the test condition, as indicated in the last paragraph of R 50-2, 7.1

1.4 Zero-setting device (R 50-1, 4.5)

1.4.1 Zero-setting (range) (R 50-1, 3.7.3, 4.5.1 & R 50-2, 5.4.3)

Application no.: .....

Type designation: .....

Observer: .....

Resolution during test: (smaller than *d*) .....

	At start	At end	
Temp.:			°C
Rel. h.:			%
Date:			yyyy-mm-dd
Time:			hh:mm:ss

Positive portion, L_1		Negative portion, L_2		Zero-setting range $L_1 + L_2$
Weight added	Re-zero Yes/no	Weight removed	Re-zero Yes/no	

☐ Passed ☐ Failed

Where: L_1 is the maximum load that can be re-zeroed (positive portion)
L_2 is the maximum load that can be removed while the instrument can still be re-zeroed (negative portion)

Check: $L_1 + L_2 \leq 4$ % of Max

Remarks: Waagen dieser Bauart verfügen über eine Zählersperre im Bereich zwischen + 2 % und - 2 % von Max. Dies schließt den Nullstellbereich mit ein, weshalb diese Prüfung entfallen kann.

Include information that affect the test condition, as indicated in the last paragraph of R 50-2, 7.1

1.4.2 Zero-setting (semi-automatic and automatic) (R 50-1, 4.5.1 & R 50-2, 5.4.4)

Application no.: .....

Type designation: .....

Observer: .....

Resolution during test: (smaller than *d*) .....

	At start	At end	
Temp.:			°C
Rel. h.:			%
Date:			yyyy-mm-dd
Time:			hh:mm:ss

	Load, *L* ( )	Pulses*	Calculated totalization, *T*** ( )	Indicated totalization, *I* ( )	Difference, *I* – *T* ( )	*E* %***
L_1						
L_2						
L_3						
L_4						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause 1 for the simulated totalization calculation formula
*** See the "explanatory notes" section for the *E* % calculation formula

Where: L_1 = 50 % of positive zero-setting range
L_2 = 100 % of positive zero-setting range
L_3 = –50 % of negative zero-setting
L_4 = –100 % of negative zero-setting

Remarks: siehe vorherige Anmerkung.

Include information that affect the test condition, as indicated in the last paragraph of R 50-2, 7.1

1.5.4 Mains voltage variation (R 50-1, 3.7.4.3 & 5.5.4)

1.5.4.1 AC mains voltage variation (R 50-2, 7.2.4)

			At start	At end	
Application no.:	BEV-13.414/0016-NB/2017	Temp.:	22,9		°C
Type designation:	F-EBW	Rel. h.:			%
Observer:	Pohl	Date:	2019-02-06		yyyy-mm-dd
Resolution during test: (smaller than *d*)	1 kg	Time:	11:00		hh:mm:ss
		Barometric pressure:	--		hPa

Automatic zero-setting:

[ ] Non existent [X] Not in operation [ ] Out of working range [ ] In operation

Marked nominal voltage, U_{nom} = 230 V or voltage range, U_{min} / U_{max} [1] = 195,5 / 253 V

Pre-test information

	Flowrate (t /h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} (kg)
Q_{max}	100	14400	5

Q (t /h)	Load, L (kg)	Pulses*	Calculated totalization, T** (kg)	Indicated totalization, I (t)	Difference, $I - T$ (kg)	E %***
Test 1 at reference voltage[2]						
Q_{max}	5	14400	8000	7,998	-2	-0,025
Test 2 at reference voltage: 0.85 × U_{nom} or 0.85 × U_{min}						
Q_{max}	5	14400	8000	7,998	-2	-0,025
Test 3 at reference voltage: 1.10 × U_{nom} or 1.10 × U_{max}						
Q_{max}	5	14400	8000	7,998	-2	-0,025
Test 4 at reference voltage						
Q_{max}	5	14400	8000	7,998	-2	-0,025

