ORGANISATION INTERNATIONALE

DE MÉTROLOGIE LÉGALE

INTERNATIONAL RECOMMENDATION

Continuous totalizing automatic weighing instruments (belt weighers)
Part 2: Test report format

Instruments de pesage totalisateurs continus à fonctionnement automatique (peseuses sur bande)
Partie 2: Format du rapport d'essai

OIML R 50-2

Edition 1997 (E)

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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 two main categories of OIML publications are:

1) **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; the OIML Member States shall implement these Recommendations to the greatest possible extent.

2) **International Documents (OIML D)**, which are informative in nature and intended to improve the work of the metrological services.

OIML Draft Recommendations and Documents are developed by technical committees or subcommittees which are formed by the Member States. Certain international and regional institutions also participate on a consultation basis.

Cooperative agreements are established between OIML and certain institutions, such as ISO and IEC, with the objective of avoiding contradictory requirements; consequently, manufacturers and users of measuring instruments, test laboratories, etc. may apply simultaneously OIML publications and those of other institutions.

International Recommendations and International Documents are published in French (F) and English (E) and are subject to periodic revision.

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INTRODUCTION

The "Test report format", the subject of OIML R 50-2, aims at presenting, in a standardized format, the results of the various tests and examinations to which a pattern 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 requirements of OIML R 50-1. The words or condensed sentences aim at reminding the examiner of the requirements of R 50-1 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 test procedures (Annex A of OIML R 50-1).

The "information concerning the test equipment used for pattern 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 test of electromagnetic susceptibility.

All metrology services or laboratories evaluating patterns of continuous totalizing automatic weighing instruments according to OIML R 50-1 or to national or regional regulations based on OIML R 50-1 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.

Identification of the instrument

Application No.: .....
Report date: .....
Pattern designation: .....
Manufacturer: .....
Serial No.: .....

Manufacturing documentation

Drawing No.	Issue level	Build standard
.....	.....	.....
.....	.....	

Software reference	Software revision level
.....	.....
.....	.....
.....	.....

Other system drawings

.....
.....

Simulator documentation

Drawing No.	Issue level
.....	.....
.....	.....
.....	.....

Software reference	Software revision level
.....	.....
.....	.....

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.: .....
Report date: .....
Pattern designation: .....
Manufacturer: .....

Description or other information pertaining to identification of the instrument:

(attach photograph here if available).

General information concerning the pattern

Application No.: .....
Manufacturer: .....
Applicant: .....
Instrument category: .....

Testing on: ☐ Complete instrument ☐ Module (*)

Pattern designation: .....

Accuracy class ☐ 0.5 ☐ 1 ☐ 2

Speed (v) = ☐ m/s Q_{min} = ☐ Σ_{min} = ☐

Max = ☐ Q_{max} = ☐ d = ☐

L = ☐ m

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

Zero-setting device:

☐ Nonautomatic

☐ Semi-automatic

☐ Automatic

Temperature range ☐ °C

(*) 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 1000-4-11 (1994) section 5.

General information concerning the pattern (continued)

Printer:

☐ Built in ☐ Connected ☐ Non present but connectable ☐ No connection

Instrument submitted: .....

Identification No.: .....

Connected equipment: .....

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

Load cell:

Manufacturer:

OIML R 60 Certificate of conformity. Please tick and if "Yes" supply Certificate number.	Yes		Certificate number	
	No			

Type:

Capacity:

Number:

Classification symbol:

Remarks: see following page

Date of report: .....

Evaluation period: .....

Observer: .....

General information concerning the pattern (continued)

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.

CHECKLIST

For each test, the "Summary of the checklist" and the "Checklist" 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 2			
Technical requirements R 50-1 clause 3			
Requirements for electronic belt weighers R 50-1 clause 4			
Metrological controls R 50-1 clause 5			
Test report			
Overall result			

Summary of the checklist (remarks)

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

Checklist

Application No.: .....

Pattern Designation: .....

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
2		METROLOGICAL REQUIREMENTS			
2.2		Maximum permissible errors			
2.2.1	A.11.2	Maximum permissible errors for automatic weighing: do not exceed values in Table 1 (R 50-1) rounded to nearest d			
2.2.2	Observe	Difference between indicated or printed weighing results: no difference between results			
2.2.3	A.7	Maximum permissible errors for influence factor tests: do not exceed the values in Table 2 (R 50-1) rounded to nearest d			
2.3		Minimum value of minimum totalized load (Σ_{min}) ≥ largest of the following:			
	Observe	2 % of load totalized in 1 hour at maximum flowrate			
		the load obtained at maximum flowrate in one revolution of the belt			
		the load corresponding to the appropriate number of totalization scale intervals in Table 3			
2.4		Minimum flowrate			
	Observe	single speed belt weighers: General Q_{min} = 20 % of Q_{max}			
		Particular installation : Q_{min} ≤ 35 % of Q_{max}			
		Variable and multi-speed belt weighers may have Q_{min} less than 20 % of Q_{max} and minimum instantaneous net load ≥ 20 % of Max			
2.5		Simulation tests			
2.5.1	A.6.3.1	Variation of simulation speed: errors do not exceed mpe's for influence factor tests in 2.2.3 (R 50-1)			
2.5.2	A.6.3.2	Eccentric loading: errors do not exceed values in 2.2.3 (R 50-1)			
2.5.3	A.6.3.4	Zero-setting: totalization error does not exceed mpe for influence factor tests in 2.2.3 (R 50-1)			
2.5.4		Influence quantities			
2.5.4.1	A.7.1	Static temperatures			
2.5.4.2	A.7.2	Temperature effect at zero flowrate			
2.5.4.3	A.7.4	Mains power supply (AC)			
2.5.4.4	A.7.5	Battery power supply (DC)			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
2.5.5		Metrological characteristics			
2.5.5.1	A.9.1	Repeatability: difference between 2 results obtained for the same load ≤ mpe for influence factor tests in 2.2.3 (R 50-1)			
2.5.5.2	A.9.2	Discrimination of the totalization indicating device: error is not more than specified in 2.6.3 (R 50-1)			
2.5.5.3	A.9.3	Discrimination of the totalization indicating device used for zero totalization: 3 minute test, visible differences between indications obtained at no load and for a load equal to:			
		0.05 % of Max for class 0.5			
		0.1 % of Max for class 1			
		0.2 % of Max for class 2			
2.5.5.4	A.9.4	Short-term stability of zero: In 5 tests of 3 minutes, the difference between indications must not exceed following percentage of load totalized in 1 hour at Q_{max}			
		0.0013 % for class 0.5			
		0.0025 % for class 1			
		0.005 % for class 2			
2.5.5.5	A.9.4	Long-term stability of zero: Difference between smallest and largest of all indications shall not exceed the following percentages of the load totalized in 1 hour at Q_{max}			
		0.0018 % for class 0.5			
		0.0035 % for class 1			
		0.007 % for class 2			
2.6		In-situ tests			
2.6.1	A.11.2	Repeatability: difference between relative errors shall not exceed the absolute value of the appropriate mpe for automatic weighing in 2.2.1 (R 50-1).			
2.6.2	A.10.1	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:			
		0.05 % for class 0.5			
		0.1 % for class 1			
		0.2 % for class 2			
2.6.3	A.10.2	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:			
		0.05 % for class 0.5			
		0.1 % for class 1			
		0.2 % for class 2			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
2.6.4	10.3	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}:			
		0.18 % for class 0.5			
		0.35 % for class 1			
		0.7 % for class 2			
3		Technical requirements			
3.1	Observe	Suitability for use			
		Instrument suits method of operation			
		Instrument suits materials			
		Instrument suits accuracy class			
3.2	Observe	Security of operation			
3.2.1	Observe	Accidental maladjustment: effect is obvious			
3.2.2	Observe	Operational adjustment: not possible for general totalization indicating device to be reset to zero, and not possible to make operating adjustments or to reset other trade indicating devices during an automatic weighing operation.			
3.2.3	Observe	Fraudulent use: no characteristics likely to facilitate fraudulent use			
3.2.4	Observe	Operating devices: cannot normally come to rest in a position other than those intended unless all indication and printing disabled			
3.2.5	Observe	Conveyor interlock: If instrument is switched off/ceases to function:			
		conveyor stops			
		visible or audible signal is given			
3.2.6	Observe	Remote indicating devices: out of range indication is provided as specified in 3.4 (R 50-1).			
3.3		Totalization indicating and printing devices			
3.3.1	Observe	Quality of indication:			
		reliable			
		simple			
		non-ambiguous			
		by simple juxtaposition			
		name or symbol of appropriate unit of mass			
3.3.2	Observe	Form of the scale interval: 1×10^k, 2×10^k or 5×10^k			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
3.3.3	Observe	Scale interval (d) of a partial totalization indicating device: is equal to scale interval of the general totalization indicating device			
3.3.4	Observe	Scale interval of supplementary totalization indicating devices: is at least equal to 10 times totalization scale interval			
3.3.5	Observe	Range of indication: at least one totalization indicating device indicates a value equal to quantity of product weighed in 10 hours of operation at Q_{max}			
3.3.6	Observe	Engagement of totalization indicating and printing devices: permanently engaged			
3.4	Observe	Out-of-range indication: a continuous audible or visual indication shall be given when:			
		the instantaneous load is above the maximum capacity of the weighing unit, or			
		the flowrate is above the maximum or below the minimum value			
3.5	Observe	Zero-setting device: does not exceed 4 % of maximum capacity			
3.5.1		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			
		the limits of adjustment are indicated			
		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			
3.6	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 to correspond with displacement of belt equal to or less than weigh length			
		adjustable parts can be sealed			
3.7	Observe	Belt weighers inclusive of conveyor			
		constructed in a rigid manner			
		shall form a rigid assembly			
3.8	Observe	Installation conditions (where applicable)			
		Instrument is installed where:			
		the frame support of the conveyor is constructed in a rigid manner			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
		in any straight longitudinal section the roller track is such that the belt is constantly supported on the weighing rollers			
		belt cleaning devices, if fitted, are positioned and operated so as to have no significant effect on the results			
		roller track does not allow slippage to occur			
		Installation does not cause excessive additional errors			
3.8.1	Observe	Roller track			
		is protected against corrosion and clogging			
		is aligned properly			
3.8.2	Observe	Conveyor belt			
		mass per unit length is practically constant			
		belt joints have no significant effect on the results			
3.8.3	Observe	Speed control			
		Single speed instruments:			
		speed of belt during weighing does not vary by more than 5 % of nominal speed			
		Variable speed belt weighers (with speed setting control):			
		speed of the belt does not vary by more than 5 % of the set speed			
3.8.4	Observe	Weigh length			
		remains unchanged in service			
		if adjustable, the adjusting devices can be sealed			
3.8.5	Observe	Belt tension for belt weighers with weigh table: longitudinal tension is maintained independent of the effects of:			
		temperature			
		wear			
		load			
		no slip between belt and driving drum			
		When conveyor length exceeds 10 m the roller that transfers the force from the tensioner shall have an arc at belt contact of not less than 90°			
3.8.6	Observe	Overload protection: for accidental loads greater than the maximum capacity			
3.9	Observe	Ancillary devices: do not affect weighing results			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
3.10	Observe	Sealing: components not intended to be adjusted/removed are fitted with sealing device or are encased (casing used has a provision for sealing)			
3.11		Descriptive markings			
3.11.1	Observe	Markings shown in full:			
		identification mark of the manufacturer			
		identification mark of the importer (if applicable)			
		serial number and type designation of the belt weigher			
		the inscription: zero testing shall have a duration of at least ..... revolutions			
		mains voltage ...V			
		mains frequency ...Hz			
3.11.2	Observe	Markings in code:			
		- pattern approval sign			
		- accuracy class (0.5), (1) or (2)			
		- totalization scale interval d = ... kg or t			
		As appropriate			
		nominal speed(s) of the belt v = ... m/s, or			
		range of speeds of the belt v = .../... m/s			
		maximum flowrate Q_{max} = ... kg/h or t/h			
		minimum flowrate Q_{min} = ... kg/h or t/h			
		minimum totalized load Σ_{min} = ... kg or t			
3.11.3	Observe	Markings consequential to pattern evaluation:			
		designation of type(s) of product to be weighed			
		maximum capacity (Max) ... kg or t			
		weigh length (L) ... m			
		control value ... kg or t			
		temperature range ... °C/... °C			
		speed range of displacement simulation device ... m/s			
		operating frequency (if totalizing by addition) ... cycles/hour			
		identification mark on parts of the belt weigher not directly attached to the main unit			
3.11.4	Observe	Supplementary markings: as required by metrological authority	Note in remarks		

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
3.11.5	Observe	Presentation of descriptive markings			
		indelible	Confirm		
		easily readable	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. Plate shall be sealable, unless it cannot be removed without it being destroyed	Confirm		
3.12	Observe	Verification marks			
3.12.1		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			
3.12.2	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 material 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)			
4		Requirements for electronic belt weighers			
4.1		General requirements			
4.1.1		Rated operating conditions: errors do not exceed mpe			
4.1.2	A.8	Disturbances			
	A.8.1	Voltage dips and short interruptions			
	A.8.2	Electrical fast transients/burst immunity			
	A.8.3	Electrostatic discharges			
	A.8.4	Electromagnetic susceptibility			
4.1.3	Observe	Durability: requirements of 4.1.1 and 4.1.2 shall be met durably			
4.1.4	Observe	Evaluation for compliance: instrument has passed examination and tests specified in Annex A			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
4.2	Observe	Application: requirement in 4.1.2 may be applied separately to:	Note in remarks		
4.2.1		a) each individual cause of significant fault, and/or	Note in remarks		
		b) each part of the electronic instrument	Note in remarks		
4.2.2		Choice above is made by the manufacturer	Note in remarks		
4.3	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			
4.4	Observe	Switch-on procedure: all relevant signs of indicating devices are activated			
4.5		Functional requirements			
4.5.1	See A.7	Influence factors: complies with 2.5.4 (R 50-1), and			
		maintains its characteristics at a relative humidity of 85 % at the upper limit of its temperature range			
4.5.2	See A.8	Disturbances:			
		either difference in indications shall not exceed value in T.5.5 (R 50-1), or	Note in remarks		
		instrument shall detect and act upon a significant fault	Note in remarks		
4.5.3	A.6.1.1	Warm-up time			
		no indication/transmission of results and automatic operation is inhibited			
4.5.4	Observe	Interface: does not affect metrological functions and instrument functions correctly			
4.5.5	A.7.4	Mains power supply (AC): at power fail,			
		the metrological information (contained in the belt weigher at the time of failure) is retained for at least 24 hours and displayed for at least 5 minutes during that period and			
		the switch-over to emergency power supply shall not cause a significant fault			
4.5.6	A.7.5	Battery power supply (DC)			
		functions correctly when voltage drops below specified minimum value, or			
		is automatically put out of service			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
4.6		Examination and tests comply with applicable requirements and especially clause 4			
4.6.1	Observe	Examinations: general appraisal of design and construction			
4.6.2	Observe	Performance tests: operates as specified in Annex A			
5		Metrological controls			
5.1		Pattern evaluation			
5.1.1	Observe	Documentation			
		metrological characteristics of the belt weigher			
		a standard set of specifications for the belt weigher			
		functional description of components and devices			
		drawings, diagrams and general software information			
		any document or other evidence that the belt weigher complies with the requirements			
5.1.2	Observe	General requirements			
		at least one and not normally > 3 units that represent the definitive pattern, one of these in a form suitable for simulation testing in a laboratory			
		at least one unit installed at a typical site			
5.1.3	Observe	Pattern evaluation tests			
		complies with R 50-1, clause 2			
		complies with R 50-1, clause 3			
		complies with R 50-1, clause 4 if it is an electronic belt weigher			
		tests conducted without unnecessary commitment of resources	Note in remarks		
		Metrological authority permits the results of these tests to be assessed for initial verification	Note in remarks		
5.1.3.1	A.11	Material tests: In-situ material tests shall be done as follows:			
		in accordance with the descriptive markings	Confirm		
		under the normal conditions of use for which the instrument is intended	Confirm		
		with a quantity of the product not less than the minimum test load	Confirm		
		at flowrates between the minimum and maximum values	Confirm		
		at each belt speed for conveyors with more than one fixed speed, or throughout the speed range for variable speed conveyors	Confirm		
		in accordance with the test methods in A.11 (R 50-1)			

