Anhang 3 zu Ergebnisbericht Nr. T16-1157 über die Labortests der SW zum kontinuierlichen Totalisieren der Bauart "F-EBW"

- Wiederholung von Punkt 1.1 "Warm-up time" und
- Ergänzung von Punkt 1.5.4.2 "DC mains voltage variation" Mai 2020

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.: | 209 und 54 | 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 | | 209 und 54 |
| Wägezelle | HBM Z6FC3, 20 kg | | 31444990 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Simulator documentation

| System or module name | Drawing number or software reference | Issue level | Serial no. |
|---|---|---|---|
| Impulsgeber | Keysight "33500 B" | | MM004006 |
| Labornetzteil | ISO-Tech "IPS-405" | | 712D009G1 |
| Thermo-Hygrometer | Lufft "OPUS 10" | | MM003615 |
| Gewichtsstücke | 2 kg und 10 kg | | MM003552 und MM003566 |
| | | | |
| | | | |
| | | | |
| | | | |

## 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 [ ] 1 [ ] 2

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $Q_{min}$ = | 2 | t/h | $Q_{max}$ = | 10 | t/h | $\Sigma_{min}$ = | 400 kg |
| Speed, $v$ = | 1 | m/s | $v_{min}$ = | -- | m/s | $v_{max}$ = | -- m/s |
| Max = | 10 | kg | $d$ = | 0,1 | kg | $W_L$ = | 1 m |

$U_{nom}$** = 24 VDC $U_{min}$ = [ ] V $U_{max}$ = [ ] V $f$ = -- Hz Battery, $U$ = -- V

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

Temperature range: -10 bis + 40 °C

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

| | | | |
|---|---|---|---|
| Instrument submitted: | | Load sensor: | Z6 F 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 type evaluation tests

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

Report date: 2020-05-30 Manufacturer: Kukla Waagenfabrik

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

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

**1.1 Warm-up time (R 50-1, 5.5.3 and R 50-2, 5.2)**

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

Type designation: F-EBW

Observer: Roman Pohl

Resolution during test: (smaller than *d*) 0,1 kg

| | At start | At end | |
|---|---|---|---|
| Temp.: | 23,7 | 25,7 | °C |
| Rel. h.: | 28,0 | 27,0 | % |
| Date: | 2020-02-27 | 2020-02-27 | yyyy-mm-dd |
| Time: | 08:00 | 09:05 | hh:mm:ss |

Duration of disconnection before test: etwa 20 Stunden
--> Zählerstand der letzten Messung noch vorhanden!

Automatic zero-setting:

Werte in kg

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

| Weight table load % Max as defined in R 50-1, 3.5 Q in kg/h | Applied load | Time* | Pulses** | Calculated totalization, *T**** | Indicated totalization, *I* | Error, *E* %***** | Zeit |
|---|---|---|---|---|---|---|---|
| Min load (nominally 20 % of Max) Q = 1998 | 2 kg | 0 min | 36000 | 399,6 | 399,7 | 0,025 | 08:10 |
| Max capacity (Max) 9997 | 10 kg | | 7200 | 399,9 | 400,1 | 0,050 | 08:25 |
| Min load (nominally 20 % of Max) Q = 1998 | 2 kg | | 36000 | 399,6 | 399,7 | 0,025 | 08:28 |
| Max capacity (Max) 9997 | 10 kg | | 7200 | 399,9 | 400,1 | 0,050 | 08:45 |
| Min load (nominally 20 % of Max) | | | | | | | |
| Max capacity (Max) | | | | | | | |
| Min load (nominally 20 % of Max) Q = 1998 | 2 kg | 30 min | 36000 | 399,6 | 399,6 | 0,0 | 08:48 |
| Max capacity (Max) 9997 | 10 kg | | 7200 | 399,9 | 400,2 | 0,075 | 09:03 |

[X] Passed [ ] Failed

EFG = +/- 0,126 %
= +/- 0,50 kg

* Counted from the moment an indication first appears
** 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 affects the test condition, as indicated in the last paragraph of R 50-2, 7.1.