[X] Passed [ ] Failed

EFG = +/- 0,126 %
= +/- 10 kg

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause 1 for the simulated totalization calculation formula
*** See the "explanatory notes" section for the E % calculation formula

Remarks:

[1] If a voltage-range is marked, use the average value as nominal U_{nom}
[2] The reference voltage shall be as defined in IEC 61000-4-11

Include information that affect the test condition, as indicated in the last paragraph of R 50-2, 7.1

1.7 Metrological characteristics (R 50-1, 3.7.5 & R 50-2, 8)

1.7.1 Repeatability (R 50-1, 3.7.5.1 & R 50-2, 8.1)

Application no.: BEV-13.414/0016-NB/2017

Type designation: F-EBW

Observer: Ströck

Resolution during test: (smaller than *d*) 1 kg

	At start	At end	
Temp.:	22,5	22,9	°C
Rel. h.:	34,5	34,5	%
Date:	2018-05-04	2018-05-08	yyyy-mm-dd
Time:	11:00	14:00	hh:mm:ss
Barometric pressure:	--	--	hPa

Pre-test information

Equivalent pulses for Σ_{min} at L	Static load, L (kg)
72000	20 % Max = 1
28800	50 % Max = 2,5
19200	75 % Max = 3,75
14400	Max = 5

Load, L	Pulses*	T**	Indicated total		Difference $I_1 - I_2$
			Run 1, I_1	Run 2, I_2	
1	72000	8000	7983	7983	0
2,5	28800	8000	7995	7995	0
3,75	19200	8000	7995	7995	0
5	14400	8000	7998	7998	0

[X] Passed [ ] Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement

** See the simulation page in clause 1 for the simulated totalization calculation formula

Remarks:

Include information that affect the test condition, as indicated in the last paragraph of R 50-2, 7.1

1.7.2 Discrimination of the totalization indicating device (R 50-1, 3.7.5.2 & R 50-2, 8.2)

Application no.: BEV-13.414/0016-NB/2017

Type designation: F-EBW

Observer: Ströck

Resolution during test: (smaller than d) 1 kg

	At start	At end	
Temp.:	23,1	23,4	°C
Rel. h.:	--	--	%
Date:	2018-05-09	2018-05-18	yyyy-mm-dd
Time:	9:30	12:00	hh:mm:ss
Barometric pressure:	--	--	hPa

Pre-test information

Equivalent pulses for Σ_{min} at L	Static load, L (kg)
72000	20 % Max = 1
28800	50 % Max = 2,5
199200	75 % Max = 3,75
14400	Max = 5

First weigh table load, L_1	Pulses	Additional load L_2	Pulses	Calculated totalized load		Indicated totalized load		Difference, $I_2 - I_1$	Diff. $T_2 - T_1$
				T_1	T_2	I_1	I_2		
20 % Max = 1	72000	2 g	72000	8000	8016	7983	7998	15 kg	16 kg
50 % Max = 2,5	28800	4 g	28800	8000	8013	7995	8007	12 kg	13 kg
75 % Max = 3,75	19200	7 g	19200	8000	8015	7998	8011	13 kg	15 kg
Max = 5	14400	9 g	14400	8000	8014	7998	8013	15 kg	14 kg

[X] Passed [ ] Failed

Where: L_1 = First weigh table load

$$L_2 = \begin{cases} \text{load} \times 0.07\,\% \text{ for class } 0.2 \\ \text{load} \times 0.175\,\% \text{ for class } 0.5 \\ \text{load} \times 0.35\,\% \text{ for class } 1 \\ \text{load} \times 0.7\,\% \text{ for class } 2 \end{cases}$$

"Pulses" = the number of pulses sent by the displacement transducer (or simulator) to simulate belt movement

$$T = \frac{\text{Pulses transmitted} \times L}{\text{Pulses per weighlength}}$$

Remarks: Anforderung = $(I_2 - I_1) * 2 > (T_2 - T_1)$

Include information that affect the test condition, as indicated in the last paragraph of R 50-2, 7.1