Requirement R 50-1	Test procedure	Belt weighers Checklist	Passed	Failed	Remarks
5.1.3.2	Observe	Minimum test load is the largest of the following values:			
		2 % of the load totalized in one hour at maximum flowrate, or	Confirm		
		load obtained at maximum flowrate in one revolution of the belt (not applicable when all material test load readings are obtained over a whole number of belt revolutions), or	Confirm		
		appropriate number of scale intervals for testing given in R 50-1, 5.1.3.2, Table 4	Confirm		
5.1.3.3	Observe	Tests for compliance with technical requirements: tests performed to assess compliance with R 50-1, clause 2	Confirm		
5.1.3.4	A.6.3	Simulation tests: carried out in a way that will reveal a corruption of any weighing result. Means of assessing results can be:			
		adaptation of the totalization indicating device, or	Note in remarks		
		use of change point weights, or	Note in remarks		
		any other means mutually agreed	Note in remarks		
5.1.4	Observe	Provision for means of testing			
		Metrological Authority has been supplied with sufficient means for testing	Confirm		
5.1.5	Observe	Place of testing			
		either on the premises of the Metrological Authority, or	Confirm		
		any other suitable place, mutually agreed	Note in remarks		

Use this page to detail remarks from the checklist:

TEST REPORT

Test equipment used for pattern evaluation

Application No.: .....

Report date: .....

Pattern designation: .....

Manufacturer: .....

List all test equipment used in this report:

Equipment name	Manufacturer	Type No.	Serial No.	Used for (Test references)
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....

Configuration for test

Application No.: .....

Report date: .....

Pattern designation: .....

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.

Explanatory notes

Meaning of symbols:

I = Indication of the belt weigher
I_n = n^{th} indication
S = Static load
ΔS = Additional static load to next changeover point
T = Totalized load (calculated for simulation tests or controlled load for material tests)
L = Weigh length
E = I – T

$$E\ \% = \frac{(I - T) \times 100}{T} = \text{Error as percentage for simulation tests}$$

mpe = Maximum permissible error (absolute value)
EUT = Equipment under test
d = Totalization scale interval
P = I + 0.5 d – ΔS = Indication of the control instrument prior to rounding

Note:

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

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

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

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:	95:12:29	95:12:30	yy:mm:dd
Time:	16:00:05	16:30:05	hh:mm:ss

where:
Temp = temperature
Rel. h = relative humidity

"Date" in the test reports 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.

Summary of test report

Application No.: .....

Pattern designation: .....

R 50-2	Tests	Report page	Passed	Failed	Remarks
1	Simulation tests - simulator data				
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, steady state				
1.5.4	Mains power supply (AC)				
1.5.5	Battery power supply (DC)				
1.6	Disturbances				
1.6.1	Voltage dips and short interruptions				
1.6.2	Electrical fast transients/burst immunity				
1.6.2.1	Power supply lines				
1.6.2.2	I/O circuits and communication lines				
1.6.3	Electrostatic discharges				
1.6.3.1	Direct application				
1.6.3.2	Indirect application				
1.6.4	Electromagnetic susceptibility				
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, or maximum variation during zero load test (depending on ratio rev/Σ_{min})				
1.8.2	Discrimination of the indicator used for zero-setting				
2	In-situ material tests (fixed and all other speed belt weighers)				
2.1	Accuracy of control instrument				
2.2	Repeatability				
	mpe for pattern evaluation				
	mpe for initial verification and in-service inspection.				

1 Simulation tests (R 50-1, 5.1.3.4 & A.6.3)
Simulator data

Application No.: .....

Pattern designation: .....

Date: .....

Observer: .....

Data	Derivation	Ref	Value	Units
Maximum flowrate	Max at maximum speed	Q_{max}		
Totalization scale interval		d		
Zero-setting scale interval				
Simulator resolution(*)		d		
Max weigh table capacity	To obtain Q_{max}	Max		
Weigh length		L		m
Pulses per weigh length				
Nominal speed or		v = ..		m/s
Range of speeds		v = ../..		m/s
(**)				

(*) Where:
Simulator resolution "d" is obtained by using one of the methods in the "Note" in R 50-1, 5.1.3.4. If other means are agreed (including the error calculation method in R 50-1, A.4.2), they should be noted below.

(**) Insert other relevant data as necessary.

Detail formula for calculating totalized load for simulation tests:

example:

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

T =

DESCRIPTION OF SIMULATOR:

(Must include details of any differences from installed instruments)

1.1 Warm-up time (R 50-1, 4.5.3 and A.6.1.2)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Duration of disconnection
before test: .....

Automatic zero-setting:

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

Weigh table load % Max as defined in R 50-1, 2.4	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)					

* Counted from the moment an indication first appears.

Where:
"Pulses" are the pulses sent by the displacement transducer (or simulator) to simulate belt movement

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

$$E\,\% = \frac{(I - T) \times 100}{T}$$

Remarks:

1.2 Variation of simulation speed (R 50-1, 2.5.1 & A.6.3.1)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

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

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

Where:
"Revolutions" are the integral number of simulated belt revolutions

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

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

$$E\,\% = \frac{(I - T) \times 100}{T}$$

Remarks:

1.3 Eccentric loading (R 50-1, 2.5.2 & A.6.3.2)

Application No.: .....

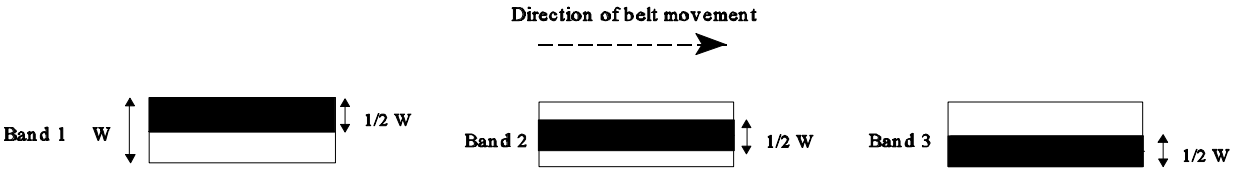
Pattern designation: .....

Observer: .....

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

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

Location of test loads:



Provide the following information:
for a load equal to half Max, totalization Σ_{min} (expressed as number of "d") is either

- equal to .... d or,
- 5 times the appropriate value in R 50-1, 2.3 Table 3, ... d

	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I − T ( )	E %
Band 1						
Band 2						
Band 3						

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

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

$$E\,\% = \frac{(I - T) \times 100}{T}$$

Remarks:

1.4 Zero-setting device (R 50-1, 3.5)

1.4.1 Zero-setting (range) (R 50-1, 3.5 & A.6.3.3)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Positive portion S_1		Negative portion S_2		Zero-setting range $S_1 + S_2$
Weight added	Re-zero Yes/No	Weight removed	Zero Yes/No	

Where:

S_1 is the maximum load that can be re-zeroed (positive portion)
S_2 is the maximum load that can be removed while the instrument can still be re-zeroed (negative portion)

Check: $S_1 + S_2 \leq 4$ % of Max

Remarks:

1.4.2 Zero-setting (semi-automatic and automatic) (R 50-1, 2.5.3 & A.6.3.4)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
S_1						
S_2						
S_3						
S_4						

Where:
S_1 = 50 % of positive zero-setting range
S_2 = 100 % of positive zero-setting range
S_3 = –50 % of negative zero-setting range
S_4 = –100 % of negative zero-setting range

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

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

$$E\ \% = \frac{(I - T) \times 100}{T}$$

Remarks:

1.5 Influence quantities (R 50-1, 2.5.4 & A.7)

1.5.1 Static temperatures (R 50-1, 2.5.4.1 & A.7.1)

Application No.: .....

Pattern designation: .....

Observer: .....

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

Confirm automatic zero-setting device is:

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

Pre-test information

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

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

Test 1 - Static temperature 20 °C

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

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

1.5.1 Static temperatures (continued)

Test 2 - Static temperature specified high (°C)

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

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

Test 3 - Static temperature specified low (°C)

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

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

1.5.1 Static temperatures (continued)

Test 4 - Static temperature 5 °C

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

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

Test 5 - Static temperature 20 °C

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

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

1.5.1 Static temperatures (continued)

Where:

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

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

$$E\ \% = \frac{(I - T) \times 100}{T}$$

Remarks:

1.5.2 Temperature effect at zero flowrate (R 50-1, 2.5.4.2 & A.7.2)

Application No.: .....

Pattern designation: .....

Observer: .....

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

Confirm automatic zero-setting device is:

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

Temperature at start specified minimum ( ) °C

	At start	At end	
Rel. h:			%
Date:			yy:mm:dd
Time:			hh:mm:ss

	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								

Where:

temp = temperature

The difference between each start temperature and end temperature is to be 10 °C with the rate of temperature change not to 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.

1.5.3 Damp heat, steady state (R 50-1, 4.5.1 & A.7.3)

Application No.: .....

Pattern designation: .....

Observer: .....

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

Automatic zero-setting device is:

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

Pre-test information

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

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

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

	At start	After 3 hrs	At end	
Temp:				°C
Rel. h:				%
Date:				yy:mm:dd
Time:				hh:mm:ss

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						
Q_{min}						

1.5.3 Damp heat, steady state (continued)

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

	At start	After 2 days	At end	
Temp:				°C
Rel. h:				%
Date:				yy:mm:dd
Time:				hh:mm:ss

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						
Q_{min}						

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

	At start	After 2 hrs	At end	
Temp:				°C
Rel. h:				%
Date:				yy:mm:dd
Time:				hh:mm:ss

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						
Q_{min}						

Where:
“Pulses” are the number of pulses sent by the displacement transducer (or simulator) to simulate belt movement

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

$$E\ \% = \frac{(I - T) \times 100}{T}$$

Remarks:

1.5.4 Mains power supply (AC) (R 50-1, 2.5.4.3 & A.7.4)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Automatic zero-setting device is:

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

Marked nominal voltage, U_n, or voltage range: ☐ V

Pre-test information

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

Test results

Test 1 at reference voltage (*)

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						

Test 2 at reference voltage –15 %

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						

Test 3 at reference voltage +10 %

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						

(*) The reference voltage shall be as defined in IEC 1000-4-11 (1994).

1.5.4 Mains power supply (AC) (continued)

Test 4 at reference voltage (*)

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						

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

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

$$E\ \% = \frac{(I - T) \times 100}{T}$$

Remarks:

(*) The reference voltage shall be as defined in IEC 1000-4-11 (1994).

1.5.5 Battery power supply (DC) (R 50-1, 2.5.4.4, 4.5.6 & A.7.5)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Automatic zero-setting device is:

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

Marked voltage ☐ V

Pre-test information

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

Test results

Test 1 at reference voltage

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						

Test 2 at lower limit voltage +2 % (*)

Q (/h)	Load S ( )	Pulses	Calculated totalization T ( )	Indicated totalization I ( )	Difference I – T ( )	E %
Q_{max}						

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

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

$$E\ \% = \frac{(I - T) \times 100}{T}$$

Remarks:

1.6 Disturbances (R 50-1, 4.5.2 & A.8)

1.6.1 Voltage dips and short interruptions (R 50-1, 4.5.2 & A.8.1)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

Marked nominal voltage U_n or voltage range: V

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

Test results

Disturbance						
Amplitude (*) % of U_n	Duration cycles	Number of disturbances	Repetition interval (s)	Pulses	Indication I ( )	Significant fault No/Yes
without disturbance						
0	0.5	10				
50	1	10				

Remarks:

(*) The reference voltage shall be as defined in IEC 1000-4-11 (1994).

1.6.2 Electrical fast transients/burst immunity (R 50-1, 4.5.2 & A.8.2)

1.6.2.1 Power supply lines

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

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

Test results

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

L = live, N = neutral, PE = protective earth

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

Remarks:

1.6.2 Electrical fast transients/burst immunity (continued)

1.6.2.2 I/O circuits and communication lines

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

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

Test results

I/O signals, data and control lines: test voltage 0.5 kV, duration of the test 1 min at each polarity

Cable/interface	Polarity	Pulses	Indicated totalization I ( )	Significant fault Yes/No
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.

Remarks:

1.6.3 Electrostatic discharges (R 50-1, 4.5.2 & A.8.3)

1.6.3.1 Direct application

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

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

☐ Contact discharge ☐ Paint penetration

☐ Air discharge Polarity (*): ☐ pos ☐ neg

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

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

Remarks:

(*) IEC 1000-4-2 specifies that the test shall be conducted with the most sensitive polarity.

1.6.3 Electrostatic discharges (continued)

1.6.3.2 Indirect application (contact discharges only)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

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

Polarity (*): ☐ pos ☐ neg

Horizontal coupling plane

Load S ( )	Discharges				
	Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Indicated totalization I	Significant fault Yes/No
	without disturbance				
	2				
	4				
	6				

Vertical coupling plane

Load S ( )	Discharges				
	Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Indicated totalization I	Significant fault Yes/No
	without disturbance				
	2				
	4				
	6				

Remarks:

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

(*) IEC 1000-4-2 specifies that the test shall be conducted with the most sensitive polarity.

1.6.3 Electrostatic discharges (continued)

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

a) Direct application

Contact discharges:

Air discharges:

b) Indirect application

1.6.4 Electromagnetic susceptibility (R 50-1, 4.5.2 & A.8.4)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

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

Rate of sweep:

Disturbance				Result		
Antenna	Frequency range (MHz)	Polarization	Facing EUT	Pulses	Indication	Significant fault Yes/No (remarks)
without disturbance						
		Vertical	Front			
			Right			
			Left			
			Rear			
		Horizontal	Front			
			Right			
			Left			
			Rear			
		Vertical	Front			
			Right			
			Left			
			Rear			
		Horizontal	Front			
			Right			
			Left			
			Rear			

Remarks:

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

1.7 Metrological characteristics (R 50-1, 2.5.5)

1.7.1 Repeatability (R 50-1, 2.5.5.1 & A.9.1)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

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

Load S	Pulses	T	Indicated total		Difference $I_1 - I_2$
			Run 1 I_1	Run 2 I_2	

Where:

“Pulses” are the number of pulses sent by the displacement transducer (or simulator) to simulate belt movement

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

Remarks:

1.7.2 Discrimination of the totalization indicating device (R 50-1, 2.5.5.2 & A.9.2)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Pre-test information

Equivalent pulses for Σ_{min} at S_1	Static load (S_1) ( )
	20 % Max =
	50 % Max =
	75 % Max =
	Max =