### 1.5.4.2 DC mains voltage variation (R 50-2, 7.2.5)

| | | | At start | At end | |
|---|---|---|---|---|---|
| Application no.: | BEV-13.414/0016-NB/2017 | Temp.: | 24,2 | 24,5 | °C |
| Type designation: | F-EBW | Rel. h.: | 29,0 | 29,0 | % |
| Observer: | Roman Pohl | Date: | 2020-02-26 | 2020-02-26 | yyyy-mm-dd |
| Resolution during test: (smaller than *d*) | 0,1 kg | Time: | 07:25 | 07:40 | hh:mm:ss |
| | | Barometric pressure: | -- | -- | hPa |

Automatic zero-setting:

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

Marked nominal voltage, $U_{nom}$ = 24 VDC or voltage range, $U_{min}$ / $U_{max}$ [3] = -- / -- V

Pre-test information

| | Flowrate ( t /h) | Equivalent pulses for $\Sigma_{min}$ | Static load, $L$, for $\Sigma_{min}$ ( kg ) | $\Sigma_{min}$ |
|---|---|---|---|---|
| $Q_{max}$ | 10 | 7200 | 10 | 400 kg |

entspricht 144 Sekunden und 0,055 kg/Impuls

| $Q$ ( kg /h) | Load, $L$ ( kg ) | Pulses* | Calculated totalization, $T$** ( kg ) | Indicated totalization, $I$ ( kg ) | Difference, $I - T$ ( kg ) | $E$ %*** |
|---|---|---|---|---|---|---|
| Test 1 at reference voltage [4] = 24 V | | | | | | |
| $Q_{max}$ = 10000 | 10 | 7200 | 400,0 | 400,0 | 0,0 | 0,0 |
| Test 2 at minimum operating voltage = 18,8 V | | | | | | |
| $Q_{max}$ = 10000 | 10 | 7200 | 400,0 | 400,2 | 0,2 | 0,050 |
| Test 3 at reference voltage: 1.20 × $U_{nom}$ or 1.20 × $U_{max}$ = 28,8 V | | | | | | |
| $Q_{max}$ = 10000 | 10 | 7200 | 400,0 | 400,1 | 0,1 | 0,025 |
| Test 4 at reference voltage = 24 V | | | | | | |
| $Q_{max}$ = 10000 | 10 | 7200 | 400,0 | 400,2 | 0,2 | 0,050 |

[X] Passed [ ] Failed

EFG = +/- 0,126 %
= +/- 0,50 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

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

1) Einhaltung der kleinstmöglichen Nennspannung:

- Errormeldungen des Systems, wenn Spannungsversorgung geringer als 18,7 V ;
- Verlust des Wägezellensignals bei Unterschreiten von 17,3 V ;
- Abschalten des Systems bei Unterschreiten von 15,3 V

--> $\underline{U_{min\ (Test)} = 18{,}8\ V}$
(keine Fehlermeldungen und Waage voll funktionsfähig)

2) Berechnung der Mindestabgabemenge (gemäß Punkt 3.4 der OIML R50:2014):

- 2 % von $Q_{max}$ = 200 kg
- Abgabemenge bei einem Bandumlauf bei Qmax = 56 kg
  (20 Sekunden, 20 Meter)
- Anzahl der Teilungswerte = 800 x 0,1 kg = 80 kg
  (gemäß Punkt A 4.2 der OIML R50-1:1997, und
  Punkt 3.7.3 der OIML R50-2:2014 ist die Anzahl der
  Teilungswerte mit Faktor 5 zu erweitern.

--> $\underline{\Sigma_{min}}$ = 80 x 5 = $\underline{400\ kg}$

3) Berechnung der Anzahl an Impulsen für $\Sigma_{min}$:

- $v_{max}$ = 50 Hz  entspr. 50 Impulsen/Sekunde
- $Q_{max}$ = 10 t/h  entspr. 10000 / 3600 = 2,77 kg/s
  --> 2,77 / 50 = 0,055 kg/Impuls

- $\underline{\Sigma_{min}}$ = 400 kg  $\underline{\text{entspr.}}$ 400 / 0,055 = $\underline{7200\ Impulse}$