OIML TC9/SC2

International Organisation for Legal Metrology (OIML)

INTERNATIONAL RECOMMENDATION

Second committee draft revision

OIML R 107- 2

Discontinuous totalizing automatic weighing instruments (totalizing hopper weighers)

Part 2: Test report format

May 2006

EXPLANATORY NOTE

This working draft revision of OIML R 107-2 was prepared by OIML TC 9/ SC 2 *Automatic weighing instruments,* following consultations on the Working Draft Revision in June 2005.

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CONTENTS

FOREWORD

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

The 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;

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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.

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INTRODUCTION

This "test report format" aims at presenting, in a standardized format, the results of the various tests and examinations to which a type of a totalizing automatic weighing instrument shall be submitted with a view to its approval.

The test report format consists of two parts, a "checklist" and the "test report" itself.

The checklist is a summary of the examinations carried out on the instrument. It includes the conclusions of the results of the test performed, experimental or visual checks based on the requirements of Part 1. The words or condensed sentences aim at reminding the examiner of the requirements in OIML R 107-1 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 OIML R 107-1.

All metrology services or laboratories evaluating types of totalizing automatic weighing instruments accordingly to R 107 or to national or regional regulations based on this OIML Recommendation 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 multilateral cooperation agreements. In the framework of the *OIML Certificate System for measuring instruments*, use of this test report format is mandatory.

The "information concerning the test equipment used for type evaluation" shall cover all test equipment which has been used in determining the test results given in a report. The information may be a short list containing only 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 immunity to radiated electromagnetic fields

Note concerning the numbering of the following pages

In addition to a sequential numbering: "R 107-2 page .." at the bottom of the pages of this publication, a special place is left at the top of each page (starting with the following page) for numbering the pages of reports established following this model; in particular, some tests (e.g. metrological performance tests) shall be repeated several times, each test being reported individually on a separate page following the relevant format; in the same way, a multiple range instrument shall be tested separately for each range and a separate form (including the general information form) shall be filled out for each range. For a given report, it is advisable to complete the sequential numbering of each page by the indication of the total number of pages of the report.

DISCONTINUOUS TOTALIZING AUTOMATIC WEIGHING INSTRUMENTS (TOTALIZING HOPPER WEIGHERS)

TYPE EVALUATION REPORT

EXPLANATORY NOTES

Symbols	Meaning
I	Indication
I_n	n^{th} indication
L	Load
ΔL	Additional load to next changeover point
P	I + 1/2 e – ΔL = Indication prior to rounding (digital indication)
E	I – L or P – L = Error
E%	(P - L)/L %
E_0	Error at zero load
d	Actual scale interval
d_t	Totalisation scale interval
p_i	Fraction of the MPE applicable to a module of the instrument which is examined separately.
MPE	Maximum permissible error
EUT	Equipment under test
sf	Significant fault
Max	Maximum capacity of the weighing instrument
Min	Minimum capacity of the weighing instrument
U_{nom}	Nominal voltage value marked on the instrument
U_{max}	Highest value of a voltage range marked on the instrument
U_{min}	Lowest value of a voltage range marked on the instrument
v_{min}	Minimum operating speed
v_{max}	Maximum operating speed
DC	direct current
AC	alternating current
Temp	temperature
Rel. h	relative humidity

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

For each test, the "SUMMARY OF TYPE EVALUATION" and the "CHECKLIST" shall be completed according to this example:

	P	F
when the instrument has passed the test:	X	
when the instrument has failed the test:		X
when the test is not applicable:	/	/

P = Passed
F = Failed

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

	At start	At end	
Temp:	20.5	21.1	°C
Rel. h:			%
Date:	2006-01-29	2006-01-30	yyyy-mm-dd
Time:	16:00:05	16:30:25	hh:mm:ss

"Date" in the test reports refers to the date that the test was performed.

In the disturbance tests, faults greater than d_t are acceptable provided that they are detected and acted upon, or that they result from circumstances such that these faults shall not be considered as significant; an appropriate explanation shall be given in the column "Yes (remarks)".

Section numbers in brackets refer to the corresponding subclauses of R 107-1.

GENERAL INFORMATION CONCERNING THE TYPE

Application No: .....

Type designation: .....

Manufacturer: .....

Applicant: .....

Instrument category: .....

Testing on: ☐ Complete instrument ☐ Module [1]

Accuracy class ☐ 0.2 ☐ 0.5 ☐ 1 ☐ 2

Min = ☐ $\sum_{min}$ = ☐

Max = ☐

T + = ☐ T - = ☐ d = ☐ d_t = ☐

U_{nom} [2] = ☐ V U_{min} = ☐ V U_{max} = ☐ V f = ☐ Hz Battery, U = ☐ V

Zero-setting device:

☐ Nonautomatic

☐ Semi-automatic

☐ Automatic zero-setting

☐ Initial zero-setting

☐ Zero-tracking

Initial zero-setting range ☐ % Temperature range ☐ °C

Printer: ☐ Built in ☐ Connected ☐ Not present but connectable ☐ No Connection

[1] The test equipment (simulator or part of a complete instrument) connected to the module shall be defined in the test form(s) used.
[2] Voltage U_{nom} is the nominal voltage, or the average if a voltage range, marked on the instrument.

GENERAL INFORMATION CONCERNING THE TYPE (continued)

Instrument submitted:	.....	Load cell:	.....
Identification No:	.....	Manufacturer:	.....
Connected equipment:	.....	Type:	.....
Remarks:		Capacity:	.....
		Number:	.....
Interfaces: (numbers, nature)	.....	Classification symbol:	.....
Remarks:	see below		
Date of report:	.....	Evaluation period:	.....
Observer:	.....		

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

IDENTIFICATION OF THE INSTRUMENT

Application No: .....

Report date: .....

Type designation: .....

Manufacturer: .....

Serial No: .....

Manufacturing Documentation

(Record as necessary to identify the equipment under test)

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

Simulator documentation

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

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: .....

Type designation: .....

Manufacturer: .....

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

INFORMATION CONCERNING THE TEST EQUIPMENT USED FOR TYPE EVALUATION

TEST EQUIPMENT

Application No: .....

Report date: .....

Type 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: .....

Type 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.

SUMMARY OF TYPE EVALUATION

Application No: .....

Type designation: .....

	TESTS	Report page	Passed	Failed	Remarks
1	Warm-up time test				
2	Zero-setting				
3	Stability of equilibrium				
4	**Influence factors**				
4.1	Static temperatures				
4.2	Temperature effect on no load indication				
4.3	Damp heat, steady state				
4.4	AC mains power voltage variation				
4.5	External or plug-in power (AC or DC), including rechargeable battery power voltage if (re)charge of batteries during the operation of the instrument is possible				
4.6	Battery power voltage (not mains connected), including rechargeable auxiliary battery power if (re)charge of batteries during the operation of the instrument is not possible				
4.7	Voltage variation of 12 V or 24 V road vehicle batteries				
5	**Disturbances**				
5.1	AC mains short time power reductions				
5.2	Bursts (transients) on mains power lines and on signal and communication lines				
5.3	Electrical surges on mains power lines and on signal and communication lines				
5.4	Electrostatic discharge test				
5.5	Immunity to electromagnetic fields				
5.6	Electrical transient conduction test for instruments powered by 12 V and 24 V road vehicle batteries				
6	Span stability				
7	Material tests				
7.1	Separate verification method				
7.2	Integral verification method				
	EXAMINATIONS				
8	Examination of the construction				
9	Checklist				

SUMMARY OF TYPE EVALUATION (continued)

Use this page to detail remarks from the summary of the type evaluation.

1 WARM-UP TIME (4.2.5, A.5.5)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss
		Bar. Pres:			hPa

Control scale interval *d*: .....

Resolution during test

(smaller than *d*): .....

Duration of disconnection before test: ..... hours

Automatic zero-setting and zero-tracking device is:

☐ Non-existent ☐ Not in operation ☐ Out of working range ☐ In operation [3]

$E = I + ½\ d - \Delta L - L$
E_0 = error calculated prior to each measurement at zero or near zero (unloaded)
E_L = error calculated at load (loaded)

	time (*)	Load L	Indication I	Add load ΔL	Error	$E_L - E_0$
Unloaded	0 min				E_{0I} =	
Loaded					E_L =	
Unloaded	5 min				E_0 =	
Loaded					E_L =	
Unloaded	15 min				E_0 =	
Loaded					E_L =	
Unloaded	30 min				E_0 =	
Loaded					E_L =	

(*)Counted from the moment an indication has first appeared.

Error [4]		MPE
Initial zero-setting error	E_{0I}	≤ 0.25 d =
Maximum value of error unloaded	E_0	≤ 0.5 d =
Maximum value of zero variation	$\|E_0 - E_{0I}\|$	≤ 0.25 d * P =
Maximum value of error loaded	$E_L - E_0$	≤ MPE * P_i =

☐ Passed ☐ Failed

Remarks:

[3] In operation only if zero operates as part of every automatic weighing cycle
[4] Check that the error is ≤ the MPE

2 ZERO-SETTING (3.8.1, A.5.6)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

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

2.1 Modes of zero-setting (A.5.6.1)

Modes of zero-setting	Present	Range tested	Accuracy tested
Non-automatic			
Semi-automatic			
Auto zero at start of automatic operation			
Auto-zero as part of every weighing cycle			
Auto-zero after programmable interval			

2.2 Range of zero-setting (A.5.6.2)

2.2.1 Initial zero-setting range (A.5.6.2.1)

Positive range L_p		Negative range L_n		Zero setting range $L_p + L_n$	% of Max load

2.2.2 Automatic zero-setting range (A.5.6.2.3)

Weight added	Zero Yes/No	Zero setting range	% of Max load

2.3 Accuracy of zero-setting (A.5.6.3)

E = I + ½ d - ΔL
E = I - L or P - L = Error

Zero-setting mode:	Add. Load ΔL	E = I + ½ d - ΔL	E/d

☐ Passed ☐ Failed

Remarks:

2 ZERO-SETTING (continued)

2.4 Zero offset interlock (3.8.1.3, A.6.8)

Method of zero-setting:

	Non-automatic
	Semi-automatic
	Auto zero at start of automatic operation
	Auto-zero as part of every weighing cycle
	Auto-zero after programmable interval

Positive offset:

Load applied after zeroing:		
Automatic operation	inhibited	
	Not inhibited	

Negative offset:

Load removed after zeroing:		
Automatic operation	inhibited	
	Not inhibited	

☐ Passed ☐ Failed

Remarks:

3 STABILITY OF EQUILIBRIUM FOR STATIC WEIGHING (3.5.6, A.6.1)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

In the case of printing or data storage

Load = ☐

Printing or data storage			
Number	First printed or stored value after manual disturbance and command	Reading during 5 seconds after print-out or storage	
		Minimum	Maximum
1			
2			
3			
4			
5			

Check separately for each of the 5 tests if only two adjacent figures appear, one being the printed value

In the case of zero-setting

E = I + ½ d - ΔL - L L = zero or near zero

Zero-setting				
Number	Load L	Indication I	Add. load ΔL	Error E
1				
2				
3				
4				
5				

Check the accuracy according to A.5.6.3 for zero-setting.

☐ Passed ☐ Failed

Remarks:

4 INFLUENCE FACTORS (2.7, A.7.3)

4.1 Static temperatures (2.7.1, A.7.3.1)

Test 1 Static temperature, reference 20°C

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss
		Bar. Pres:			hPa

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test	At end of test	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.1 Static temperatures (continued)

Test 2 Static temperature, specified high (°C)

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

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test	At end of test	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.1 Static temperatures (continued)

Test 3 Static temperature, specified low (°C)

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

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test	At end of test	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.1 Static temperatures (continued)

Test 4 Static temperature, 5°C

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

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test	At end of test	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.1 Static temperatures (continued)

Test 5 Static temperature, reference 20°C

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

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test	At end of test	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.2 Temperature effect on no-load indication (2.7.1.2, A.7.3.2)

Application No: .....

Type designation: .....

Observer: .....

Control scale interval d: .....

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

Automatic zero-setting device is:

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

$P = I + ½ d - \Delta L$

Report Page [5]	Date	Time	Temp (°C)	Zero indication I	Add load ΔL	P	ΔP	ΔTemp	Zero-change per ... °C

ΔP = difference of P for two consecutive tests at different temperatures
ΔTemp = difference of temperature for two consecutive tests at different temperatures
Check if the zero-change per 5 °C is smaller than d.

☐ Passed ☐ Failed

Remarks:

[5] Give the report page of the relevant weighing test where weighing tests and temperature effect on no-load indication test are conducted together.

4.3 Damp heat, steady state (non-condensing) (4.2.3, A.7.3.3)

Test 1 Reference temperature of 20 °C at 50 % humidity

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test ( )	At end of test ( )	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.3 Damp heat, steady state (continued)

Test 2 Upper limit temperature ___(°C) at 85 % humidity

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

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test ( )	At end of test ( )	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.3 Damp heat, steady state (continued)

Test 3 Reference temperature of 20 °C at 50 % humidity

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

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Load L	Indication I		Add load ΔL		Error		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Totalisation indication		
At start of test ( )	At end of test ( )	Max deviation observed (except for non-recordable transients)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_i = T_a - T_b$	Error $T_c - T_i$

☐ Passed ☐ Failed

Remarks

4.4 AC mains power voltage variation test (2.7.2, A.7.3.4)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Marked nominal voltage[6] (U_{nom}) or voltage range: ☐ V

$E = I + ½\ d - \Delta L - L$, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Voltage conditions	Load L	Indication I	Add load ΔL	Error	Corrected error E_c
U_{nom}			(*)		
U_{nom} or U_{max} × 1.10					
U_{nom} or U_{min} × 0.85					
U_{nom}					

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Voltage conditions	Totalisation indication		
	At start of test	At end of test	Max deviation observed (except for non-recordable transients)
U_{nom}			
U_{nom} or U_{max} × 1.10			
U_{nom} or U_{min} × 0.85			
U_{nom}			

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Voltage conditions	Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Error $T_c - T_i$
U_{nom}						
U_{nom} or U_{max} × 1.10						
U_{nom} or U_{min} × 0.85						
U_{nom}						

☐ Passed ☐ Failed

Remarks

[6] U_{nom} is the nominal voltage marked on the instrument; if a range of voltages is marked then the test shall be performed at U_{max} (highest value of the range) and at U_{min} (lowest value of the range).

4.5 **External or plug-in power (AC or DC), including rechargeable battery power voltage if (re)charge of batteries during the operation of the instrument is possible (2.7.2, A.7.3.5)**

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....
Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Marked nominal voltage[7] (U_{nom}) or voltage range: ☐ V

$E = I + ½\ d - \Delta L - L$, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Voltage conditions	Load L	Indication I	Add load ΔL	Error	Corrected error E_c
U_{nom}			(*)		
U_{nom} or U_{max} × 1.20					
minimum operating voltage					
U_{nom}					

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

	Totalisation indication		
Voltage conditions	At start of test	At end of test	Max deviation observed (except for non-recordable transients)
U_{nom}			
U_{nom} or U_{max} × 1.20			
minimum operating voltage			
U_{nom}			

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Voltage conditions	Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Error $T_c - T_I$
U_{nom}						
U_{nom} or U_{max} × 1.20						
minimum operating voltage						
U_{nom}						

☐ Passed ☐ Failed

Remarks:

[7] U_{nom} is the nominal voltage marked on the instrument; if a range of voltages is marked then the test shall be performed at U_{max} (highest value of the range) and at U_{min} (lowest value of the range).

4.6 Battery power voltage (not mains connected), including rechargeable auxiliary battery power if (re)charge of batteries during the operation of the instrument is not possible (2.7.2, A.7.3.6)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....
Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Marked nominal voltage (U_{nom}) or voltage range: ☐ V

E = I + ½ d - ΔL – L, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Voltage conditions	Load L	Indication I	Add load ΔL	Error	Corrected error E_c
U_{nom} or U_{max}					
minimum operating voltage					
U_{nom}					

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Voltage conditions	Totalisation indication		
	At start of test	At end of test	Max deviation observed (except for non-recordable transients)
U_{nom} or U_{max}			
minimum operating voltage			
U_{nom}			

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Voltage conditions	Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Error $T_c - T_I$
U_{nom} or U_{max}						
minimum operating voltage						
U_{nom}						

☐ Passed ☐ Failed

Remarks:

4.7 Voltage variation of 12 V or 24 V road vehicle batteries (2.7.2, A.7.3.6)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....
Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Marked nominal voltage[8] (U_{nom}) of the vehicle's electrical system: ☐ V

$E = I + ½\ d - \Delta L - L$, $E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Voltage conditions	Test limits		Load L	Indication I	Add load ΔL	Error E	Corrected error E_c
12 V	U_{max} =	16 V				(*)	
	U_{min} =	minimum operating voltage					
24 V	U_{max} =	32 V					
	U_{min} =	minimum operating voltage					

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

	Totalisation indication				
Voltage conditions	Test limits		At start of test	At end of test	Max deviation observed (except for non-recordable transients)
12 V	U_{max} =	16 V			
	U_{min} =	minimum operating voltage			
24 V	U_{max} =	32 V			
	U_{min} =	minimum operating voltage			

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Voltage conditions	Test limits		Static Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Error $T_c - T_I$
12 V	U_{max} =	16 V						
	U_{min} =	minimum operating voltage						
24 V	U_{max} =	32 V						
	U_{min} =	minimum operating voltage						

☐ Passed ☐ Failed

Remarks:

[8] The nominal voltage (U_{nom}) of the vehicle's electrical system is usually 12 V or 24 V. However, the practical voltage at the battery-terminals of a road vehicle can vary considerably.

5 DISTURBANCES (4.1.2, A.7.4)

5.1 AC mains short time power reductions (A.7.4.1)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Marked nominal voltage (U_{nom}) or voltage range: ☐ V

Pre-test information

Disturbance parameters			
Amplitude % of U_{nom} [9]	Duration cycles	Number of disturbances	Repetition Interval (s)
0 %	0.5	10	
0 %	1	10	
40 %	10	10	
70 %	25	10	
80 %	250	10	
0 %	250	10	

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Disturbance	Result			
Amplitude % of U_{nom} (other pre-test information)	Load	Indication I	Significant fault (>1 d_t) No	Yes (remarks)
without disturbance				
0 %				
0 %				
40 %				
70 %				
80 %				
0 %				

[9] In case a voltage-range is marked, use the average value as U_{nom}.

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Disturbance	Result			
Amplitude % of U_{nom} (other pre-test information)	Totalisation indication		Significant fault (>1 d_t)	
	At start of test	At end of test	No	Yes (remarks)
without disturbance				
0 %				
0 %				
40 %				
70 %				
80 %				
0 %				

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Disturbance	Result						
Amplitude % of U_{nom} (other pre-test information)	Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Significant fault ($T_c - T_I$)	
						No	Yes (remarks)
without disturbance							
0 %							
0 %							
40 %							
70 %							
80 %							
0 %							

☐ Passed ☐ Failed

Remarks:

5.2 Bursts (transients) on mains power lines and on signal and communication lines (A.7.4.2)

5.2.1 Mains power lines

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Mains power lines: test voltage 1.0 kV (peak), duration of the test > 1 minute at each amplitude and polarity

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Connection	Polarity	Result			
		Load	Indication I	Significant fault (>1 d_t)	
				No	Yes (remarks)
without disturbance					
Live ↓ ground	pos				
	neg				
without disturbance					
Neutral ↓ ground	pos				
	neg				
without disturbance					
Protective earth ↓ ground	pos				
	neg				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Connection	Polarity	Result			
		Totalisation indication		Significant fault (> 1 d_t)	
		At start of test	At end of test	No	Yes (remarks)
without disturbance					
Live ↓ ground	pos				
	neg				
without disturbance					
Neutral ↓ ground	pos				
	neg				
without disturbance					
Protective earth ↓ ground	pos				
	neg				

5.2.1 Mains power lines (continued)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Connection	Polarity	Result						
		Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Significant fault ($T_c - T_I$)	
							No	Yes (remarks)
without disturbance								
Live ↓ ground	pos							
	neg							
without disturbance								
Neutral ↓ ground	pos							
	neg							
without disturbance								
Protective earth ↓ ground	pos							
	neg							

☐ Passed ☐ Failed

Remarks:

5.2 Bursts (transients) on mains power lines and on signal and communication lines (A.7.4.2) Supprimé : continued

5.2.2 Signal and communication lines

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Signal and communication lines: test voltage 0.5 kV (peak), duration of the test > 1 minute at each amplitude and polarity

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Cable/Interface	Polarity	Result			
		Load	Indication I	Significant fault (>1 d_t) No	Yes (remarks)
without disturbance					
C/1,1	pos				
	neg				
without disturbance					
C/1,2	pos				
	neg				
without disturbance					
C/1,3	pos				
	neg				
without disturbance					
C/1,4	pos				
	neg				
without disturbance					
C/1,5	pos				
	neg				
without disturbance					
C/1,6	pos				
	neg				

Notes: (1) Explain or make a sketch indicating where the clamp is located on the cable; if necessary, add additional page.

(2) The cell references C/1,1 to C/1,6 should be used to cross-reference the cable or interface between Tables A and B.

5.2.2 Signal and communication lines (continued)

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Cable/Interface	Polarity	Result			
		At start of test	At end of test	Significant fault (>1 d_t) No	Yes (remarks)
without disturbance					
C/1,1	pos				
	neg				
without disturbance					
C/1,2	pos				
	neg				
without disturbance					
C/1,3	pos				
	neg				
without disturbance					
C/1,4	pos				
	neg				
without disturbance					
C/1,5	pos				
	neg				
without disturbance					
C/1,6	pos				
	neg				

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Cable/Interface	Polarity	Result						
		Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Significant fault ($T_c - T_I$) No	Yes (remarks)
without disturbance								
C/1,1	pos							
	neg							
without disturbance								
C/1,2	pos							
	neg							
without disturbance								
C/1,3	pos							
	neg							
without disturbance								
C/1,4	pos							
	neg							
without disturbance								
C/1,5	pos							
	neg							
without disturbance								
C/1,6	pos							
	neg							

☐ Passed ☐ Failed

Remarks:

5.3 Electrical surges on mains power lines and on signal and communication lines (A.7.4.3)

5.3.1 Mains power lines

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Mains power lines: test voltage 1.0 kV, duration of the test > 1 minute at each amplitude and polarity

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Connection	Polarity	Result			
		Load	Indication I	Significant fault (>1 d_t)	
				No	Yes (remarks)
without disturbance					
Live ↓ ground	pos				
	neg				
without disturbance					
Neutral ↓ ground	pos				
	neg				
without disturbance					
Protective earth ↓ ground	pos				
	neg				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Connection	Polarity	Result			
		Totalisation indication		Significant fault (>1 d_t)	
		At start of test	At end of test	No	Yes (remarks)
without disturbance					
Live ↓ ground	pos				
	neg				
without disturbance					
Neutral ↓ ground	pos				
	neg				
without disturbance					
Protective earth ↓ ground	pos				
	neg				

5.3.1 Mains power lines (continued)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Connection	Polarity	Result						
		Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Significant fault ($T_c - T_I$)	
							No	Yes (remarks)
without disturbance								
Live ↓ ground	pos							
	neg							
without disturbance								
Neutral ↓ ground	pos							
	neg							
without disturbance								
Protective earth ↓ ground	pos							
	neg							

☐ Passed ☐ Failed

Remarks (including additional test set-up information):

5.3 Electrical surges on mains power lines and on signal and communication lines (A.7.4.3)

5.3.2 Electrical surges on signal and communication lines

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Signal and communication lines: test voltage 0.5 kV, duration of the test 1 minute at each amplitude and polarity

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Cable/Interface	Polarity	Result			
		Load	Indication I	Significant fault (>1 d_t) No	Yes (remarks)
without disturbance					
C/1,1	pos				
	neg				
without disturbance					
C/1,2	pos				
	neg				
without disturbance					
C/1,3	pos				
	neg				
without disturbance					
C/1,4	pos				
	neg				
without disturbance					
C/1,5	pos				
	neg				
without disturbance					
C/1,6	pos				
	neg				

Notes: (1) Explain or make a sketch indicating where the clamp is located on the cable; if necessary, add additional page.

(2) The cell references C/1,1 to C/1,6 should be used to cross-reference the cable or interface between Tables A and B.

5.3.2 Electrical surges on signal and communication lines (continued)

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Cable/Interface	Polarity	Result			
		At start of test	At end of test	Significant fault (>1 d_t) No	Yes (remarks)
without disturbance					
C/1,1	pos				
	neg				
without disturbance					
C/1,2	pos				
	neg				
without disturbance					
C/1,3	pos				
	neg				
without disturbance					
C/1,4	pos				
	neg				
without disturbance					
C/1,5	pos				
	neg				
without disturbance					
C/1,6	pos				
	neg				

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Cable/Interface	Polarity	Result						
		Load	Calculated change in totalisation T_c	Totalisation before adding load T_b	Totalisation after adding load T_a	Indicated change in totalisation $T_I = T_a - T_b$	Significant fault ($T_c - T_I$) No	Yes (remarks)
without disturbance								
C/1,1	pos							
	neg							
without disturbance								
C/1,2	pos							
	neg							
without disturbance								
C/1,3	pos							
	neg							
without disturbance								
C/1,4	pos							
	neg							
without disturbance								
C/1,5	pos							
	neg							
without disturbance								
C/1,6	pos							
	neg							

☐ Passed ☐ Failed

Remarks:

5.4 Electrostatic discharge test (A.7.4.4)

5.4.1 Direct application

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....
Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

☐ Contact discharges ☐ Paint penetration

☐ Air discharges Polarity [10]: ☐ pos ☐ neg

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Discharges			Result			
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Load	Indication I	Significant fault (>1 d_t) No	Significant fault (>1 d_t) Yes (remarks)
without disturbance						
2						
4						
6						
8 (air discharges)						

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Discharges			Result			
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	At start of test	At end of test	Significant fault (>1 d_t) No	Significant fault (>1 d_t) Yes (remarks)
without disturbance						
2						
4						
6						
8 (air discharges)						

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Discharges			Result						
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Load	Calculated change T_c	Before adding load T_b	After adding load T_a	Indicated change $T_I = T_a - T_b$	Significant fault ($T_c - T_I$) No	Significant fault ($T_c - T_I$) Yes (remarks)
without disturbance									
2									
4									
6									
8 (air discharges)									

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

☐ Passed ☐ Failed

Remarks:

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

5.4 Electrostatic discharge test (A.7.4.4)

5.4.2 Indirect application (contact discharges only)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Automatic zero-setting device is:

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

Polarity [11]: ☐ pos ☐ neg

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Horizontal coupling plane

Discharges			Result			
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Load	Indication I	Significant fault (>1 d_t) No	Significant fault (>1 d_t) Yes (remarks)
without disturbance						
2						
4						
6						

Vertical coupling plane

Discharges			Result			
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Load	Indication I	Significant fault (>1 d_t) No	Significant fault (>1 d_t) Yes (remarks)
without disturbance						
2						
4						
6						

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

5.4.2 Indirect application – contact discharges only (continued)

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Horizontal coupling plane

Discharges			Result			
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Totalisation		Significant fault (>1 d_t)	
			At start of test	At end of test	No	Yes (remarks)
without disturbance						
2						
4						
6						

Vertical coupling plane

Discharges			Result			
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Totalisation		Significant fault (>1 d_t)	
			At start of test	At end of test	No	Yes (remarks)
without disturbance						
2						
4						
6						

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Horizontal coupling plane

Discharges			Result						
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Totalisation					Significant fault (T_c - T_I)	
			Load ( )	Calculated change T_c	Before adding load T_b	After adding load T_a	Indicated change $T_I = T_a - T_b$	No	Yes (remarks)
without disturbance									
2									
4									
6									

Vertical coupling plane

Discharges			Result						
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Totalisation					Significant fault (T_c - T_I)	
			Load ( )	Calculated change T_c	Before adding load T_b	After adding load T_a	Indicated change $T_I = T_a - T_b$	No	Yes (remarks)
without disturbance									
2									
4									
6									

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

☐ Passed ☐ Failed

Remarks:

5.4 Electrostatic discharge test (A.7.4.4)

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

a) Direct application

Contact discharges:

Air discharges:

b) Indirect application

5.5 Immunity to electromagnetic fields (A.7.4.5)

5.5.1 Immunity to radiated electromagnetic fields (A.7.4.5.1)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Rate of sweep: ☐

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Disturbances				Result			
Antenna	Frequency range (MHz)	Polarization	Facing EUT	Load	Indication I	Significant fault (>1 d_t) No	Significant fault (>1 d_t) Yes (remarks)
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				

Test severity:

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

(1) For instruments having no mains or other I/O ports available so that the conducted test according to 5.5.2 cannot be applied, the lower limit of the radiation test is 26 MHz

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

☐ Passed ☐ Failed

Remarks:

5.5.1 Immunity to radiated electromagnetic fields (continued)

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Disturbances				Result			
Antenna	Frequency range (MHz)	Polarization	Facing EUT	Totalisation indication			Significant fault (>1 d_t)
				At start of test	At end of test	No	Yes (remarks)
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
without disturbance							
		Horizontal	Front				
			Right				
			Left				
			Rear				
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
without disturbance							
		Horizontal	Front				
			Right				
			Left				
			Rear				

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Disturbances				Result						
Antenna	Frequency range (MHz)	Polarization	Facing EUT	Totalisation						Significant fault (T_c - T_I)
				Load	Calculated change T_c	Before adding load T_b	After adding load T_a	Indicated change $T_I = T_a - T_b$	No	Yes (remarks)
without disturbance										
		Vertical	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Horizontal	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Vertical	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Horizontal	Front							
			Right							
			Left							
			Rear							

☐ Passed ☐ Failed

Remarks:

5.5.2 Immunity to conducted electromagnetic fields (A.7.4.5.2)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Rate of sweep: ☐

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Disturbances				Result			
Antenna	Frequency range (MHz)	Polarization	Level (volts e.m.f)	Load	Indication I		Significant fault (>1 d_t)
						No	Yes (remarks)
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				

Test severity;

Frequency range	:	0.15 – 80	MHz
RF amplitude (50 ohms)	:	10	V (e.m.f.)
Modulation	:	80 % AM, 1 kHz, sine wave	

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

☐ Passed ☐ Failed

Remarks:

5.5.2 Immunity to conducted electromagnetic fields (continued)

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Disturbances				Result			
Antenna	Frequency range (MHz)	Polarization	Level (volts e.m.f)	Totalisation indication			Significant fault (>1 d_t)
				At start of test	At end of test	No	Yes (remarks)
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
without disturbance							
		Horizontal	Front				
			Right				
			Left				
			Rear				
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
without disturbance							
		Horizontal	Front				
			Right				
			Left				
			Rear				

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Disturbances				Result						
Antenna	Frequency range (MHz)	Polarization	Level (volts e.m.f)	Totalisation						Significant fault (T_c - T_I)
				Load	Calculated change T_c	Before adding load T_b	After adding load T_a	Indicated change $T_I = T_a - T_b$	No	Yes (remarks)
without disturbance										
		Vertical	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Horizontal	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Vertical	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Horizontal	Front							
			Right							
			Left							
			Rear							

☐ Passed ☐ Failed

Remarks:

5.5 Immunity to electromagnetic fields (A.7.4.5)

Supprimé : continued

Include a description of the set-up of EUT, e.g. by photos or sketches.

Radiated:

Conducted:

5.6 Electrical transient conduction for instruments powered by road vehicle batteries (A.7.4.6)

5.6.1 Conduction along supply lines of 12 V and 24 V batteries (A.7.4.6.1)

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval d: .....

Totalisation scale interval d_t : .....

Marked nominal voltage (U_{nom}) of the vehicle's electrical system: [ ] V

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Voltage conditions U_{nom}	Test pulse	Pulse voltage U_s	Result			
			Load	Indication I	Significant fault (>1 d_t)	
					No	Yes (remarks) [12]
12 V	2a	+ 50				
	2b[13]	+10				
	3a	-150				
	3b	+100				
	4	-7				
24 V	2a	+50				
	2b	+20				
	3a	-200				
	3b	+200				
	4	-16				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Voltage conditions U_{nom}	Test pulse	Pulse voltage U_s	Result			
			Totalisation indication		Significant fault (>1 d_t)	
			At start of test	At end of test	No	Yes (remarks)
12 V	2a	+ 50				
	2b	+10				
	3a	-150				
	3b	+100				
	4	-7				
24 V	2a	+50				
	2b	+20				
	3a	-200				
	3b	+200				
	4	-16				

[12] Functional status of the instrument during and after exposure to test pulses

[13] Test pulse 2b is only applicable if the instrument is connected to the battery via the main (ignition) switch of the car, i.e. if the manufacturer has not specified that the instrument is to be connected directly (or by its own main switch) to the battery.

5.6.1 Conduction along supply lines of external 12 V and 24 V batteries (continued)

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Voltage conditions U_{nom}	Test pulse	Pulse voltage U_s	Result						
			Totalisation indication					Significant fault ($T_c - T_I$)	
			Load	Calculated change T_c	Before adding load T_b	After adding load T_a	Indicated change $T_I = T_a - T_b$	No	Yes (remarks)
12 V	2a	+ 50							
	2b	+10							
	3a	-150							
	3b	+100							
	4	-7							
24 V	2a	+50							
	2b	+20							
	3a	-200							
	3b	+200							
	4	-16							

☐ Passed ☐ Failed

Remarks:

5.6 Electrical transient conduction for instruments powered by road vehicle batteries (A.7.4.6) Supprimé : continued

5.6.2 Electrical transient conduction via lines other supply lines, for external 12 V and 24 V batteries (A.7.4.6.2)

Marked nominal voltage (U_{nom}) or voltage range: ☐ V

Result sheet A - Used in conjunction with result sheet B when the integral control device is used to determine the error

Voltage conditions U_{nom}	Test pulse	Pulse voltage U_s	Result			
			Load	Indication I	Significant fault (>1 d_t)	
					No	Yes (remarks) [14]
12 V	a	-60 V				
	b	+40 V				
24 V	a	-80 V				
	b	+80 V				

Result sheet B - Used in conjunction with result sheet A to record the retained totalisation

Voltage conditions U_{nom}	Test pulse	Pulse voltage U_s	Result			
			Totalisation indication		Significant fault (>1 d_t)	
			At start of test	At end of test	No	Yes (remarks)
12 V	a	-60 V				
	b	+40 V				
24 V	a	-80 V				
	b	+80 V				

Result sheet C - Used where the total is being increased by continually adding the result of weighing a static load and the totalisation indicator is used to determine the error

Voltage conditions U_{nom}	Test pulse	Pulse voltage U_s	Result						
			Totalisation indication					Significant fault ($T_c - T_I$)	
			Load	Calculated change T_c	Before adding load T_b	After adding load T_a	Indicated change $T_I = T_a - T_b$	No	Yes (remarks)
12 V	a	-60 V							
	b	+40 V							
24 V	a	-80 V							
	b	+80 V							

☐ Passed ☐ Failed

Remarks:

[14] Functional status of the instrument during and after exposure to test pulses

6 SPAN STABILITY (6.3.1, A.8)

Supprimé : 4

Application No: .....

Type designation: .....

Control scale interval d: .....

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

Automatic zero-setting and zero-tracking device is:

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

Test load = ☐

Measurement No 1: Initial measurement

Observer: .....

Location: .....

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

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$, $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected value[15]
1								
2								
3								
4								
5								

Average error = average ($E_L - E_0$) ☐

$(E_L - E_0)_{max} - (E_L - E_0)_{min}$ = ☐

0.1 *d* = ☐

If $|(E_L - E_0)_{max} - (E_L - E_0)_{min}| \leq 0.1\ d$, one loading and reading will be sufficient for each of the subsequent measurements: if not, five loadings and readings shall be performed at each measurement.

Remarks:

[15])When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

6 Span stability (continued)

Subsequent measurements

For each of the subsequent measurements (at least 7), indicate on the "conditions of the measurement", as appropriate, if the measurement has been performed:

- after the temperature test, the EUT having been stabilized for at least 16 h;
- after the humidity test, the EUT having been stabilized for at least 16 h;
- after the EUT has been disconnected from the mains for at least 8 h and then stabilized for at least 5 h;
- after any change in the test location;
- under any other specific condition.

Measurement No 2:

Observer: .....

Location: .....

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

Conditions of the measurement:……

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$, $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected value [16]
1								
2								
3								
4								
5								

If five loadings and readings have been performed: Average error = average ($E_L - E_0$)

Remarks:

[16] When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

6 Span stability (continued)

Measurement No 3:

		At start	At end	
Observer:	Temp:			°C
	Rel. h:			%
Location:	Date:			yyyy-mm-dd
	Time:			hh:mm:ss
	Bar. Pres:			hPa

Conditions of the measurement: ……

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$, $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected Value [17]
1								
2								
3								
4								
5								

If five loadings and readings have been performed: Average error = average ($E_L - E_0$) ☐

Remarks:

Measurement No 4:

		At start	At end	
Observer:	Temp:			°C
	Rel. h:			%
Location:	Date:			yyyy-mm-dd
	Time:			hh:mm:ss
	Bar. Pres:			hPa

Conditions of the measurement: ……

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$, $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected Value
1								
2								
3								
4								
5								

If five loadings and readings have been performed: Average error = average ($E_L - E_0$) ☐

Remarks:

[17])When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

6 Span stability (continued)

Measurement No 5:

		At start	At end	
Observer:	Temp:			°C
	Rel. h:			%
Location:	Date:			yyyy-mm-dd
	Time:			hh:mm:ss
	Bar. Pres:			hPa

Conditions of the measurement: ……

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$ $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected value [18]
1								
2								
3								
4								
5								

If five loadings and readings have been performed: Average error = average ($E_L - E_0$)

Remarks:

Measurement No 6:

		At start	At end	
Observer:	Temp:			°C
	Rel. h:			%
Location:	Date:			yyyy-mm-dd
	Time:			hh:mm:ss
	Bar. Pres:			hPa

Conditions of the measurement: ……

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$, $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected Value
1								
2								
3								
4								
5								

If five loadings and readings have been performed: Average error = average ($E_L - E_0$)

Remarks:

[18])When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

6 Span stability (continued)

Measurement No 7:

Observer: .....

Location: .....

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

Conditions of the measurement: ……

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$, $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected value [19]
1								
2								
3								
4								
5								

If five loadings and readings have been performed: Average error = average ($E_L - E_0$)

Remarks:

Measurement No 8:

Observer: .....

Location: .....

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

Conditions of the measurement: ……

$E_0 = I_0 + ½\ d - \Delta L_0 - L_0$, $E_L = I_L + ½\ d - \Delta L - L$

	Indication of zero (I_0)	Add. Load (ΔL_0)	E_0	Indication of load (I_L)	Add. Load (ΔL)	E_L	$E_L - E_0$	Corrected value
1								
2								
3								
4								
5								

If five loadings and readings have been performed: Average error = average ($E_L - E_0$)

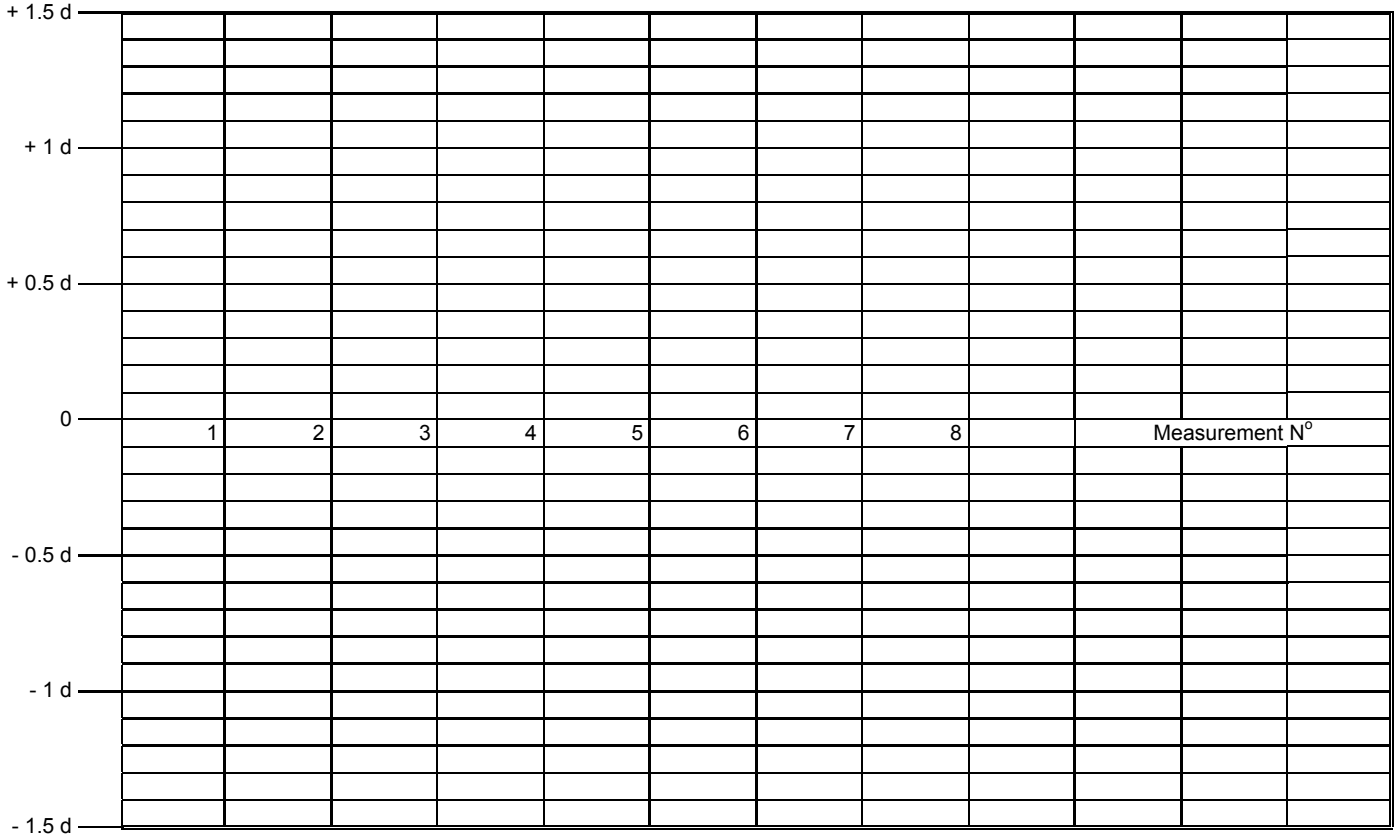
Remarks:

[19])When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

6 Span stability (continued)

Application No: ..... Type designation: .....

Plot on the diagram the indication of temperature test (T), damp heat test (D) and disconnections from the mains power supply (P)



Maximum allowable variation:

☐ Passed ☐ Failed

Remarks:

7 Material tests (6.1, A.5.1)

Supprimé : 4

7.1 Material testing (separate verification method) (A.5.2, A.9.2.3)

Test 1

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval *d*:	.....	Time:			hh:mm:ss
Totalisation scale interval d_t:	.....				
Material:	.....				
Condition of material:	.....				
Nominal load:	.....				

Parameter	Results
Number of loads	
Indicated total at start T_S	
Indicated total at end T_F	
$I = T_F - T_S$	
Control instrument indication for total load L	
Error = $\frac{I - L}{L} \times 100\%$	

Remarks:

7.1 Material testing (separate verification method) (continued)

Test 2

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval d:	.....	Time:			hh:mm:ss
Totalisation scale interval d_t :	.....				
Material:	.....				
Condition of material:	.....				
Nominal load:	.....				

Parameter	Results
Number of loads	
Indicated total at start T_S	
Indicated total at end T_F	
$I = T_F - T_S$	
Control instrument indication for total load L	
$\text{Error} = \frac{I - L}{L} \times 100\%$	

Remarks

7.1 Material testing (separate verification method) (continued)

Test 2

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval d:	.....	Time:			hh:mm:ss
Totalisation scale interval d_t :	.....				
Material:	.....				
Condition of material:	.....				
Nominal load:	.....				

Parameter	Results
Number of loads	
Indicated total at start T_S	
Indicated total at end T_F	
$I = T_F - T_S$	
Control instrument indication for total load L	
$\text{Error} = \frac{I - L}{L} \times 100\%$	

Remarks

7.1 Material testing (separate verification method) (continued)

Test 3

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval d:	.....	Time:			hh:mm:ss
Totalisation scale interval d_t :	.....				
Material:	.....				
Condition of material:	.....				
Nominal load:	.....				

Parameter	Results
Number of loads	
Indicated total at start T_S	
Indicated total at end T_F	
$I = T_F - T_S$	
Control instrument indication for total load L	
$\text{Error} = \frac{I - L}{L} \times 100\%$	

Remarks

7.1 Material testing (separate verification method) (continued)

Additional test

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval d:	.....	Time:			hh:mm:ss

Totalisation scale interval d_t : .....

Material: .....

Condition of material: .....

Nominal load: .....

Parameter	Results
Number of loads	
Indicated total at start T_S	
Indicated total at end T_F	
$I = T_F - T_S$	
Control instrument indication for total load L	
$\text{Error} = \frac{I - L}{L} \times 100\%$	

Note: Reproduce this sample test report to record the results of the other material tests as appropriate.

☐ Passed ☐ Failed

Remarks

7.1 Material testing (separate verification method) (continued)

Additional test

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval d:	.....	Time:			hh:mm:ss

Totalisation scale interval d_t : .....

Material: .....

Condition of material: .....

Nominal load: .....

Parameter	Results
Number of loads	
Indicated total at start T_S	
Indicated total at end T_F	
$I = T_F - T_S$	
Control instrument indication for total load L	
$\text{Error} = \frac{I - L}{L} \times 100\%$	

☐ Passed ☐ Failed

Remarks

7 Material tests (continued)

7.2 Integral verification weighing test performance (A.5.3)

Note: The test (A.5.3) is only part of the material tests when the integral weighing method is used for the tests. It is then conducted prior to the actual material test.

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
		Time:			hh:mm:ss

Control scale interval *d*: .....

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_o$ with E_o = error calculated at or near zero (*)

Load L	Indication I		Add load ΔL		Error E		Corrected error E_c		MPE
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

☐ Passed ☐ Failed

Remarks:

7 Material tests (continued)

7.2.1 Material tests (integral verification method) (6.2, A.5.3, A.9.2.1)

Test 1

			At start	At end	
Application No:	....	Temp:			°C
Type designation:	....	Rel. h:			%
Observer:	....	Date:			yyyy-mm-dd
Control scale interval *d*:	....	Time:			hh:mm:ss
Totalisation scale interval d_t :	....				
Material:	....				
Condition of material:	....				
Nominal load:	....				

	Hopper contents static weighing							Indicated total
	Indication I	Add load ΔL	Indication prior to rounding $P = I + ½ d - ΔL$	Calculated error E	Corrected indication $I_C = P - E$	Load indication $L = I_{CL} - I_{CD}$		At start T_S
Loaded					I_{CL}			
Discharged					I_{CD}			
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								At end T_F
Discharged								
	$\text{Error} = \frac{T_F - T_S - \sum_L}{\sum_L} \times 100\%$ Error =______________ %					$\sum_L$ (Total load)		

Remarks:

7.2.1 Material tests (integral verification method) (continued)

Test 2

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval *d*:	.....	Time:			hh:mm:ss
Totalisation scale interval d_t:	.....				
Material:	.....				
Condition of material:	.....				
Nominal load:	.....				

	Hopper contents static weighing							Indicated total
	Indication I	Add load ΔL	Indication prior to rounding P = I + ½ *d* - ΔL	Calculated error E	Corrected indication I_C = P - E	Load indication L = I_{CL} - I_{CD}		At start T_S
Loaded					I_{CL}			
Discharged					I_{CD}			
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								At end T_F
	Error = $T_F - T_S - \sum L$ x 100% / $\sum L$					$\sum L$ (Total load)		
	Error = _____ %							

Remarks:

7.2.1 Material tests (integral verification method) (continued)

Test 3

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval *d*:	.....	Time:			hh:mm:ss
Totalisation scale interval d_t:	.....				
Material:	.....				
Condition of material:	.....				
Nominal load:	.....				

	Hopper contents static weighing							Indicated total
	Indication I	Add load ΔL	Indication prior to rounding P = I + ½ *d* - ΔL	Calculated error E	Corrected indication I_C = P - E	Load indication L = I_{CL} - I_{CD}		At start T_S
Loaded					I_{CL}			
Discharged					I_{CD}			
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								At end T_F
	Error = $T_F - T_S - \sum L$ x 100% / $\sum L$					$\sum L$ (Total load)		
	Error = _____ %							

Remarks:

7.2.1 Material tests (integral verification method) (continued)

Test 4

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval *d*:	.....	Time:			hh:mm:ss
Totalisation scale interval d_t:	.....				
Material:	.....				
Condition of material:	.....				
Nominal load:	.....				

	Hopper contents static weighing							Indicated total
	Indication I	Add load ΔL	Indication prior to rounding P = I + ½ *d* - ΔL	Calculated error E	Corrected indication I_C = P - E	Load indication L = I_{CL} - I_{CD}		At start T_S
Loaded					I_{CL}			
Discharged					I_{CD}			
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								At end T_F
	Error = $T_F - T_S - \sum_L$ x 100% / $\sum_L$					$\sum_L$ (Total load)		
	Error = _____ %							

Remarks:

7.2.1 Material tests (integral verification method) (continued)

Test 5

			At start	At end	
Application No:	.....	Temp:			°C
Type designation:	.....	Rel. h:			%
Observer:	.....	Date:			yyyy-mm-dd
Control scale interval *d*:	.....	Time:			hh:mm:ss

Totalisation scale interval d_t: .....

Material: .....

Condition of material: .....

Nominal load: .....

	Hopper contents static weighing							Indicated total
	Indication I	Add load ΔL	Indication prior to rounding P = I + ½ *d* - ΔL	Calculated error E	Corrected indication I_C = P - E	Load indication L = I_{CL} - I_{CD}		At start T_S
Loaded					I_{CL}			
Discharged					I_{CD}			
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								
Loaded								
Discharged								At end T_F
	Error = $\frac{T_F - T_S - \sum L}{\sum L} \times 100\%$ Error = _____ %					$\sum L$ (Total load)		

☐ Passed ☐ Failed

Remarks:

8 EXAMINATION OF THE CONSTRUCTION OF THE INSTRUMENT

Use this page to indicate any description or information pertaining to the instrument, additional to that already contained in this report and in the accompanying national type approval or OIML certificate. This may include a picture of the complete instrument, a description of its main components, and any remark which could be useful for authorities responsible for the initial or subsequent verifications of individual instruments built according to the type. It may also include references to the manufacturer description.

Description:

Remarks:

9 CHECKLIST

The checklist has been developed based on the following principles:

To include requirements that cannot be tested according to the type evaluation tests 1 to 8 in the summary of evaluation above, but shall be checked visually, e.g. the descriptive markings (3.9);

To include requirements which indicate prohibitions of some functions, e.g. semi-automatic zero-setting devices shall not be operable during automatic operation (3.8.1.4);

Not to include general requirements, e.g. suitability for use (3.1);

This checklist is intended to serve as a summary of the results of examinations to be performed and not as a procedure. The items on this checklist are provided to recall the requirements specified in R 107-1 and they shall not be considered as a substitution for these requirements.

The requirements that are not included in this type evaluation report (tests 1 to 8 and checklist 9) are considered to be globally covered by the type approval or OIML certificate (e.g. classification criteria [2.2 and 2.3], suitability for use [3.1]).

For non-mandatory devices, the checklist provides space to indicate whether or not the device exists and, if appropriate, its type. A cross in the box for “present” indicates that the device exists and that it complies with the definition given in the terminology; when indicating that a device is “not present”, also check the boxes to indicate that the tests are not applicable (see p. 5).

If appropriate, the results stated in this checklist may be supplemented by remarks given on additional pages.

9.1 CHECKLIST

Application No: .....

Type designation: .....

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
2.3	Observe	Form of the scale interval : 1×10^k, 2×10^k, or 5×10^k			
2.6	**A.6.2**	**Agreement between indicating and printing devices:**			
	Observe	For the same load, the difference between the weighing results from any two devices having same scale interval is:			
		• zero for digital indicating or printing devices;			
		• not greater than the absolute value of the maximum permissible errors for automatic weighing for analogue devices.			
2.7	A.7.3	**Influence factors**			
2.7.1.1	A.7.3.1	Temperature limits			
2.7.1.2		**Power supply:**			
	A.7.3.4	AC mains power			
	A.7.3.5	DC mains power			
	A.7.3.6	Battery power (DC)			
	A.7.3.7	12 V or 24 V road vehicle battery power			
2.8	Observe	Units of measurement: g, kg, t			
3		**Technical requirements**			
3.1	**A.1.4**	Instrument is designed to suit intended materials and usage and is of adequately robust construction in order that it maintains its metrological characteristics			
3.2	Observe	**Security of operation**			
3.2.1		No characteristics likely to facilitate fraudulent use			
3.2.2		Effect of accidental breakdown or maladjustment is evident			
3.2.3		Operation unaffected by incomplete discharge			
3.2.4	Observe	**Overload**			
		Design of the load receptor and the operation of the instrument ensures that the weighing results are not adversely affected by any variation in the quantity of the load resulting in overload			
		The overload limit shall be specified by the manufacturer.			
3.2.5	Observe	**Automatic weighing conditions**			
		Interruption of automatic operation, printing inhibited or marked, or clear warning at:			
		overloads; and			
		at less than Minimum capacity			
3.2.6	Observe	**Use as a nonautomatic weighing instrument:**			
		• comply with the requirements of OIML R76-1 for class (III) or class (IIII) non-automatic weighing instruments;			
		• be equipped with an enabling device for non-automatic operation that prevents both automatic operation and in-motion weighing.			

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
3.2.7	A.6.3	**Operational adjustments:** prevented in automatic mode, except during tests in accordance with R107-1 (6.2.1.2.1)			
3.2.8	Observe	**Controls:** **c**ome to rest in intended positions and unambiguously marked keys			
3.2.9	Observe	**Dust extraction:** shall not affect measurement			
3.3	A.6.4	**Securing of components and pre-set controls**			
	Observe	**General:**			
		Instrument, modules, devices and controls:			
		a) Fitted with a securing means, or			
		b) Enclosed;			
		c) If enclosed, the enclosure is sealed;			
		d) National prescribed types of securing are permitted which provide sufficient integrity;			
		e) Seals are easily accessible;			
		f) Breakable security seals fitted on devices for changing the parameters of legally relevant measurement results;			
		g) Securing provided on all parts of the measuring system which cannot be materially protected in any other way against operations liable to affect the measurement accuracy			
3.3.2	Observe	**Means of securing**			
		a) Access shall only be allowed to authorised people, e.g. by means of a changeable code (key-word) or of a special device (hard key, etc);			
		b) It shall be possible to record and store to memory the ten most recent access or changes, including a record of the last intervention, its traceability, and a means of identifying the interventionist; which shall be assured for at least two years, if it is not over-written on the occasion of a further intervention. If it is possible to memorise more than one intervention, and if deletion of a previous intervention must occur to permit a new record, the oldest record shall be deleted.			
		c) Software functions secured against intentional, unintentional and accidental changes in accordance with R107-1 (3.6);			
		d) Transmission of legally relevant data via interfaces secured against intentional, unintentional and accidental changes according to R107-1 (4.3.6.2);			
		e) The securing possibilities available in an instrument shall be such that separate securing of the settings is possible;			
		f) Stored data shall be secured against intentional, unintentional and accidental changes in accordance with R107-1 (3.4).			

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
3.4	Observe	**Data storage**			
		Memory of the instrument (hard drive),	Present [ ]	Not-Present [ ]	
		Universal computer storage	Present [ ]	Not-Present [ ]	
		Removable external storage	Present [ ]	Not-Present [ ]	
		In all cases, the stored data is adequately protected against intentional and unintentional changes during the storage process and contains all relevant information necessary to reconstruct an earlier measurement.			
		Software transmission and downloading process shall be secured in accordance with R107-1 (3.6);			
		External storage devices identification and security attributes shall be verified to ensure integrity and authenticity;			
		Exchangeable storage media is sealed against removing in accordance with R107-1 (3.3);			
		When storage capacity is exhausted, new data shall replace oldest data.			
		National regulation may specify other requirements for securing stored data which provide sufficient integrity.			
3.5	A.6.5	**Indication, storage and printing of weighing results**			
		Totalisation, storage and printing devices:			
	Observe	Principal totalisation indicating device	Present [ ]	Not-Present [ ]	
		Supplementary totalisation indicating device	Present [ ]	Not-Present [ ]	
		Partial totalisation indicating device	Present [ ]	Not-Present [ ]	
		Data storage	Present [ ]	Not-Present [ ]	
		Printer	Present [ ]	Not-Present [ ]	
3.5.1		**Quality of indication:**			
	Observe	Reliable, easy and unambiguous under normal conditions			
		Overall inaccuracy of an analogue device < 0.2 d_i			
		The indication is of the self-indicating type and the scales, numbering and printing shall permit the figures which form the results to be read by simple juxtaposition			
3.5.2	A.6.5	**Form of the indication:**			
3.5.2.1		Results contain names and symbols of the units of mass			
		For any one indication, only one unit of mass			
	Observe	Decimal sign to separate integer and decimal fraction			
		Zero displayed to the extreme right without a decimal sign			
		Units of mass written in small letters (lower case)			

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
3.5.2.2	Observe	**Scale interval:**			
		Except supplementary devices all devices have the same scale interval			
		Scale interval in the form specified in R107-1 (2.3)			
		All indicating, printing and tare weighing devices of an instrument shall, within any one weighing range have the same scale interval for any given load.			
		For supplementary devices, scale interval resolution mode is at least ten times d_t in the descriptive markings			
		Where the scale interval is changed automatically the decimal sign shall maintain its position in the display.			
3.5.2.3	Observe	**Digital indication**			
		Digital zero indication includes the display of a zero for all places that are displayed to the right of a decimal point and at least one place to the left. When no decimal values are displayed, a zero shall be displayed for each place of the displayed division.			
		A decimal fraction shall be separated from its integer by a decimal sign (comma or dot, or according to national regulation), with the indication showing at least one figure to the left of the sign and all figures to the right.			
3.5.3	Observe	**Totalisation indicating and printing devices:**			
		a) Totalisation indicating and printing devices shall allow reliable, clear and unambiguous reading of the results by simple juxtaposition and shall bear the symbol of the appropriate unit of mass;			
		b) Printing shall be clear and permanent for the intended use. Printed figures shall be at least 2 mm high.			
		c) In automatic operation, not possible to reset the principle totalisation device to zero;			
		d) In static weighing conditions, not possible to reset the partial totalisation indicating device to zero unless the last total indicated before resetting to zero is automatically recorded or printed;			
		e) Automatic printout or storage of the last total if operation interruption or adjustments			
		f) The control indicating device shall allow indication to a higher resolution to than that of the principal totalisation indicating device.			
		g) In static operations, printing shall be inhibited if the stability criteria in R 107-1 (3.5.6) are not fulfilled.			
3.5.5	Observe	**Combined indicating devices**			
		Combined indication on demand clearly identified.			
3.6	A.1.1	**Software**			
	Observe	Alteration of legally relevant software in an instrument is not possible without breaking a seal, or any change in the software can be signalled automatically by means of an identification code.			
		National regulation may specify other requirements for securing software which provide sufficient integrity.			

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
3 6	A.1.1	The software documentation provided by the manufacturer includes:			
		a) A description of the legally relevant software;			
		b) A description of the accuracy of the measuring algorithms (e.g. programming modes);			
		c) A description of the user interface, menus and dialogues;			
		d) The unambiguous software identification;			
		e) An overview of the system hardware, e.g. block diagram, type of computer(s), software source code, etc, if not described in the operating manual;			
		f) Means of securing software;			
		g) The operating manual.			
	Observe	The following means of securing legally relevant software are possible:			
		a) Access shall only allowed to authorised people, e.g. by means of a changeable code (key-word) or of a special device (hard key, etc);			
		b) It shall be possible to record and store to memory the ten most recent access or changes, including a record of the last intervention, its traceability, and a means of identifying the interventionist; which shall be assured for at least two years, if it is not over-written on the occasion of a further intervention.			
		c) If it is possible to memorise more than one intervention, and if deletion of a previous intervention must occur to permit a new record, the oldest record shall be deleted.			
		d) Downloading of legally relevant software is conducted through appropriate protective interface connected to the instrument;			
		e) The legally relevant software is assigned with appropriate software identification, which is adapted in the case of every software change that may affect the functions and accuracy of the instrument.			
		f) Functions that are performed or initiated via a software interface shall meet the securing requirements for interfaces in R 107-1 (4.2.6).			
3.8	Observe	**Ancillary devices:**			
		Ancillary devices shall not affect the indicated totalisation(s) representing a bulk load for a transaction.			
3.8.1	A.5.5	**Zero-setting:**			
	Observe	Zero-setting device is provided on instruments that do not tare-weigh after each discharge and used exclusively be used for well non-caking and non-adhesive materials			
	Observe	Zero-setting –devices:	Present		Not-Present
		Automatic zero-setting	[ ]		[ ]
		Semi-automatic zero-setting	[ ]		[ ]
		Non-automatic zero-setting	[ ]		[ ]
3 8.1.1	A.5.6.3	Accuracy of zero-setting $\leq 0.25\ d_t$			

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist		Passed	Failed	Remarks
3.8.1.2		**Maximum effect**				
	Observe	Effect of zero-setting device does not alter the maximum weighing capacity				
		Overall effect of:	Zero-setting range < 4%			= %
			Initial zero-setting < 20%			= %
3.8.1.3	A.6.8.1	**Control of zero-setting devices:**				
	Observe	Interlock is provided to stop an automatic operation if the zero indication varies by or more than:				
		a) 1 d_t on instruments with an automatic zero-setting device, or				
		b) 0.5 d_t on instruments with a semi-automatic or non-automatic zero-setting device.				
3.8.1.4		Zero indicating device with digital indication:				
		Digital indication includes a device that displays a special signal when the deviation from zero is not more than 0.25 d_t.;				
		Non-automatic or semi-automatic zero-setting device shall not be operable during automatic operation.				
3.8.1.5	A.5.5.6	**Stability of automatic zero-setting device**				
	Observe	Automatic zero-setting operates:				
		At start of automatic operation;				
		As part of automatic weighing cycle, or				
		After a programmable interval;				
		Sufficiently often to maintain zero within 0.5 d_t;				
		When operating as part of every weighing cycle, it is not possible to disable or set at time intervals.				
		The maximum programmable time interval:				
		• is not be greater than the value necessary to ensure that the zero error is not greater than 0.5 d_t.;				
		• may start again after zero tracking has taken place;				
		• is specified in accordance with the actual operating conditions of the instrument;				
		• is set to zero after allocated time interval, or				
		• stops the instrument to enable zero-setting, or				
		• generates information to overdue zero-setting.				
3.9	A.1.4	**Descriptive markings:**				
3.9.1	Observe	**Markings shown in full:**				
		• Identification mark or name of the manufacturer				
		• Identification mark or name of the importer (if applicable)				
		• Serial number and type designation of the instrument				
		• Control scale interval (if applicable) g or kg or t				
		• Electrical supply voltage (V)				
		• Electrical supply frequency (Hz)				
		• Pneumatic/hydraulic pressure (if applicable) (kPa or bar)				
		• software identification				

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
3.9.2	Observe	**Markings shown in code:**			
		Type approval sign			
		Indication of the class of accuracy: 0.2, 0.5, 1 or 2			
		Totalisation scale interval, d_t (g or kg or t)			
		Maximum capacity, Max (g or kg or t)			
		Minimum capacity, Min (g or kg or t)			
		Minimum totalized load, $\sum_{min}$ (g or kg or t)			
3.9.3	Observe	**Supplementary markings:**			
		Any additional markings	enter in remarks		
3.9.4	Observe	**Presentation of descriptive markings:**			
		Indelible and of size, shape and clarity that allows easy reading			
		Shown in accordance with national legislation.			
		Grouped together in a clearly visible place either on a descriptive plate or sticker fixed permanently near the indicating device, or on a non removable part of the instrument itself			
		In case of a plate or sticker which is not destroyed when removed, a means of securing shall be provided.			
		Shown on a programmable display, with:			
		• at least Max, Min and d_t shall be displayed as long as the instrument is switched on.			
		• the other marking may be shown on manual commend			
		• access automatically and non-erasably recorded			
		• made evident by an audit trail			
		Programmable display markings shown on or indicated near the indicator display need not be repeated on the data plate, except for the following markings which shall be shown on data plate:			
		• max, Min and d_t shall be shown near the display if not already located there,			
		• type and designation of the instrument,			
		• name or identification mark of the manufacturer,			
		• type approval number,			
		• electrical supply voltage (V),			
		• electrical supply frequency (Hz),			
		• pneumatic/hydraulic pressure, (if applicable) (kPa or bar).			
3.10	A.1.4	**Verification marks**			
3.10.1	Observe	**Position of verification marks:**			
		Cannot be removed without damaging the marks			
		Allows easy application of marks			
		Visible without the instrument having to be removed			
3.10.2	Observe	**Mounting**			
		Verification mark support which ensures conservation of the marks			

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
4.2	A.1.5	**Functional requirements**			
4.2.1		• **Acting upon significant faults:**			
		• Instrument is made inoperative automatically, or			
	Observe	• Visual or audible indication is provided automatically and is continuous until the user takes action or the fault disappears			
		• Totalized load information is retained when a significant fault occurs			
4.2.2		**Indicator display test:**			
	Observe	For displays other than displays on which failures become evident , upon switch-on all relevant signs of indicating device are active and non-active for sufficient time to be checked by operator			
4.2.5	A.5.5	**Warm-up time:**			
	Observe	No indication or transmission of weighing results			
		Automatic operation is inhibited			
4.2.6	A.7.2.2	**Interfaces**			
	Observe	**Communication and user interfaces when fitted:**			
		Instrument shall continue to function correctly and its metrological functions shall not be influenced.			
4.2.6.1	Observe	**Interface documentation:**			
		The manufacturer provides documentation on all interfaces comprising of at least:			
		a) A list of all commands (e.g. menu items);			
		b) Description of the software interface;			
		c) A list of all commands together;			
		d) A brief description of their meaning and their effect on the functions and data of the instrument.			
4.2.6.2	Observe	**Securing of interfaces:**			
		The legally relevant software and functions of the instrument and its measurement data are not adversely affected or influenced by other interconnected instruments, or by disturbances acting on the interface.			
		Interfaces for legally relevant software and functions shall be secured as follows:			
		a) Data is protected (e.g. with a protective interface) against accidental or deliberate interference during the transfer;			
		b) All functions in the software interface shall comply with the software securing requirements in 3.6;			
		c) All functions in the hardware interface shall comply with the hardware securing requirements in 3.3;			
		d) Metrologically relevant parts of the target instrument shall be included in the initial verification (or equivalent conformity assessment procedures);			

Requirement (R 107-1)	Test procedure	Totalizing hopper weigher checklist	Passed	Failed	Remarks
		it shall be easily possible to verify the authenticity and integrity of data transmitted to and from the instrument;			
		Functions performed or initiated by other connected instruments through the interfaces shall meet the appropriate requirements of R 107-1.			
		Other instruments required by national regulation to be connected to the interfaces of an instrument shall be secured to inhibit automatically the operation of the instrument for reasons of the non-presence or improper functioning of the required device.			
4.2.7	A.6.6	**AC mains supply failure:**			
	Observe	Metrological information to be retained for at least 24 hours			
		Switch-over to emergency power supply shall not cause significant fault			
4.2.8	A.6.7	**External or plug-in (AC or DC) battery power supply:**	Present [ ]	Not-Present [ ]	
	Observe	When below the specified voltage value:			
		Continues to function correctly, or			
		Is automatically put out of service			
5	A.1.1	**Documents for metrologcial control**			
5.1.1	Observe	**Documentation includes:**			
		Metrological characteristics of the instrument			
		A standard set of specifications for the instrument			
		A functional description of the components and devices			
		Drawings, diagrams and general software information explaining the construction and operation			
		Details of fractions P_i (modules tested separately)			
		Any document or other evidence that the design and construction of the instrument complies with the requirements of the recommendation			
5.1.3	Observe	**Examination of:**			
		Documents			
		Functional checks			
		Test reports from other authorities			
6.4	A.5.1.1	Instruments subjected to material tests in accordance with:			
		Separate verification method as in A.5.2, or			
		Integral verification method as in A.5.3			

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Use this space to detail remarks from the checklist