SAUDI STANDARD
DRAFT
SASO OIML R 50-2: 2011
OIML R 50-2: 1997

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

SAUDI ARABIAN STANDARDS ORGANIZATION

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Foreword

The Saudi Arabian Standards Organization (SASO) has adopted the International standard No. OIML R 50-2/1997 “Continuous totalizing automatic weighing instruments (belt weighers)- Part 2: Test report format ” issued by the OIML. The text of this international standard has been translated into Arabic so as to be approved as a Saudi standard without introducing any technical modification.

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} = ☐ Δ_{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:

	Failed	Passed
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:

Remarks	Failed	Passed	Requirement
			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 sllllmrny of the checklist

Checklist

Application No.: .....

Pattern Designation: .....

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

Remarks	Failed	Passed	Belt weighers Checklist	Test procedure	Requirement R 50-1
Metrological characteristics					2.5.5
			Repeatability: difference between 2 results obtained for the same load ≤ mpe for influence factor tests in 2.2.3 (R 50-1)	A.9.1	2.5.5.1
			Discrimination of the totalization indicating device: error is not more than specified in 2.6.3 (R 50-1)	A.9.2	2.5.5.2
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:				A.9.3	2.5.5.3
			0.05 % of Max for class 0.5		
			0.1 % of Max for class 1		
			0.2 % of Max for class 2		
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}				A.9.4	2.5.5.4
			0.0013 % for class 0.5		
			0.0025 % for class 1		
			0.005 % for class 2		
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}				A.9.4	2.5.5.5
			0.0018 % for class 0.5		
			0.0035 % for class 1		
			0.007 % for class 2		
In-situ tests					2.6
			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).	A.11.2	2.6.1
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:				A.10.1	2.6.2
			0.05 % for class 0.5		
			0.1 % for class 1		
			0.2 % for class 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:				A.10.2	2.6.3
			0.05 % for class 0.5		
			0.1 % for class 1		
			0.2 % for class 2		

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

Remarks	Failed	Passed	Belt weighers Checklist	Test procedure	Requirement R 50-1
			Scale interval (d) of a partial totalization indicating device: is equal to scale interval of the general totalization indicating device	Observe	3.3.3
			Scale interval of supplementary totalization indicating devices: is at least equal to 10 times totalization scale interval	Observe	3.3.4
			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}	Observe	3.3.5
			Engagement of totalization indicating and printing devices: permanently engaged	Observe	3.3.6
Out-of-range indication: a continuous audible or visual indication shall be given when:				Observe	3.4
			the instantaneous load is above the maximum capacity of the weighing unit, or		
			the flowrate is above the maximum or below the minimum value		
			Zero-setting device: does not exceed 4 % of maximum capacity	Observe	3.5
Semi-automatic and automatic zero-setting devices:					3.5.1
			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		
Displacement transducer				Observe	3.6
			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		
Belt weighers inclusive of conveyor				Observe	3.7
			constructed in a rigid manner		
			shall form a rigid assembly		
Installation conditions (where applicable)				Observe	3.8
Instrument is installed where:					
			the frame support of the conveyor is constructed in a rigid manner		

Remarks	Failed	Passed	Belt weighers Checklist	Test procedure	Requirement R 50-1
			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		
Roller track				Observe	3.8.1
			is protected against corrosion and clogging		
			is aligned properly		
Conveyor belt				Observe	3.8.2
			mass per unit length is practically constant		
			belt joints have no significant effect on the results		
Speed control				Observe	3.8.3
			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		
Weigh length				Observe	3.8.4
			remains unchanged in service		
			if adjustable, the adjusting devices can be sealed		
Belt tension for belt weighers with weigh table: longitudinal tension is maintained independent of the effects of:				Observe	3.8.5
			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°		
			Overload protection: for accidental loads greater than the maximum capacity	Observe	3.8.6
			Ancillary devices: do not affect weighing results	Observe	3.9

Remarks	Failed	Passed	Belt weighers Checklist	Test procedure	Requirement R 50-1
			Sealing: components not intended to be adjusted/removed are fitted with sealing device or are encased (casing used has a provision for sealing)	Observe	3.10
Descriptive markings					3.11
Markings shown in full:				Observe	3.11.1
			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		
Markings in code:				Observe	3.11.2
			- 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 Θ_{min} = ... kg or t		
Markings consequential to pattern evaluation:				Observe	3.11.3
			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		
	Note in remarks		Supplementary markings: as required by metrological authority	Observe	3.11.4

Remarks	Failed	Passed	Belt weighers Checklist	Test procedure	Requirement R 50-1
Presentation of descriptive markings				Observe	3.11.5
	Confirm		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		
Verification marks				Observe	3.12
Position of verification marks:					3.12.1
			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		
			Mounting: Belt weighers required to have verification marks shall have:	Observe	3.12.2
			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		
General requirements					4.1
			Rated operating conditions: errors do not exceed mpe		4.1.1
Disturbances				A.8	4.1.2
			Voltage dips and short interruptions	A.8.1	
			Electrical fast transients/burst immunity	A.8.2	
			Electrostatic discharges	A.8.3	
			Electromagnetic susceptibility	A.8.4	
			Durability: requirements of 4.1.1 and 4.1.2 shall be met durably	Observe	4.1.3
			Evaluation for compliance: instrument has passed examination and tests specified in Annex A	Observe	4.1.4

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

Remarks	Failed	Passed	Belt weighers Checklist	Test procedure	Requirement R 50-1
Examination and tests comply with applicable requirements and especially clause 4					4.6
			Examinations: general appraisal of design and construction	Observe	4.6.1
			Performance tests: operates as specified in Annex A	Observe	4.6.2
Metrological controls					5
Pattern evaluation					5.1
			Documentation	Observe	5.1.1
			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		
General requirements				Observe	5.1.2
			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		
Pattern evaluation tests				Observe	5.1.3
			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		
	Note in remarks		tests conducted without unnecessary commitment of resources		
	Note in remarks		Metrological authority permits the results of these tests to be assessed for initial verification		
Material tests: In-situ material tests shall be done as follows:				A.11	5.1.3.1
	Confirm		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		
			in accordance with the test methods in A.11 (R 50-1)		

Remarks	Failed	Passed	Belt weighers Checklist	Test procedure	Requirement R 50-1
Minimum test load is the largest of the following values:				Observe	5.1.3.2
	Confirm		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		Tests for compliance with technical requirements: tests performed to assess compliance with R 50-1, clause 2	Observe	5.1.3.3
Simulation tests: carried out in a way that will reveal a corruption of any weighing result. Means of assessing results can be:				A.6.3	5.1.3.4
	Note in remarks		adaptation of the totalization indicating device, or		
	Note in remarks		use of change point weights, or		
	Note in remarks		any other means mutually agreed		
Provision for means of testing				Observe	5.1.4
	Confirm		Metrological Authority has been supplied with sufficient means for testing		
Place of testing				Observe	5.1.5
	Confirm		either on the premises of the Metrological Authority, or		
	Note in remarks		any other suitable place, mutually agreed		

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

$$E\ \% = \frac{(I - T) \times 100}{T}$$ = 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:	21.1	20.5	°C
Rel. h:			%
Date:	95:12:30	95:12:29	yy:mm:dd
Time:	16:30:05	16:00:05	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 Δ_{min}, for the designated class of the belt weigher.

Summary of test report

Application No.: .....

Pattern designation: .....

Remarks	Failed	Passed	Report page	Tests	R 50-2
				Simulation tests - simulator data	1
				Warm-up time	1.1
				Variation of simulation speed	1.2
				Eccentric loading	1.3
				Zero-setting device	1.4
				Zero-setting (range)	1.4.1
				Zero-setting (semi-automatic and automatic)	1.4.2
				Influence quantities	1.5
				Static temperatures	1.5.1
				Temperature effect at zero flowrate	1.5.2
				Damp heat, steady state	1.5.3
				Mains power supply (AC)	1.5.4
				Battery power supply (DC)	1.5.5
				Disturbances	1.6
				Voltage dips and short interruptions	1.6.1
Electrical fast transients/burst immunity					1.6.2
				Power supply lines	1.6.2.1
				I/O circuits and communication lines	1.6.2.2
Electrostatic discharges					1.6.3
				Direct application	1.6.3.1
				Indirect application	1.6.3.2
				Electromagnetic susceptibility	1.6.4
				Metrological characteristics	1.7
				Repeatability	1.7.1
				Discrimination of the totalization indicating device	1.7.2
				Discrimination of the totalization indicating device used for zero totalization	1.7.3
				Short- and long-term stability of zero	1.7.4
				In-situ tests	1.8
				Maximum permissible errors on checking of zero, or maximum variation during zero load test (depending on ratio rev/Φ_{min})	1.8.1
				Discrimination of the indicator used for zero-setting	1.8.2
				In-situ material tests (fixed and all other speed belt weighers)	2
				Accuracy of control instrument	2.1
				Repeatability	2.2
				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:

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

(*) 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:

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

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

Error E %	Indicated totalization I	Calculated totalization T	Pulses	Time (*)	Weigh table load % Max as defined in R 50-1, 2.4
				0 min	Min load (nominally 20 % of Max)
					Max capacity (Max)
					Min load (nominally 20 % of Max)
					Max capacity (Max)
					Min load (nominally 20 % of Max)
					Max capacity (Max)
				30 min	Min load (nominally 20 % of Max)
					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

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

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

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

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

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

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

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

Remarks:

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

Application No.: .....

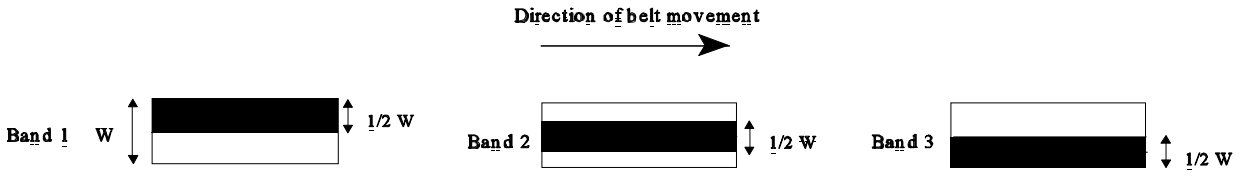
Pattern designation: .....

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 I_{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

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

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

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

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

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) .....

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

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: $S_1 + S_2$ ≤ 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) .....

E %	Difference I – T ( )	Indicated totalization I ( )	Calculated totalization T ( )	Pulses	Load S ( )	
						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

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

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

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

Static load (S) for Θ_{min} ( )	Equivalent pulses for Θ_{min}	Flowrate (/h)	
			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

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

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

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

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

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

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

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

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

Change in indication ( )	Indicated totalization I at end ( )	Indicated totalization I at start ( )	Pulses	Temp °C	
					Start temp
					End temp
					Start temp
					End temp
					Start temp
					End temp
					Start temp
					End temp
					Start temp
					End temp

Time	Date	Report page (*)

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

Static load (S) for $\varnothing_{min}$ ( )	Equivalent pulses for $\varnothing_{min}$	Flowrate (/h)	
			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

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

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

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

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

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

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

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

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

Test results

Test 1 at reference voltage (*)

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

Test 2 at reference voltage –15 %

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

Test 3 at reference voltage +10 %

E %	Difference I – T ( )	Indicated totalization I ( )	Calculated totalization T ( )	Pulses	Load S ( )	Q (/h)
						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 (*)

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

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

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

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

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

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

Test results

Test 1 at reference voltage

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

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

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

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

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

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

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

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

Test results

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

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

Static load (S) for Θ_{min} ( )	Equivalent pulses for Θ_{min}	Flowrate (/h)	
			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

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

Static load (S) for Φ_{min} ( )	Equivalent pulses for Φ_{min}	Flowrate (/h)	
			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

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

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

☐ Contact discharge ☐ Paint penetration

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

Significant fault Yes/No	Indicated totalization I ( )	Pulses	Discharges		
			Repetition interval (s)	Number of discharges Φ 10	Test voltage (kV)
			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

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

Polarity (*): ☐ pos ☐ neg

Horizontal coupling plane

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

Vertical coupling plane

		Discharges			Load S ( )
Significant fault Yes/No	Indicated totalization I	Repetition interval (s)	Number of discharges :2 10	Test voltage (kV)	
		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

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

Rate of sweep: [ ]

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

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

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

Where:

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

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

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

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

Difference (I – I)	Indicated totalized load		Calculated totalized load		Pulses	Increased load S_2	Pulses	First weightable load $S_{1\ 2\ 1}$
	I_2	I_1	T_2	T_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

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

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 =

Difference $T_1 - T_2$ ( )	Pulses	Final total T_2 ( )	Pulses	Initial total T_1 ( )	Test
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 $\left\{ \begin{array}{l} 0.05\ \%\ \text{of Max for class } 0.5 \\ 0.1\ \%\ \text{of Max for class } 1 \\ 0.2\ \%\ \text{of Max for class } 2 \end{array} \right\}$

Remarks:

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) .....

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

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:

Units	Value	Data Ref.	Derivation	Data
		d		Totalization scale interval
			From the device used for zero indication	Scale interval for zero-setting
		Max	Maximum net load of weightable	Maximum capacity
m/s		V_{max}	Maximum speed	Belt speed
m/s		V_{min}	Minimum speed	
kg/h or t/h		Q_{max}	Max x V_{max}	Maximum flowrate
kg/h or t/h		Q_{min}	Normally 20 % of Q_{max}, but > 35 % of Q_{max}	Minimum flowrate
m		L		Weigh length
m		B		Length of belt
s			Minimum = B/V_{max}	Time per belt revolution
s			Maximum = B/V_{min}	
kg or t		(1)	$\frac{Q_{max} \times B}{V_{max}}$	Load for one belt revolution at Q_{max}
kg or t		(2)	0.02 × load at Q_{max}	2 % of the load at Q_{max} for 1 hour
kg or t		(3)	$\left\{\begin{array}{l} 800\ d \text{ for class } 0.5 \\ 400\ d \text{ for class } 1 \\ 200\ d \text{ for class } 2 \end{array}\right\}$	Table 3 (R 50-1)
kg or t		Θ_{min}	Largest of (1), (2) and (3)	Minimum totalized load
kg or t		Θ_t	= Θ_{min} unless all totalizations are over whole belt revolutions, then Θ_t = largest of (2) and (3)	Minimum test load
				*

* 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 Δ_{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 Δ_{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).

☐

Difference $I_2 - I_1$	Final indication I_2	Initial indication I_1	Duration (secs)	Belt revolutions	Test No.
					1
					2

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

Greater of (A) or (B)	$*I_1 - I_{min}*$ (B)	$*I_1 - I_{max}*$ (A)	Minimum indication I_{min}	Maximum indication I_{max}	Initial indication I_1	Test No.
						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) .....

Difference I – I	Indication		Duration ( )	Revs	Load S_D ( )	Test 1 2
	I_2	I_1				
						A
						B
						A
						B
						A
						B
						A
						B

Where:
Revs is revolution of the belt

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

Remarks:

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 .....

Δ_t (if different) .....

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

Belt weigher details:

Δ_{min} .....

..... Class .....

..... Max capacity

..... Min capacity

..... Scale interval, d_c

Transfer vehicle: .... Approval No.

Capacity: .... Date of last test

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) $\dfrac{2\,\Delta_t}{\text{Vehicle capacity}}$ N

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

Possible control instrument error (Class III) per weighing

$$\left\{\begin{array}{l} \pm\ 0.5\ d_c \text{ for } 0 \leq m \leq 500 \\ \pm\ 1.0\ d_c \text{ for } 500 \leq m \leq 2000 \\ \pm\ 1.5\ d_c \text{ for } 2000 \leq m \end{array}\right\} E_c$$

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

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.

Relative error difference %	Relative error %	Error I – T ( )	Feed flowrate (/h)	Indication I ( )	Controlled load T	Test pair
						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

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

Speed = m/s

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

Remarks: