INTERNATIONAL RECOMMENDATION

OIML R 50-3

Edition 2014 (E)

Reconfirmed in 2024

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

ORGANISATION INTERNATIONALE DE MÉTROLOGIE LÉGALE

INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY

Reconfirmed 2024

Contents

Foreword

The International Organization of Legal Metrology (OIML) is a worldwide, intergovernmental organization whose primary aim is to harmonize the regulations and metrological controls applied by the national metrological services, or related organizations, of its Member States. The main categories of OIML publications are:

- **International Recommendations (OIML R),** which are model regulations that establish the metrological characteristics required of certain measuring instruments and which specify methods and equipment for checking their conformity. OIML Member States shall implement these Recommendations to the greatest possible extent;
- **International Documents (OIML D),** which are informative in nature and which are intended to harmonize and improve work in the field of legal metrology;
- **International Guides (OIML G),** which are also informative in nature and which are intended to give guidelines for the application of certain requirements to legal metrology; and
- **International Basic Publications (OIML B),** which define the operating rules of the various OIML structures and systems.

OIML Draft Recommendations, Documents and Guides are developed by Project Groups linked to Technical Committees or Subcommittees which comprise representatives from the Member States. Certain international and regional institutions also participate on a consultation basis. Cooperative agreements have been established between the OIML and certain institutions, such as ISO and the IEC, with the objective of avoiding contradictory requirements. Consequently, manufacturers and users of measuring instruments, test laboratories, etc. may simultaneously apply OIML publications and those of other institutions.

International Recommendations, Documents, Guides and Basic Publications are published in English (E) and translated into French (F) and are subject to periodic revision.

Additionally, the OIML publishes or participates in the publication of **Vocabularies (OIML V)** and periodically commissions legal metrology experts to write **Expert Reports (OIML E)**. Expert Reports are intended to provide information and advice, and are written solely from the viewpoint of their author, without the involvement of a Technical Committee or Subcommittee, nor that of the CIML. Thus, they do not necessarily represent the views of the OIML.

This publication - reference OIML R 50-3, Edition 2014 - was developed by Project Group 7 of OIML TC 9/SC 2 *Automatic weighing instruments*. It was approved for final publication by the International Committee of Legal Metrology in 2014 and will be submitted to the International Conference of Legal Metrology in 2016 for formal sanction.

OIML Publications may be downloaded from the OIML web site in the form of PDF files. Additional information on OIML Publications may be obtained from the Organization’s headquarters:

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Introduction

The “Test report format”, the subject of OIML R 50-3, aims at presenting, in a standardized format, the results of the various tests and examinations to which a type of a continuous totalizing automatic weighing instrument (belt weigher) shall be submitted with a view to its approval.

The “Test report format” consists of two parts, the “Checklist” and the “Test report”.

The “Checklist” is a summary of the examinations carried out on the instrument. It includes the conclusions of the results of the tests performed, experimental or visual checks based on the required performance criteria and associated tests in OIML R 50-1 and -2. The words or condensed sentences intend to remind the examiner of the requirements of R 50-1 and -2 without reproducing them.

The “Test report” is a record of the results of the tests carried out on the instrument. The “test report” forms have been produced based on the tests detailed in the performance test procedures (OIML R 50-2).

The “information concerning the test equipment used for type evaluation” shall cover all test equipment which has been used in determining the test results given in a report. The information may be a short list containing essential data (name, type, reference number for purpose of traceability). For example:

- Verification standards (accuracy or accuracy class, and no.);
- Simulator for testing of modules (name, type, traceability and no.);
- Climatic test and static temperature chamber (name, type and no.);
- Electrical tests, bursts (name of the instrument, type and no.);
- Description of the procedure of field calibration for the electromagnetic susceptibility test.

All metrology services or laboratories evaluating types of continuous totalizing automatic weighing instruments according to OIML R 50-1 and -2 or to national or regional regulations based on OIML R 50-1 and -2 are strongly advised to use this “Test report format”, directly or after translation into a language other than English or French. Its direct use in English or in French, or in both languages, is even more strongly recommended whenever test results may be transmitted by the country performing these tests to the approving authorities of another country, under bi- or multi-lateral cooperation agreements. In the framework of the OIML Certificate System for measuring instruments, use of the “Test report format” is mandatory.

Type evaluation report

Explanatory notes

Symbols	Meaning
I	Indication of the measuring instrument
I_c	Indication of the control instrument
I_n	nth indication
I	Static load
ΔL	Additional static load to next changeover point
T	Totalized load (calculated for simulation tests or controlled load for product tests) $T = \frac{\text{Pulses transmitted} \times L}{\text{Pulses per weigh length}}$ [*calculation for simulation*]
W_L	Weigh length
E	$I - T$
E %	Error as percentage for simulation tests, $E\ \% = (I - T) \times 100 / T$
P	Indication of the control instrument prior to rounding (digital indication): $P = I_c + 0.5\ d_c - \Delta L$
d	Totalization scale interval
d_c	Scale interval of the control instrument
p_i	Fraction of the MPE applicable to a module of the instrument which is examined separately
MPE	Maximum permissible error (absolute value)
EUT	Equipment under test
sf	Significant fault
Max	Maximum capacity of the instrument
Min	Minimum capacity of the instrument
U_{nom}	Nominal voltage value marked on the instrument
U_{max}	Highest value of a voltage range marked on the instrument
U_{min}	Lowest value of a voltage range marked on the instrument
v_{min}	Minimum operating speed
v_{max}	Maximum operating speed
e.m.f	Electromotive force
I/O	Input / output ports
RF	Radio frequency

Note: For simulation tests, T is calculated from the simulation test equipment and is the product of the static load, L, and pulse count as indicated in the individual tests and test report sheet.

For product tests, T is the indication of the control instrument prior to rounding, thus for product tests $T = P$.

The calculation of P is only relevant to the control instrument and the subsequent determination of T for product tests.

Explanatory notes (continued)

The name(s) or symbol(s) of the unit(s) used to express test results shall be specified on each form.

The boxes under the headings of the report should always be filled in according to the following example:

	At start	At end	
Temp.:	20.5	21.1	°C
Rel. h.:			%
Date:	2014-10-15	2014-10-15	yyyy-mm-dd
Time:	16:00:05	16:30:05	hh:mm:ss

where: Temp. = temperature
Rel. h. = relative humidity

"Date" in the test report refers to the date on which the test was performed.

In the disturbance tests, significant faults are faults greater than the absolute value of the appropriate maximum permissible error for influence factor tests for a load equal to Σ_{min}, for the designated class of the belt weigher.

Identification of the instrument

Application no.:		Type designation:	
Identification no.:		Manufacturer:	
Software version:			
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.

Simulator documentation

System or module name	Drawing number or software reference	Issue level	Serial no.

Identification of the instrument (continued)

Application no.:		Type designation:	
Identification no.:		Manufacturer:	
Software version:			
Report date:			

Simulator function (summary)

(Simulator description and drawings, block diagram, etc. should be attached to the report if available)

Identification of the instrument (continued)

Application no.:		Type designation:	
Identification no.:		Manufacturer:	
Software version:			
Report date:			

Description or other information pertaining to identification of the instrument:
(attach photograph here if available)

General information concerning the type

Application no.: ..... Manufacturer: .....

Type designation: ..... Applicant: .....

Instrument category: .....

Testing on: ☐ Complete instrument ☐ Module*

Accuracy class: ☐ 0.2 ☐ 0.5 ☐ 1 ☐ 2

Q_{min} = ☐ Q_{max} = ☐ Σ_{min} = ☐

Speed, v = ☐ m/s v_{min} = ☐ m/s v_{max} = ☐ m/s

Max = ☐ d = ☐ W_L = ☐ m

U_{nom}** = ☐ V U_{min} = ☐ V U_{max} = ☐ V f = ☐ Hz Battery, U = ☐ V

Zero-setting device: ☐ Non-automatic ☐ Semi-automatic ☐ Automatic

Temperature range ☐ °C

Printer: ☐ Built-in ☐ Connected ☐ Non present but connectable ☐ No connection

Instrument submitted: .....

Identification no.: .....

Software version: .....

Connected equipment: .....

.....

.....

Interfaces (number, nature): .....

.....

Evaluation period: .....

Date of report: .....

Observer: .....

Load sensor: .....

Manufacturer: .....

Type: .....

Capacity: .....

Number: .....

Classification symbol:

OIML R 60 Certificate of conformity. Please tick. If "Yes" supply certificate number.

Yes	No

Certificate number: .....

* 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

General information concerning the type (continued)

Application no.:	.....	Manufacturer:	.....
Type designation:	.....	Applicant:	.....
Instrument category:	.....		

Testing on: ☐ Complete instrument ☐ Module*

Use this space to indicate additional remarks and/or information: connecting equipment, interfaces and load cells, choice of the manufacturer regarding protection against disturbances, etc.

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

Information concerning the test equipment used for type evaluation

Application no.: ..... Type designation: .....

Report date: ..... Manufacturer: .....

List all test equipment used in this report (including descriptions of the equipment used for testing)

Equipment name	Manufacturer	Type no.	Serial no.	Used for (test references)

Configuration for test

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

Use this space for additional information relating to equipment configuration, interfaces, data rates, load cells, EMC protection options etc., for the instrument and/or simulator.

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			
Technical requirements R 50-1 clause 4			
Additional requirements for electronic belt weighers R 50-1 clause 5			
Metrological controls R 50-1 clause 6			
Test procedures R 50-2			
Overall result			

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.: ..... Type designation: .....

Report date: ..... Manufacturer: .....

R 50-3	Tests	Report page	Passed	Failed	Remarks
1	Simulation tests				
1.1	Warm-up time				
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				
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 Simulation tests (R 50-1, 7.3, R 50-2, 5.4)

Application no.: ..... Type designation: .....

Report date: ..... Observer: .....

Simulation tests

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

* 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)

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

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

Duration of disconnection before test .....

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range ☐ In operation

Weight table load % Max as defined in R 50-1, 3.5	Applied load	Time*	Pulses**	Calculated totalization, *T****	Indicated totalization, *I*	Error, *E* %*****
Min load (nominally 20 % of Max)		0 min				
Max capacity (Max)						
Min load (nominally 20 % of Max)						
Max capacity (Max)						
Min load (nominally 20 % of Max)						
Max capacity (Max)						
Min load (nominally 20 % of Max)		30 min				
Max capacity (Max)						

☐ Passed ☐ Failed

* 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.

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

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

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

Load, *L* ( )	Speed (m/s)	Flowrate (/h)	Revolutions* or pulses** ( )	Calculated totalization, *T*** ( )	Indicated totalization, *I*	Difference *I* – *T* ( )	Error, *E* %****

☐ 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

Remarks:

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

1.3 Eccentric loading (R 50-1, 3.7.2 & R 50-2, 5.4.2)

Application no.: .....

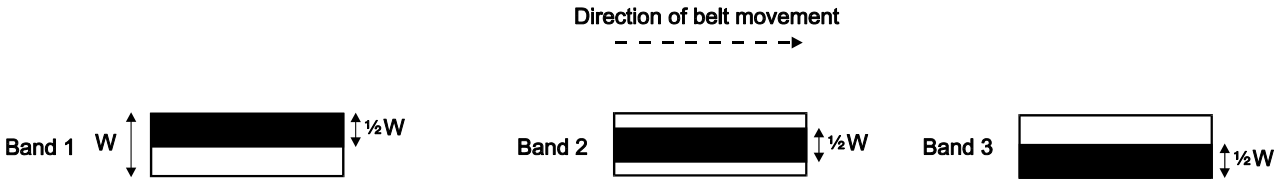
Type designation: .....

Observer: .....

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

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

Location of test loads:



	Load, *L* ( )	Pulses*	Calculated totalization, *T*** ( )	Indicated totalization, *I* ( )	Difference, *I* – *T* ( )	*E* %***
Band 1						
Band 2						
Band 3						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the Simulation page in section 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:

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:

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

1.5 Influence quantities (R 50-1, 3.7.4 & R 50-2, 7)
1.5.1 Static temperatures (R 50-1, 3.7.4.1 & R 50-2, 7.2.1)

Application no.: ..... Type designation: .....

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

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range

Pre-test information:

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			
$Q_{intermediate}$			
Q_{min}			

Test results (note that at each "Q", the test is repeated)

Test 1 - Static temperature 20 °C

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause1 for the simulated totalization calculation formula
*** See the "explanatory notes" section for the E % calculation formula

1.5.1 Static temperatures (continued)

Application no.: ..... Type designation: .....

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

Test 2 - Static temperature specified high (°C)

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause1 for the simulated totalization calculation formula
*** See the "explanatory notes" section for the E % calculation formula

1.5.1 Static temperatures (continued)

Application no.: ..... Type designation: .....

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

Test 3 - Static temperature specified low (°C)

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

Q (/h)	Load, *L* ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, *I* ( )	Difference, *I* – *T* ( )	*E* %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

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

** See the simulation page in clause1 for the simulated totalization calculation formula

*** See the "explanatory notes" section for the *E* % calculation formula

1.5.1 Static temperatures (continued)

Application no.: ..... Type designation: .....

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

Test 4 - Static temperature 5 °C

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

Q (/h)	Load, *L* ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, *I* ( )	Difference, *I* – *T* ( )	*E* %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause1 for the simulated totalization calculation formula
*** See the "explanatory notes" section for the *E* % calculation formula

1.5.1 Static temperatures (continued)

Application no.: ..... Type designation: .....

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

Test 5 - Static temperature 20 °C

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

Q (/h)	Load, *L* ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, *I* ( )	Difference, *I* – *T* ( )	*E* %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause1 for the simulated totalization calculation formula
*** See the "explanatory notes" section for the *E* % calculation formula

Remarks:

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

1.5.2 Temperature effect at zero flowrate (R 50-1, 3.7.4.2 & R 50-2, 7.2.2)

Application no.: ..... Type designation: .....

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

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range

Temperature at start specified minimum ( ) °C

	At start	At end	
Rel. h.:			%
Date:			yyyy-mm-dd
Time:			hh:mm:ss
Barometric pressure:			hPa

	Temp. °C	Pulses	Indicated totalization, *I*, at start ( )	Indicated totalization, *I*, at end ( )	Change in indication ( )	Report page*	Date	Time
Start temp.								
End temp.								
Start temp.								
End temp.								
Start temp.								
End temp.								
Start temp.								
End temp.								
Start temp.								
End temp.								

☐ Passed ☐ Failed

Where: temp. = temperature

The rate of temperature change between totalizations shall not exceed 5 °C per hour.

Remarks:

* Indicate the report page of the relevant test where the temperature effect at zero flowrate and static temperature tests are conducted together.

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

1.5.3 Damp heat (R 50-1, 5.5.1 & R 50-2, 7.2.3)

Application no.: ..... Type designation: .....

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

Damp heat tests are performed according to one of the options in R 50-1, 5.5.1. The results for the option chosen are recorded in 1.5.3.1 or 1.5.3.2 below accordingly.

1.5.3.1 Damp heat, steady state (non-condensing) (R 50-1, 5.5.1 & R 50-2, 7.2.3.1)

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range

Pre-test information:

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			
$Q_{intermediate}$			
Q_{min}			

Test results (Note that at each "Q", the test is repeated)

Initial test at reference temperature of 20 °C and relative humidity of 50 %

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

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

** See the simulation page in clause1 for the simulated totalization calculation formula

*** See the "explanatory notes" section for the E % calculation formula

1.5.3.1 Damp heat, steady state (non-condensing) (continued)

Application no.: ..... Type designation: .....

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

Test at specified high temperature (°C), relative humidity 85 %

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

Final test at reference temperature 20 °C, relative humidity 50 %

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause1 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

1.5.3.2 Damp heat, cyclic (condensing) (R 50-1, 5.1.1, 5.1.2 & R 50-2, 7.2.3.2)

Application no.: ..... Type designation: .....

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

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range ☐ In operation

Pre-test information:

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			
$Q_{intermediate}$			
Q_{min}			

Test results (Note that at each "Q", the test is repeated)

Temperature rise from reference at 95 % RH

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

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

** See the simulation page in clause1 for the simulated totalization calculation formula

*** See the "explanatory notes" section for the E % calculation formula

1.5.3.2 Damp heat, cyclic (condensing) (continued)

Application no.: ..... Type designation: .....

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

Specified high temperature at 93 % RH

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ 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

Remarks:

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

Temperature drop to reference at 95 % RH

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

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Q_{min}						
$Q_{intermediate}$						
Q_{max}						
Q_{min}						

☐ Passed ☐ Failed

* The pulses sent by the displacement transducer (or simulator) to simulate belt movement
** See the simulation page in clause1 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

1.5.4 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.:				
Type designation:	Temp.:			°C
Observer:	Rel. h.:			%
Resolution during test: (smaller than *d*)	Date:			yyyy-mm-dd
	Time:			hh:mm:ss
.....	Barometric pressure:			hPa

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range ☐ In operation

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max} [1] = ... / V

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

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

☐ 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

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

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

		At start	At end	
Application no.:				
Type designation:	Temp.:			°C
Observer:	Rel. h.:			%
Resolution during test: (smaller than *d*)	Date:			yyyy-mm-dd
.....	Time:			hh:mm:ss
	Barometric pressure:			hPa

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range ☐ In operation

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max} [3] = ... / V

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Test 1 at reference voltage[4]						
Q_{max}						
Test 2 at minimum operating voltage						
Q_{max}						
Test 3 at reference voltage: 1.20 × U_{nom} or 1.20 × U_{max}						
Q_{max}						
Test 4 at reference voltage						
Q_{max}						

☐ 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

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

1.5.5 Battery voltage variation, not mains connected (DC) (R 50-1, 3.7.4.3, 5.5.5 & R 50-2, 7.2.6)

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
Barometric pressure:			hPa

Automatic zero-setting:

☐ Non existent ☐ Not in operation ☐ Out of working range ☐ In operation

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max} [5] = ... / V

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Q (/h)	Load, L ( )	Pulses*	Calculated totalization, T** ( )	Indicated totalization, I ( )	Difference, $I - T$ ( )	E %***
Test 1 at minimum operating voltage						
Q_{max}						
Test 2 at reference voltage, U_{nom} [6] or U_{max}						
Q_{max}						
Test 3 at lower limit: minimum operating voltage						
Q_{max}						
Test 4 at reference voltage, U_{nom}						
Q_{max}						

☐ 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

Remarks:

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

[5] If a voltage-range is marked, use the average value as nominal U_{nom}
[6] The minimum battery supply voltage is to be specified by the manufacturer of the instrument

1.6 Disturbances (R 50-1, 5.5.2 & R 50-2, 7.3)

1.6.1 AC mains voltage dips, short interruptions and reductions (R 50-1, 5.5.2 & R 50-2, 7.3.1)

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
Barometric pressure:			hPa

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max} [7] = ... / V

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Disturbance					Result		
Amplitude (% of U_{nom} [8])	Duration (cycles)	Number of disturbances	Repetition interval	Pulses	Indicated totalization, I	Significant fault	
						No	Yes (remarks)
	without disturbance						
0	0.5	10					
0	1	10					
40	10	10					
70	25/30 [9]	10					
80	250/300 [9]	10					
0	250/300 [9]	10					

☐ Passed ☐ Failed

Remarks:

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

[7] If a voltage-range is marked, use the average value as nominal U_{nom}
[8] The reference voltage shall be as defined in IEC 61000-4-11.
[9] These values are for 50 Hz/60 Hz, respectively.

1.6.2 Bursts (fast transient tests) on mains power lines and on signal, data and control lines (R 50-1, 5.5.2 & R 50-2, 7.3.2)

1.6.2.1 Bursts on AC and DC mains power lines

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
Barometric pressure:			hPa

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Kind or type of voltage supply: ☐

DC ☐ Other form ☐ Voltage ☐

Power supply lines: test voltage 2.0 kV, duration of the test: 1 min at each polarity

Connection			Polarity				
L	N	PE		Pulses	Indicated totalization, I ( )	Significant fault	
↓ ground	↓ ground	↓ ground				No	Yes (remarks)
without disturbance							
X			pos				
			neg				
without disturbance							
	X		pos				
			neg				
without disturbance							
		X	pos				
			neg				

Where L = line, N = neutral, PE = protective earth

☐ Passed ☐ Failed

Remarks:

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

1.6.2 Bursts (fast transient tests) on mains power lines and on signal, data and control lines (R 50-1, 5.5.2 & R 50-2, 7.3.2)

1.6.2.2 Bursts on signal, data and control lines

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
Barometric pressure:			hPa

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

I/O signals, data and control lines: test voltage 1.0 kV, duration of the test: 1 min at each polarity

Cable/interface	Polarity	Pulses	Indicated totalization, I ( )	Significant fault	
				No	Yes (remarks)
without disturbance					
	pos				
	neg				
without disturbance					
	pos				
	neg				
without disturbance					
	pos				
	neg				
without disturbance					
	pos				
	neg				
without disturbance					
	pos				
	neg				
without disturbance					
	pos				
	neg				

Explain or make a sketch indicating where the clamp is located on the cable; if necessary, use an additional page.

☐ Passed ☐ Failed

Remarks:

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

1.6.3 Surges on AC and DC mains power lines and on signal, data and control lines (R 50-1, 5.5.2 & R 50-2, 7.3.3)

1.6.3.1 Surges on AC and DC mains power lines

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
Barometric pressure:			hPa

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Kind or type of voltage supply: ☐

DC ☐ Other form ☐ Voltage ☐

Load, *L*	Disturbance			Result		
	3 positive and 3 negative surges (for each of the angles 0°, 90°, 180° and 270° in case of AC supply).			Indicated totalization, *I*	Significant fault	
	Amplitude / apply on		Polarity		No	Yes (remarks)
	without disturbance					
	1.0 kV	Line ↓ neutral	pos			
			neg			
	without disturbance					
	2.0 kV	Line ↓ PE	pos			
			neg			
	without disturbance					
	2.0 kV	Neutral ↓ PE	pos			
			neg			

Where PE = protective earth

☐ Passed ☐ Failed

Note: If significant faults are detected and acted upon, or if the EUT fails, the test point at which this occurs shall be recorded.

Remarks:

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

1.6.3.1 Surges on AC and DC mains power lines (continued)

Application no.:	.....	Type designation:	.....
Resolution during test: (smaller than *d*)	.....	Observer:	.....

Use this page for additional test set-up information.

1.6.3.2 Surges on signal, data and control lines

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
Barometric pressure:			hPa

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Signal and communication lines: test voltage 1.0 kV, 3 positive and 3 negative surges

Cable/interface	Polarity	Result			
		Load	Indicated totalization, I	Significant fault	
				No	Yes (remarks)
without disturbance					
C/1,1	pos				
	neg				
without disturbance					
C/1,2	pos				
	neg				
without disturbance					
C/1,3	pos				
	neg				
without disturbance					
C/1,4	pos				
	neg				
without disturbance					
C/1,5	pos				
	neg				
without disturbance					
C/1,6	pos				
	neg				

☐ Passed ☐ Failed

Note 1: Explain or make a sketch indicating where the clamp is located on the cable; if necessary, add additional pages.
Note 2: The cell references C/1,1 to C/1,6 should be used to cross-reference the cable or interface between Tables A and B.

Remarks:

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

1.6.3.2 Surges on signal, data and control lines (continued)

Application no.:	.....	Type designation:	.....
Resolution during test: (smaller than *d*)	.....	Observer:	.....

Use this page for additional test set-up information.

1.6.4 Electrostatic discharge (R 50-1, 5.5.2 & R 50-2, 7.3.4)

1.6.4.1 Direct application

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
Barometric pressure:			hPa

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

☐ Contact discharge ☐ Paint penetration

☐ Air discharge Polarity*: ☐ positive ☐ negative

Discharges			Pulses	Indicated totalization, I ( )	Significant fault	
Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)			No	Yes (remarks)
without disturbance						
2						
4						
6						
8 (air discharges)						

☐ Passed ☐ Failed

Note: If the EUT fails, the test point at which this occurs shall be recorded.

Remarks:

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

* IEC 61000-4-2 specifies that the test shall be conducted with the most sensitive polarity.

1.6.4 Electrostatic discharge test (continued)
1.6.4.2 Indirect application (contact discharges only)

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
Barometric pressure:			hPa

Pre-test information

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Polarity*: ☐ positive ☐ negative

Horizontal coupling plane

Load, L ( )	Discharges				Significant fault	
	Test voltage (kV)	Number of discharges ≥ 10	Repetitio interval (s)	Indicated totalization, I	No	Yes (remarks)
	without disturbance					
	2					
	4					
	6					

Vertical coupling plane

Load, L ( )	Discharges				Significant fault	
	Test voltage (kV)	Number of discharges ≥ 10	Repetitio interval (s)	Indicated totalization, I	No	Yes (remarks)
	without disturbance					
	2					
	4					
	6					

Note: If the EUT fails, the test point at which this occurs shall be recorded.

☐ Passed ☐ Failed

Remarks:

* IEC 61000-4-2 specifies that the test shall be conducted with the most sensitive polarity.

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

1.6.4 Electrostatic discharge test (continued)

			At start	At end	
Application no.:	.....				
Type designation:	.....	Temp.:			°C
Observer:	.....	Rel. h.:			%
Resolution during test: (smaller than *d*)		Date:			yyyy-mm-dd
	.....	Time:			hh:mm:ss
		Barometric pressure:			hPa

Specification of test points of EUT (direct application), e.g. by photos or sketches

a) Direct application

Contact discharges:

Air discharges:

b) Indirect application

1.6.5 Immunity to electromagnetic fields (R 50-1, 5.5.2 & R 50-2, 7.3.5)

1.6.5.1 Immunity to radiated electromagnetic fields (R 50-1, 5.5.2 & R 50-2, 7.3.5.1)

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
Barometric pressure:			hPa

Pre-test information

Test severity:

Frequency range: 80[10] to 2000 MHz
Field strength: 10 V/m
Modulation: 80 % AM, 1 kHz, sine wave

Rate of sweep: ☐

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Disturbance				Result			
Test facility	Frequency Range (MHz)	Polarization	Facing EUT	Pulses	Indicated totalization, I	Significant fault	
						No	Yes (remarks) (Remarks)
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				

Note: If EUT fails, the frequency and level at which this occurs shall be recorded.

☐ Passed ☐ Failed

Remarks:

[10] For instruments having no mains or other I/O ports available so that the conducted test according to R 50-2, 7.3.5.2 cannot be applied, the lower limit of the radiation test is 26 MHz

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

1.6.5.1 Immunity to radiated electromagnetic fields (continued)

Application no.:	.....	Type designation:	.....
Resolution during test: (smaller than *d*)	.....	Observer:	.....

Additional information regarding testing, e.g., by photos or sketches

1.6.5 Immunity to electromagnetic fields (R 50-1, 5.5.2 & R 50-2, 7.3.5) (continued)

1.6.5.2 Immunity to conducted electromagnetic fields (R 50-1, 5.5.2 & R 50-2, 7.3.5.2)

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
Barometric pressure:			hPa

Pre-test information

Test severity:

Frequency range: 0.15–80 Mhz
RF amplitude: 10 V_{emf}
Modulation: 80 % AM, 1 kHz, sine wave

Rate of sweep:

	Flowrate (/h)	Equivalent pulses for Σ_{min}	Static load, L, for Σ_{min} ( )
Q_{max}			

Disturbance			Result		
Frequency range (MHz)	Cable/interface	Level (V_{emf})	Indicated totalization, I	Significant fault	
				No	Yes (remarks)
without disturbance					
without disturbance					
without disturbance					
without disturbance					
without disturbance					
without disturbance					

Note: If EUT fails, the frequency and level at which this occurs must be recorded.

☐ Passed ☐ Failed

Remarks:

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

1.6.5.2 Immunity to conducted electromagnetic fields (continued)

Application no.:	.....	Type designation:	.....
Resolution during test: (smaller than *d*)	.....	Observer:	.....

Additional information regarding testing, e.g., by photos or sketches

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.: .....

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
Barometric pressure:			hPa

Pre-test information

Equivalent pulses for Σ_{min} at L	Static load, L ( )
	20 % Max =
	50 % Max =
	75 % Max =
	Max =

Load, L	Pulses*	T**	Indicated total		Difference $I_1 - I_2$
			Run 1, I_1	Run 2, I_2	

☐ 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.: .....

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
Barometric pressure:			hPa

Pre-test information

Equivalent pulses for Σ_{min} at L	Static load, L ( )
	20 % Max =
	50 % Max =
	75 % Max =
	Max =

First weigh table load, L_1	Pulses	Additional load L_2	Pulses	Calculated totalized load		Indicated totalized load		Difference, $I_2 - I_1$
				T_1	T_2	I_1	I_2	
20 % Max =								
50 % Max =								
75 % Max =								
Max =								

☐ 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:

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

1.7.3 Discrimination of the totalization indicating device used for zero totalization (R 50-1, 3.7.5.3 & R 50-2, 8.3)

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
Barometric pressure:			hPa

Test duration = 3 minutes, equivalent pulses = ☐

Test	Initial total, T_1 ( )	Pulses	Final total, T_2 ( )	Pulses	Difference, $T_1 - T_2$ ( )
Weight added					
1					
2+					
3					
4+					
5					
6+					
Weight removed					
7+					
8					
9+					
10					
11+					
12					

☐ Passed ☐ Failed

Where: + indicates presence of test weight on the load receptor

$$\text{Test weight} = \begin{Bmatrix} 0.02\,\% \text{ of Max for class } 0.2 \\ 0.05\,\% \text{ of Max for class } 0.5 \\ 0.1\,\% \text{ of Max for class } 1 \\ 0.2\,\% \text{ of Max for class } 2 \end{Bmatrix}$$

Remarks:

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

1.7.4 Short- and long-term stability of zero (R 50-1, 3.7.5.4 & R 50-2, 8.4)

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
Barometric pressure:			hPa

Elapsed time in min.	ZTID indication	Load totalized in 3 min.		Elapsed time in min.	ZTID indication	Load totalized in 3 min.
0				195		
3				198		
6				201		
9				204		
12				207		
15				210		

Where ZTID = Zero totalization indicating device

Requirement (R 50 -1, 3.7.5.4.1)	class 0.2: 0.000 5 %	class 0.5: 0.001 25 %	class 1: 0.002 5 %	class 2: 0.005 %
Difference between the highest and lowest indicated values obtained in the set of the six readings from 0 minutes to 15 minutes =				
Difference between the highest and lowest indicated values obtained in the set of the six readings from 195 minutes to 210 minutes =				
Requirement (R 50-1, 3.7.5.4.2)	class 0.2: 0.000 7 %	class 0.5: 0.001 75 %	class 1: 0.003 5 %	class 2: 0.007 %
Difference between the highest and lowest indicated values obtained in the set of the twelve readings from 0 minute to 210 minutes =				

☐ Passed ☐ Failed

Remarks:

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

1.8 In-situ tests (R 50-1, 3.8 & 7.1 and R 50-2, 9 & 10)

Location details:	
In-situ data:	
Application no.:	
Type designation:	
Observer:	
Date:	

Data	Derivation	Data ref.	Value	Units
Totalization scale interval		d		
Scale interval for zero-setting	From the device used for zero indication			
Maximum capacity	Maximum net load of the load receptor	Max		
Belt speed	Maximum speed	v_{max}		m/s
	Minimum speed	v_{min}		m/s
Maximum flowrate	Max × v_{max}	Q_{max}		kg/h or t/h
Minimum flowrate	Normally 20 % of Q_{max}, but ≤ 35 % of Q_{max}	Q_{min}		kg/h or t/h
Weigh length		W_L		m
Length of belt		B		m
Time per belt revolution	Minimum = B / v_{max}			s
	Maximum = B / v_{min}			s
Load for one belt revolution at Q_{max}	$\frac{Q_{max} \times B}{v_{max}}$	(1)		kg or t
2 % of the load at Q_{max} for 1 hour	0.02 × load at Q_{max}	(2)		kg or t
Table 3 (R 50-1)	$\begin{cases} 2000\,d \text{ for class } 0.2 \\ 800\,d \text{ for class } 0.5 \\ 400\,d \text{ for class } 1 \\ 200\,d \text{ for class } 2 \end{cases}$	(3)		kg or t
Minimum totalized load, Σ_{min}	Largest of (1), (2) and (3)	Σ_{min}		kg or t
Minimum test load, Σ_t	= Σ_{min} unless all totalizations are over whole belt revolutions, then Σ_t = larger of (2) and (3)	Σ_t		kg or t
*				

* Insert other relevant data as necessary

Comments on site conditions (e.g. environmental protection of belt weigher, weather conditions, product weighed):

1.8.1 Maximum permissible errors on checking of zero (R 50-1, 3.8.2 & R 50-2, 9.1) and where Σ_{min} is equal to or less than 3 belt revolutions at Q_{max}

Maximum variation during zero-load test (R 50-1, 3.8.4 & R 50-2, 9.1.2)

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

Note: ☐ When Σ_{min} is less than or equal to 3 belt revolutions at Q_{max}, use the indication from the totalization indicator, and tick this box

☐ In all other cases, the indication shall be from the indication device used for zero setting, and tick this box

Test no.	Belt revolutions	Duration (s)	Initial indication, I_1	Final indication, I_2	Difference, $I_2 - I_1$
1					
2					

Where a separate zero (test) totalization indication device (ZTID) is provided and Σ_{min} is less than or equal to 3 belt revolutions at Q_{max} then the following table should also be completed.

Test no.	Initial indication, I_1	Maximum indication, I_{max}	Minimum indication, I_{min}	$\lvert I_1 - I_{max} \rvert$ (A)	$\lvert I_1 - I_{min} \rvert$ (B)	Greater of (A) or (B)
1						
2						

☐ Passed ☐ Failed

Remarks:

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

1.8.2 Discrimination of the indicator used for zero-setting (R 50-1, 3.8.3 & R 50-2, 9.1.1)

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

Test	Load, L_D ( )	Belt revolutions	Duration ( )	Indication		Difference, $I_1 - I_2$
				I_1	I_2	
A						
B						
A						
B						
A						
B						
A						
B						

☐ Passed ☐ Failed

Where: L_D is discrimination = load, $L_D = \left\{ \begin{array}{l} 0.02\,\% \text{ of Max for class } 0.2 \\ 0.05\,\% \text{ of Max for class } 0.5 \\ 0.1\,\% \text{ of Max for class } 1 \\ 0.2\,\% \text{ of Max for class } 2 \end{array} \right\}$

Remarks:

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

2 In-situ product tests (R 50-1, 3.8, 6.2.2.1, 7.1 & R 50-2, 10)

2.1 Accuracy of control instrument

			At start	At end	
Application no.:	.....	Temp.:			°C
Type designation:	.....	Rel. h.:			%
Maximum capacity:	.....	Date:			yyyy-mm-dd
Minimum capacity:	.....	Time:			hh:mm:ss
Scale interval, d	.....				
Resolution during test: (smaller than d)	.....				
Observer:	.....				

Control instrument details:	.....	Belt weigher details:	.....
Type:	.....	Σ_{min}:	.....
Class:	.....	Σ_t (if different)	.....
Max capacity:	.....	Where Σ_t is the minimum test load defined in R 50-1, 3.4	.....
Min capacity:	.....		.....
Control instrument scale interval, d_c:	.....		.....
Approval no.:	.....	Transfer vehicle:	.....
Date of last test:	.....	Capacity:	.....

REQUIREMENT (R 50-1, 7.2.1):

The control method used for product tests shall enable determination of the weight of the product used for testing with an error not exceeding one-third of the appropriate MPE for automatic weighing in R 50-1, 3.2.1.

Example: Number of weighings on control instrument $= \dfrac{2\,\Sigma_t}{\text{Vehicle capacity}} = N$ (One gross, one tare for each load)

$$\text{Number of scale intervals for one} = \frac{\text{Vehicle gross load}}{d_c} = m$$

$$\text{Possible control instrument error} = \left\{ \begin{array}{c} \pm 0.5\, d_c \text{ for } 0 \le m \le 500 \\ \pm 1.0\, d_c \text{ for } 500 < m \le 2000 \\ \pm 1.5\, d_c \text{ for } 2000 < m \end{array} \right\} = E_c \text{ (Class III) per weighing}$$

$$\text{Requirement: } \frac{\text{MPE}}{100} \times \Sigma_t \times 1/3 \ge \sqrt{N} \times E_c$$

where $\sqrt{N}$ is an adjustment for the probable error of N partial weighings.

The metrological authority may want to take into consideration other factors such as journey distance, weather, product loss on route, etc.

2.2 Repeatability (R 50-1, 3.8.1 & R 50-2, 10.3.1)

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

Note: For multi-speed or variable-speed belt weighers the tests should be repeated as indicated in R 50-2, 10.3.2 & 10.3.3. A continuation test sheet is provided overleaf.

Test pair	Controlled load, *T*	Indication, *I* ( )	Feed flowrate (/h)	Error, *I* – *T* ( )	Relative error (%)	Relative error difference (%)
1						
2						
3						
4						
5						

☐ Passed ☐ Failed

Note: To be used to determine the following:
MPE for type evaluation (R 50-1, 6.1.3.1 & R 50-2, 10.3.2);
MPE for initial verification and in-service inspection (R 50-1, 6.2.2.1).

Remarks:

Include information that affect the test condition, as indicated in the last paragraph of R 50-1, 7.1

2.2 Repeatability (continued) - continuation test sheet

Speed = ... m/s

Test pair	Controlled load, T	Indication, I ( )	Feed flowrate (/h)	Error, $I - T$ ( )	Relative error (%)	Relative error difference (%)
1						
2						
3						
4						
5						

Speed = ... m/s

Test pair	Controlled load, T	Indication, I ( )	Feed flowrate (/h)	Error, $I - T$ ( )	Relative error (%)	Relative error difference (%)
1						
2						
3						
4						
5						

☐ Passed ☐ Failed

Remarks:

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

3 Checklist

Application no.: ..... Type designation: .....

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
3		METROLOGICAL REQUIREMENTS				
3.2		Maximum permissible errors				
3.2.1	10.3	Maximum permissible errors for automatic weighing: do not exceed values in R 50-1 Table 1 rounded to nearest *d*				
3.2.2	7	Maximum permissible errors for influence factor tests shall not exceed the values in R 50-1 Table 2 rounded to nearest *d*				
3.3	Observe	Agreement between multiple indicating devices				
		No difference between results				
3.4	Observe	Minimum value of minimum totalized load, $\Sigma_{min} \geq$ largest of the following:				
		2 % of load totalized in 1 hour at max flowrate	Confirm			
		Load obtained at maximum flowrate in one revolution of the belt	Confirm			
		Load corresponding to the appropriate number of totalization scale intervals in R 50-1 Table 3	Confirm			
3.5	Observe	Minimum flowrate:				
		Single speed belt weighers: General Q_{min} = 20 % of Q_{max}				
		Particular installation: $Q_{min} \leq$ 35 % of Q_{max}				
		Variable and multi-speed belt weighers: Q_{min} may be less than 20 % of Q_{max} and minimum instantaneous net load ≥ 20 % of Max				
3.6	Observe	The units of mass used on a belt weigher are: gram (g), kilogram (kg) and tonne (t)				
		The mass flow rate units to be used are: gram per hour (g/h), kilogram per hour (kg/h) and tonne per hour (t/h)				
		The belt speed is in metres per second (m/s)				
		Verify compliance using simulation:				
3.7.1	5.4.1	Variation of simulation speed: errors do not exceed MPEs for influence factor tests in R 50-1, 3.2.2				
3.7.2	5.4.2	Eccentric loading: errors do not exceed values in R 50-1, 3.2.2				
3.7.3	5.4.4	Zero-setting: totalization error does not exceed influence factor MPE in R 50-1, 3.2.2				

* Use continuation sheet if necessary.

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
3.7.4	7.2	Influence quantities				
3.7.4.1	7.2.1	Static temperatures				
3.7.4.2	7.2.2	Temperature effect at zero flowrate: error is not more than specified in R 50-1, 2.7.4.2				
3.7.4.3	7.2.4	Mains voltage(AC)				
3.7.4.4	7.2.5	Mains voltage (DC)				
3.7.4.4	7.2.6	Battery voltage (not main connected)				
3.7.5		Metrological characteristics				
3.7.5.1	8.1	Repeatability: difference between two results obtained for the same load ≤ absolute value of MPE for influence factor tests in R 50-1, 3.2.2				
3.7.5.2	8.2	Discrimination of the totalization indicating device: error is not more than specified in R 50-1, 3.8.3				
3.7.5.3	8.3	Discrimination of the totalization indicating device used for zero totalization: Visible differences between indications obtained at no load and for a load either deposited on or removed from the load receptor, equal to the following percentages of the maximum capacity:				
		0.02 % for class 0.2				
		0.05 % for class 0.5				
		0.1 % for class 1				
		0.2 % for class 2				
3.7.5.4	8.4	Stability of zero:				
3.7.5.4.1		Difference between the highest and lowest indicated values obtained in the set of the six readings from 0 minute to 15 minutes:				
		0.000 05 % for class 0.2				
		0.001 25 % for class 0.5				
		0.002 5 % for class 1				
		0.005 % for class 2				
		Difference between the highest and lowest indicated values obtained in the set of the six readings from 195 minutes to 210 minutes				
		0.000 05 % for class 0.2				
		0.001 25 % for class 0.5				
		0.002 5 % for class 1				
		0.005 % for class 2				
3.7.5.4.2	8.4	Difference between the highest and lowest indicated values obtained in the set of the twelve readings from 0 minute to 210 minutes =				
		0.000 07 % for class 0.2				
		0.001 75 % for class 0.5				
		0.003 5 % for class 1				
		0.007 % for class 2				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
3.8		In-situ method				
3.8.1	10.3	Repeatability: Difference between relative errors shall not exceed the absolute value of the appropriate MPE for automatic weighing in R 50-1, 3.2.1				
3.8.2	9.1	Maximum permissible errors on checking of zero: variations of the indication of zero do not exceed the following percentage of the load totalized at max flowrate for the duration of the test:				
		0.02 % for class 0.2				
		0.05 % for class 0.5				
		0.1 % for class 1				
		0.2 % for class 2				
3.8.3	9.1.1	Discrimination of the indicator used for zero-setting: There must be a visible difference between indications obtained at no load and for a load (deposited on or removed from the load receptor) equal to:				
		0.02 % for class 0.2				
		0.05 % for class 0.5				
		0.1 % for class 1				
		0.2 % for class 2				
3.8.4	9.1.2	Maximum variation during zero-load test: The totalization indicator shall not vary from the initial indicated value by more than the following percentage of the load totalized at Q_{max} for the duration of the test when Σ_{min} is less than 3 belt revolutions at Q_{max}:				
		0.07 % for class 0.2				
		0.175 % for class 0.5				
		0.35 % for class 1				
		0.7 % for class 2				
3.8.5	Observe	Indication over whole belt revolution (minimum load):				
		Include a means of permitting all test load readings to be obtained over a whole number of belt revolutions				
		Where such a facility is present it meets the requirements in R 50-1, 4.6 (b), and for material tests complies with R 50-1, 3.4(a) and (c) only				
3.9	5	The durability error due to wear and tear, or the decay of the properties of electronic components shall not be greater than the absolute value of the maximum permissible error for automatic weighing R 50-1, 3.2.2				
4		Technical requirements				
4.1	Observe	Suitability for use:				
		Instrument suits method of operation				
		Instrument suits products				
		Instrument suits accuracy class				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
4.2	Observe	Rated operating conditions: Instrument does not exceed the MPE				
4.3	Observe	Security of operation:				
4.3.1	6.2	Accidental maladjustment: effect is obvious				
	6.2	Adjustable components that can disturb the metrological performance of a belt weigher are held securely and the position of the component is accurately and permanently defined, and				
4.3.2	6.4	Operational adjustment: It is not possible for general totalization indicating device to be reset to zero				
		It is not possible to make operating adjustments or to reset other trade indicating devices during an automatic weighing operation				
4.3.3	Observe	Fraudulent use: No characteristics likely to facilitate fraudulent use				
4.3.4	Observe	Operating devices: Cannot normally come to rest in a position other than those intended unless all indication and printing disabled				
4.3.5	Observe	Conveyor interlock: If instrument is switched off/ceases to function:				
		Conveyor stops, or				
		Visible or audible signal is given				
4.3.6	Observe	Out of range warning or alarm:				
		Produces a continuous, clearly audible and/or visible warning or alarm, or				
		A record of the warning or alarm with the date, time, duration and totalized value on the applicable partial or general totalized printout, or on any supplementary recording devices; if:				
		The instantaneous load is above the maximum capacity of the weighing unit				
		The flowrate is above the maximum or below the minimum value				
		A breakdown, maladjustment or fault has been detected (R 50-1, 3.3.1)				
		A whole belt totalization device, if applicable, provides a totalization over less than a whole number of belt revolutions; or				
		The MPE on checking of zero (R 50-1, 3.8.2) has been exceeded (R 50-1, 4.5.1), if applicable				
4.3.7	Observe 6.3	Securing and sealing of components and pre-set controls:				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
		Components, interfaces and pre-set controls subject to legal requirements that are not intended to be adjusted or removed by the user are fitted with a securing means or enclosed. When enclosed, it is not possible to seal the enclosure. The seals are easily accessible				
		Adequate securing is provided on all parts of the measuring system which cannot be protected in any other way against operations liable to affect the measurement accuracy				
4.3.7.1	Observe	Securing and sealing measures:				
		Access to functions liable to affect metrological properties are restricted by means such as, a switch protected by a physical seal, a password with audit trail, hard key or identification tag				
		Software functions are secured against intentional, unintentional and accidental changes in accordance with the requirements of R 50-1, 5.8				
		Transmission of metrological data via interfaces are secured against intentional, unintentional and accidental changes in accordance with the requirements of R 50-1, 5.6.1				
		Measurement data held on storage devices are secured against intentional, unintentional and accidental changes in accordance with the requirements of R 50-1, 5.7				
4.3.7.2	Observe	Means for securing components and pre-set controls to which access or adjustment is prohibited is provided:				
		Physical seals, if available, must be broken to access the components or functions, and/or an audit trail system;				
		Physical seals which automatically memorize access to components or functions and it shall be possible to access and display this information, the records shall include the date and a means of identifying the authorized person making the intervention				
		The audit trail should contain sufficient information to identify which password or identification tag was used to make the intervention				
4.3.7.2	Observe	Means for securing components and pre-set controls to which access or adjustment is prohibited is provided:				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
		The traceability of the interventions shall be assured for at least a period of time specified by national legislation. Records of interventions shall be retained;				
		Records may not be overwritten, with the exception that if the storage capacity for records is exhausted, new records may replace the oldest record provided that the owner of the data has given permission to overwrite the records;				
		The sealing measures provided shall be easily accessible.				
4.4	Observe	Totalization indicating and printing devices:				
4.4.1	Observe	Quality of indication: allow reliable, simple, and non-ambiguous reading of the primary indications;				
		The standard uncertainty in the reading of an analogue indicating device shall not exceed 0.2 *d*;				
		The figures forming the primary indications shall be of a size, shape and clarity for reading to be easy;				
		The scales, numbering and printing shall permit the figures which form the results to be read by simple juxtaposition.				
4.4.2	Observe	Form of the indication:				
4.4.2.1	Observe	Unit of mass: contain the names or symbols of the units of mass in which they are expressed;				
		For any one indication of mass, only one unit of mass may be used;				
		Units of mass are indicated in small letters (lower case) as shown in R 50-1, 3.6.				
4.4.2.2	Observe	Digital indication:				
		Shows at least one figure beginning at the extreme right;				
		Zero may be indicated by one zero to the extreme right, without a decimal sign;				
		Weight values have not more than one non-significant zero to the right, and for values with decimal sign, the non-significant zero is allowed only in the third position after the decimal sign;				
		Decimal fraction is separated from its integer by a decimal sign, with the indication showing at least one figure to the left of the sign and all figures to the right;				
		Decimal sign is on one line with the bottom of the figures (example: 0.305 kg)				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
4.4.3		Scale interval:				
4.4.3.1	Observe	In the form 1×10^k, 2×10^k, or 5×10^k, "k" being a positive or negative whole number or zero;				
4.4.3.2	Observe	Scale interval, d, of a partial totalization indicating device is equal to scale interval of the general totalization indicating device;				
4.4.3.3	Observe	Scale interval of supplementary totalization indicating devices is at least equal to 10 times totalization scale interval				
4.4.4	Observe	Range of indication:				
	Observe	At least one totalization indicating device indicates a value equal to quantity of product weighed in 10 hours of operation at Q_{max};				
		A larger range of indication may be required for installations where larger deliveries are anticipated.				
4.4.5	6.4	Totalization indicating devices:				
		In automatic operation: it is not possible to reset the general totalization indicating device; or				
		Any totalization device to zero;				
		It is not possible to reset the partial totalization indicating device to zero unless the last total indicated before resetting to zero is printed; or				
		Stored in memory with identification;				
		for a multi-function display an automatic indication of the total is generated if the automatic operation is interrupted or during automatic operation at the latest 20 seconds after indication of another information;				
		With a device such as a whole belt totalization indicating device is provided, the belt weigher shall provide a valid totalization over a whole number of complete belt revolutions. In this case the requirements of R 50-1, 4.3.6 apply				
4.4.6	Observe	Engagement of totalization indicating and printing devices:				
		Permanently engaged and clearly indicates when they are not engaged;				
		There is a device which disengages the totalization indicating devices where it is definitely ensured that there is no movement of the belt or product feed cannot occur.				
4.4.7	Observe	Printing device:				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
		Printing is clear and permanent for the intended use;				
		Printed figures are at least 2 mm high;				
		If printing takes place, the name or the symbol of the unit of measurement is either to the right of the value; or				
		Above a column of values				
4.5	5.4.3 Observe	Zero-setting device:				
		The effective mass of the belt shall be balanced by a zero-setting device of a type appropriate to the principle of operation of the belt weigher;				
		Does not exceed 4 % of max capacity				
4.5.1	Observe	Semi-automatic and automatic zero-setting devices:				
		The setting to zero takes place after a whole number of revolutions of the belt, and				
		The end of the zero-setting operation is indicated; and				
		A change in zero observed during a zero-load test that exceeds the MPE, (R 50-1, 3.8.2) shall be corrected by an automatic zero-setting device when present;				
		For testing purposes, it shall be possible to disengage automatic zero-setting devices during testing as appropriate;				
		If an automatic zero-setting device is included must have interlock to prevent zero-setting				
4.6	Observe	Belt profile correction device (if fitted):				
		Permanently in operation; or				
		Permanently disabled (any ability to enable or disable is sealed against user access); or				
		Incorporates a mechanism to reliably synchronise the belt position with the stored (empty) belt profile;				
		May be combined with an automatic or semi-automatic zero-setting device; or				
		Operate separately from an automatic or semi-automatic zero-setting device				
4.7	Observe	Displacement transducer:				
		No possibility of slip whether the belt is loaded or not;				
		Displacement sensing devices are driven by the clean side of the belt;				
		Measurement signal corresponds with displacement of belt equal to or less than weigh length;				
		Adjustable parts can be sealed				
4.8	Observe	Belt weighers inclusive of conveyor:				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
		Constructed in a rigid manner;				
		Shall form a rigid assembly.				
4.8.1	Observe	Installation conditions (where applicable)				
		Instrument is installed where:				
		The frame support of the conveyor is constructed in a rigid manner;				
		In any straight longitudinal section the roller track is such that the belt is constantly supported on the weighing rollers (idlers);				
		Belt cleaning devices, if fitted, are positioned and operated so as to have no significant effect on the results;				
		Roller track does not cause slippage of the product;				
		Installation does not cause excessive additional errors				
4.8.1.1	Observe	Roller track:				
		Is protected against corrosion and clogging;				
		Is aligned properly				
4.8.1.2	Observe	Conveyor belt:				
		Variations in the mass per unit length of the belt (including belt joins) shall not have any significant effect on the results (so as to ensure the requirement of R 50-1, 3.8.4 is met).				
4.8.1.3	Observe	Speed control:				
		For single or multiple speed weighers, the speed of the belt during weighing shall not vary by more than 5 % of the nominal speed				
		For variable speed belt weighers having a speed setting control, the speed of the belt shall not vary by more than 5 % of the set speed				
4.8.1.4	Observe	Weigh length:				
		Installed in such a way that the weigh length and vertical alignment remains unchanged while in service;				
		It is possible to seal the weigh length adjusting devices on the belt weigher to prevent adjustments of the weigh length while in service				
4.8.1.5	Observe	Belt tension for belt weighers with load receptor: longitudinal tension is maintained independent of the effects of:				
		Temperature;				
		Wear;				
		Load;				
		No slip between belt and driving drum.				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
4.9		Descriptive markings:				
4.9.1	Observe	Markings shown in full:				
		Identification mark of the manufacturer;				
		Serial number and type designation of the belt weigher;				
		The inscription: zero testing shall involve at least ..... revolutions;				
		Mains voltage …..... V;				
		Mains frequency …..... Hz (if applicable);				
		Designation of type(s) of product to be weighed;				
		Weigh length, W_L = …..... m;				
		Product description;				
		Identification mark on each unit of the belt weigher consisting of separate but associated units				
4.9.2	Observe	Markings in code:				
		Type approval sign;				
		Maximum capacity, Max = ….. g, kg or t;				
		Temperature range = …..... °C / ……. °C, (if applicable, see R 50-1, 3.7.4.1);				
		Accuracy class 0.2, 0.5, 1 or 2;				
		Totalization scale interval, d = …. kg or t;				
		Nominal speed(s) of the belt, v = …. m/s, or				
		Range of speeds of the belt, v = .../.... m/s;				
		Maximum flowrate, Q_{max} = …….. g/h, kg/h or t/h;				
		Minimum flowrate, Q_{min} = …..... g/h, kg/h or t/h;				
		Minimum totalized load, Σ_{min} = ……. g, kg or t				
4.9.3	Observe	Supplementary markings: as required by metrological authority	Note in Remarks			
4.9.4	Observe	Presentation of descriptive markings:				
		Indelible and of a size, shape and clarity to enable legibility under typical weighing conditions;				
		Either in the national language or a language which is allowed to be applied in the particular country or in form of adequate, internationally agreed and published pictograms or signs;	Confirm			
		Grouped together in a clearly visible place either on a descriptive plate near the general totalization indicating device or on the indicating device itself;				
		In the case of a plate or sticker which is not destroyed when removed, a means of securing shall be provided; or				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
		It shall be possible to seal the plate bearing the markings				
	Observe	The markings above may also be shown on a software controlled programmable display provided that:				
		At least Max, Q_{max}, Q_{min}, Σ_{min} and d are displayed as long as the instrument is switched on;				
		Other marking may be shown on manual command; and				
		It must be described in the type approval certificate;				
		The markings are considered as device-specific parameters (see 2.2.11.4) and shall comply with the appropriate requirements for securing in R 50-1, 4.3.7 and 5.8				
	Observe	Software controlled display markings need not be repeated on the data plate, if they are shown on or indicated near the display of the weighing result, with the exception of the following markings which shall be shown on the data plate:				
		Max, Q_{max}, Q_{min}, Σ_{min} and d are shown near the display;				
		Type approval sign in accordance with national requirements;				
		Name or identification mark of the manufacturer;				
		Voltage supply;				
		Voltage supply frequency, (if applicable);				
		Pneumatic/hydraulic pressure, (if applicable);				
4.10	Observe	Verification marks:				
4.10.1		Position of verification marks:				
		Part on which it is located cannot be removed from the belt weigher without damaging the marks;				
		Allows easy application of mark without changing the metrological qualities of the belt weigher;				
		Is visible without the belt weigher or its protective covers having to be moved when it is in service				
4.10.2	Observe	Mounting: Belt weighers required to have verification marks shall have:				
		Verification mark support, at the place provided for above to ensure conservation of the marks;				
		When the mark is made by a stamp, the support is a strip of lead or other product with similar qualities inserted into a plate fixed to the belt weigher; or				
		Into a cavity in the belt weigher;				
		Space provided for adhesive transfer (if applicable);				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
5		Additional requirements for electronic belt weighers:				
5.1		General requirements				
5.1.1	7.3	Disturbances:				
	7.3.1	AC mains voltage dips, short interruptions and reductions				
	7.3.2	Bursts (fast transient tests) on mains power lines and on signal, data and control lines				
	7.3.3	Surges on AC and DC mains power lines and on signal, data and control lines				
	7.3.4	Electrostatic discharge test				
	7.3.5.1	Immunity to radiated electromagnetic fields				
	7.3.5.2	Immunity to conducted electromagnetic fields				
5.1.2	Observe	Durability:				
		Requirements in R 50-1, 3, 4 and 5.1.1 shall be met durably				
5.1.3	Observe	Evaluation for compliance:				
		Instrument has passed examination and tests specified in R 50-2:				
3.7.4.2	7.2.1	Static temperatures:				
3.7.4.2	7.2.2	Temperature effect at zero flowrate				
5.5.1	7.2.3.1	Damp heat, steady state (non-condensing)				
5.1.1	7.2.3.2	Damp heat, steady state (condensing)				
3.7.4		Power Supply variations:				
3.7.4.3 and 5.5.4	7.2.4	AC mains voltage variations				
3.7.4.3 and 5.5.5	7.2.5	DC mains voltage variations				
3.7.4.3 and 5.5.5	7.2.6	Battery voltage variations, not mains connected (DC)				
5.2	Observe	Application: requirements in R 50-1, 5.1.1 & 5.1.2 may be applied separately to:				
		Each individual cause of significant fault; and/or				
		Each part of the electronic instrument				
		Choice of (a) or (b) above is made by the manufacturer	Note in remarks			
5.3	Observe	Acting upon a significant fault:				
		Visual indication; or				
		Audible indication is provided and continues until user takes action or the fault disappears				
		Totalized load information is retained when a significant fault occurs				
5.4	Observe	Indicator display test: all relevant signs of indicating devices are activated				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
5.5		Functional requirements:				
5.5.1	7	Influence factors: complies with R 50-1, 3.7.4; and				
	7.2.3.1	Maintains its characteristics at a relative humidity of 85 % at the upper limit of its temperature range				
5.5.2	7.3	Disturbances:				
		Either difference in indications shall not exceed value in R 50-1, 2.4.5.4; or				
		Instrument detects and act upon a significant fault				
5.5.3	5.2.2	Warm-up time:				
		No indication/transmission of results and automatic operation is inhibited;				
5.5.4	Observe	Interface: does not affect metrological functions and instrument functions correctly				
5.5.4	7.2.4 7.2.5	Mains electrical power supply failure:				
		Retain the metrological information contained in the belt weigher at the time of failure for at least 24 hours; and				
		is capable of indicating that information for at least 5 minutes following energization during the 24-hour period;				
		Switch-over to emergency power supply shall not cause a significant fault.				
5.5.5	7.2.6	Battery power supply:				
		Either continues to function correctly or is automatically put out of service whenever the voltage drops below the specified minimum value;				
		Retains metrological information contained in the instrument at the time of failure for at least 24 hours;				
		Capable of indicating that information for at least 5 minutes following energization during the 24-hour period				
5.6	Observe	Interfaces:				
		Where used, the belt weighers shall continue to function correctly and its metrological functions (including all metrologically relevant parameters and software) shall not be influenced				
		Includes sufficient information on belt weigher interfaces as specified in R 50-1, 5.6.				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
5.6.1	Annex A.2.3	Interface security: Does not allow the legally relevant software and functions of the belt weigher and its measurement data to be inadmissibly influenced by: Other interconnected instruments; or Disturbances acting on the interface				
	Observe	An interface through which the functions mentioned above cannot be performed or initiated, need not be protected. Other interfaces shall be secured as follows:				
		Data is protected e.g., with a protective interface (R 50-1, 0.2.14.2), against accidental or intentional interference;				
		Hardware and software functions shall comply with the appropriate requirements for securing in R 50-1, 4.3.7 and 5.8;				
		It shall be easily possible to verify the authenticity and integrity of data transmitted to and from the belt weigher;				
		Other devices required by national regulations to be connected to the interfaces of a belt weigher shall be secured to inhibit automatically the operation of the belt weigher for reasons of the non-presence or improper functioning of the required device.				
5.7	Annex A.3	Data storage device:				
		Stored in internal memory or on external storage for subsequent use;				
		The stored data is adequately protected against intentional and unintentional changes during the data transmission and/or storage process;				
		Contains all relevant information necessary to reconstruct an earlier measurement.				
5.7.1	Observe	Data storage sealing measures:				
		Meets the appropriate requirements of R 50-1, 4.3.7 for securing;				
		External storage devices identification and security attributes shall be automatically verified to ensure integrity and authenticity;				
		Exchangeable storage media for storing measurement data need not be sealed provided that the stored data is secured by a specific checksum or key code;				
		When storage capacity is exhausted, new data may replace the oldest data provided that overwriting the old data has been archived and/or authorized.				
5.8	Annex A	Software:				
	Annex A.1	Legally relevant software of the belt weigher is identified by the manufacturer;				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
	Annex A.2.1	Sufficient information on software controlled instruments is available				
5.8.2	Annex A.2.2	Security of legally relevant software:				
		Legally relevant software is adequately protected against accidental or intentional changes;				
	Annex A.2.4	Software is assigned with appropriate software identification which is adapted in the case of every software change that may affect the functions and accuracy of the belt weigher;				
	Annex A.2.3	Functions performed or initiated via connected interfaces, i.e., transmission of legally relevant software, shall comply with the securing requirements for interfaces in R 50-1, 5.6.				
6	Annex C	Metrological controls				
		Measures to ensure durability shall be taken subject to national regulations, and shall include assessments under items (a) to (d) below in compliance with R 50-1, 3.9.	Note in remarks			
		a) Type approval				
		b) Initial verification				
		c) Subsequent verification				
		d) In-service verification				
6.1		Type evaluation:				
6.1.1	Observe	Documentation:				
		Metrological characteristics;				
		A standard set of specifications for the belt weigher;				
		A functional description of components and devices;				
		Drawings, diagrams and general software information;				
		Description and application of securing components, interlocks, adjustment devices, controls, etc. (R 50-1, 4.3, 5.8);				
		Details of fractions p_i (modules tested separately) R 50-2, 6.1.6.7				
		Totalization indicating and printing devices (R 50-1, 4.4);				
		Data storage device (R 50-1, 5.7);				
		Zero-setting devices (R 50-1, 4.5);				
		Interfaces (types, intended use, immunity to external influences instructions, etc., (R 50-1, 5.6);				
		For software controlled instruments detailed software information (R 50-1, 5.8);				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
		Drawing or photo of the instrument showing the principle and the location of control marks, securing marks, descriptive and verification marks (R 50-2, 4.9, 4.10);				
		Operating instructions, manual;				
		Any document or other evidence that the belt weigher complies with the requirements				
6.1.2	Observe	General requirements:				
		At least one and not normally >3 units that represent the definitive type, one in a form suitable for simulation testing in a laboratory				
		At least one unit installed at a typical site				
6.1.3	Observe	Examinations and tests				
		Complies with R 50-1, 3, particularly with reference to maximum permissible errors, when the instrument is operated in accordance with the manufacturer's specifications for range and product(s);				
		Complies with R 50-1, 4				
		Complies with R 50-1, 5				
		Submitted documents examined and tests carried out to verify that the instruments comply with the above requirements				
		Tests conducted without unnecessary commitment of resources				
		Metrological authority permits the results of these tests to be assessed for initial verification				
6.1.3.1	8.2	In-situ product tests shall be done as follows:				
		In accordance with the descriptive markings				
		Under the normal conditions of use for which the instrument is intended				
		With a quantity of the product not less than the minimum test load				
		At flowrates between the minimum and maximum values				
		At each belt speed for conveyors with more than one fixed speed, or throughout the speed range for variable speed conveyors				
		In accordance with the test methods in R 50-2, 10				
6.1.3.2	Observe	Provision for means of testing:				
		For the purposes of testing, the applicant may be required to furnish the metrological authority with the quantity of product, handling equipment, qualified personnel, and a control instrument	Confirm			

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
6.1.3.3	Observe	Place of testing:				
		The premises of the metrological authority to which the application has been submitted;				
		Any other suitable place mutually agreed upon between the metrological authority and the applicant				
6.1.4	Observe	Type approval certificate: states the appropriate accuracy classes 0.2, 0.5, 1 or 2, as specified at type approval stage and determined by compliance with the metrological requirements at initial verification of the instrument.				
6.1.5	Observe	Influence factor tests are applied to the complete instrument or simulator as specified in R 50-2, 7.2 in a manner that will reveal a corruption of the weighing result of any weighing process to which the belt weigher could normally be applied, in accordance with R 50-1, 3.7 and 5				
6.1.6	Annex B	Testing of a family of instruments or modules:				
		As agreed between the metrological authority and the manufacturer				
		Where testing the instrument as a whole is difficult or impossible				
		Where modules are manufactured and/or placed on the market as separate units to be incorporated in a complete instrument;				
		Where the applicant wants to have a variety of modules included in the approved type;				
		When a module is intended to be used for various kinds of belt weighers (in particular load sensors, indicators, data storage).				
6.1.6.1	Annex B	Selection of EUTs:				
		Number of EUTs selected is minimized but nevertheless sufficiently representative				
		When a choice exists, the EUT with the highest metrological characteristics is selected for test				
6.1.6.2	Observe	Accuracy class:				
		If an EUT of a family has been tested completely for one accuracy class, it is sufficient for an EUT of a lower class if only partial tests are carried out that are not yet covered				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
6.1.6.3	Observe	Other metrological features to be considered:				
		All metrologically relevant features and functions are tested at least once in an EUT as far as applicable and as many as possible in the same EUT				
6.1.6.4	Observe	Summary of relevant metrological characteristics: The EUTs cover:				
		Lowest input signal (when using analogue strain gauge load cells, (see R 50-1, 6.1.6.5);				
		All accuracy classes;				
		All temperature ranges;				
		Single speed, variable or multiple speed belt weigher;				
		Maximum size of load receptor, if significant;				
		Displacement transducer;				
		Metrologically relevant features (see R 50-2, 5.1.6.3);				
		Different types of load receptors, if connectable to the indicator; and				
		All possible instrument functions;				
		Different types of belt conveyors;				
		All possible indications;				
		All possible implemented digital devices;				
		All possible interfaces;				
		Weigh idlers;				
6.1.6.5	Observe	Minimum input voltage of electronics for maximum capacity				
		An analogue data processing device or indicator intended for analogue load cell(s) is tested at a minimum input voltage signal, specified by the manufacturer, for a load equal to maximum capacity.				
		A complete instrument shall not be configured in such a way that its input voltage signal for a load equal to maximum capacity is below the value used at type testing.				
		Requirement to the minimum scale interval, v_{min} of the used load cell(s).				
6.1.6.6	Observe	When analogue strain gauge load cells are used then the minimum scale interval, v_{min}, of the load cell shall fulfil the equation in R 50-1, 6.1.6.6				
		When digital load cells are used the equation in R 50-1, 6.1.6.6 shall also be used, with the corresponding S values.				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
6.1.6.7		Apportioning of errors				
	Observe	The error limits applicable to a module which is examined separately are equal to a fraction pi of the maximum permissible errors (R 50-1, 3.2.2 Table 2) or the allowed variations of the indication of the complete instrument. The fractions for any module have to be taken for the same accuracy class as for the complete instrument incorporating the module.				
	Observe	The fraction p_i shall be chosen by the manufacturer of the module and shall be verified by an appropriate test, taking into account the following conditions: For purely digital devices p_i may be equal to 0. For weighing modules p_i may be equal to 1. For all other modules (including digital load sensors) the fraction shall not exceed 0.8 and shall not be less than 0.3, when more than one module contributes to the effect in question.				
		For mechanical structures evidently designed and manufactured according to sound engineering practice, an overall fraction, $p_i = 0.5$, may be applied without any test, e.g. when levers are made of the same material and when the chain of levers has two planes of symmetry (longitudinal and transversal).				
		For instruments incorporating the typical modules (see R 50-1 2.2.10) the fractions p_i may have the values given in Table 4, which takes into account the fact that the modules are affected in a different manner depending on the different performance criteria.				
7.3	5.4	Simulation tests (test with static load without the belt conveyor):				
		Carried out in a way that will reveal a corruption of any weighing result.				
		The EUT is fitted with:				
		A complete belt weigher without the belt conveyor;				
		A representative load receptor (normally the complete load receptor);				
		A platform (pan) for the standard weights;				

Reference R 50-1	Test procedure R 50-2	Belt weighers checklist	Passed	Failed	N/A	Remarks*
		A device (such as an operation checking device, R 50-1, 2.2.8) enabling the comparison of integrations with a constant load over equal complete belt revolutions predetermined by the operator and measured by the displacement transducer;				
		A displacement simulation device				
		Means of assessing results can be:				
		Adaptation of the totalization indicating device, or				
		Use of change point weights, or				
		Any other means mutually agreed				

Use this page to detail remarks from the checklist