First weightable load S_1	Pulses	Increased load S_2	Pulses	Calculated totalized load		Indicated totalized load		Difference
				T_1	T_2	I_1	I_2	$(I_2 - I_1)$
20 % Max =								
50 % Max =								
75 % Max =								
Max =								

Where:
S_1 = first weightable load

$$S_2 = \begin{cases} \text{Existing load} \times 0.18\ \% \text{ for class } 0.5 \\ \text{Existing load} \times 0.35\ \% \text{ for class } 1 \\ \text{Existing load} \times 0.7\ \% \text{ for class } 2 \end{cases}$$

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

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

Remarks:

1.7.3 Discrimination of the totalization indicating device used for zero totalization (R 50-1, 2.5.5.3 & A.9.3)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

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					

Where:
+ indicates presence of test weight on weightable

Test weight = { 0.05 % of Max for class 0.5 / 0.1 % of Max for class 1 / 0.2 % of Max for class 2 }

Remarks:

1.7.4 Short- and long-term stability of zero (R 50-1, 2.5.5.4 & 2.5.5.5 & A.9.4)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

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

Remarks:

1.8 In-situ tests (R 50-1, 5.2.1.1)

In-situ data Location details:

Application No.:

Pattern 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 weightable	Max		
Belt speed	Maximum speed	V_{max}		m/s
	Minimum speed	V_{min}		m/s
Maximum flowrate	Max x 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		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)	800 d for class 0.5 400 d for class 1 200 d for class 2	(3)		kg or t
Minimum totalized load	Largest of (1), (2) and (3)	Σ_{min}		kg or t
Minimum test load	= Σ_{min} unless all totalizations are over whole belt revolutions, then Σ_t = largest 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, material weighed):

1.8.1 Maximum permissible errors on checking of zero (R 50-1, 2.6.2 & A.10.1 or A.10.3) 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, 2.6.4 & A.10.3)

Application No.: .....
Pattern designation: .....
Observer: .....

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

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

Note:

When Σ_{min} is equal to or less than 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 (tick this box).

☐

Test No.	Belt revolutions	Duration (secs)	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 equal to or less than 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}	$*I_1 - I_{max}*$ (A)	$*I_1 - I_{min}*$ (B)	Greater of (A) or (B)
1						
2						

Remarks:

1.8.2 Discrimination of the indicator used for zero-setting (R 50-1, 2.6.3 & A.10.2)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Test	Load S_D ( )	Revs	Duration ( )	Indication		Difference $I_1 - I_2$
				I_1	I_2	
A						
B						
A						
B						
A						
B						
A						
B						

Where:
Revs is revolution of the belt

S_D is discrimination = load S_D = { 0.05 % of Max for class 0.5 / 0.1 % of Max for class 1 / 0.2 % of Max for class 2 }

Remarks:

2 In-situ material tests (R 50-1, 2.6.1 & 5.1.3.1 & 5.2.1.1 & A.11)

2.1 Accuracy of control instrument (R 50-1, 5.2.1.1 & A.11.1)

Application No.: .....
Pattern designation: .....
Scale interval, d: .....
Maximum capacity: .....
Minimum capacity: .....
Observer: .....

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

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

Control instrument details:

Type .....

Class .....

Max capacity .....

Min capacity .....

Scale interval, d_c .....

Approval No. .....

Date of last test .....

Belt weigher details:

Σ_{min} .....

Σ_t (if different) .....

Where Σ_t is the minimum test load defined in R 50-1, 5.1.3.2.

Transfer vehicle: .....

Capacity: .....

REQUIREMENT:

The control method used for material tests shall enable determination of the weight of the product used for testing with an error not exceeding one-third of the appropriate maximum permissible error for automatic weighing in R 50-1, 2.2.1.

Example:

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

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

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

Requirement $\dfrac{mpe\%}{100} \times \Sigma_t \times 1/3 \ge \sqrt{N} \times E_c$

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, material loss on route, etc.

2.2 Repeatability (R 50-1, 2.6.1 & A.11.2.1)

Application No.: .....

Pattern designation: .....

Observer: .....

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

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

Note:

For multi-speed or variable-speed belt weighers the tests should be repeated as indicated in R 50-1, A.11.2.2 & A.11.2.3. 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						

Note: To be used to determine the following:
mpe for pattern evaluation (R 50-1, 5.1.3.1 & A.11.2.2);
mpe for initial verification and in-service inspection (R 50-1, 5.2.1.1).

Remarks:

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						

Remarks: