INTERNATIONAL RECOMMENDATION

OIML R 76-2

Edition 2007 (E)

Non-automatic weighing instruments

Part 2: Test report format

Instruments de pesage à fonctionnement non automatique

Partie 2: Format du rapport d'essai

OIML R 76-2 Edition 2007 (E)

ORGANISATION INTERNATIONALE DE MÉTROLOGIE LÉGALE

INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY

Contents

Foreword

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

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

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

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

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

This publication – reference OIML R 76-2, Edition 2007 – was developed by Technical Subcommittee TC 9/SC 1 *Non-automatic weighing instruments*. It was approved for final publication by the International Committee of Legal Metrology in 2007 and supersedes the previous edition of R 76-2 (1993).

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

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Introduction

The "Type evaluation report", the subject of R 76-2, aims at presenting, in a standardized format, the results of the various tests to which a type of a non-automatic weighing instrument shall be submitted with a view to its approval. These tests are described in Annexes A and B of R 76-1.

All metrology services or laboratories evaluating types of non-automatic weighing instruments according to R 76-1 or to national or regional regulations based on OIML R 76-1 are strongly advised to use this "Type evaluation report", directly or after translation into a language other than English or French. Its direct use in English or in French, or in both languages, is even more strongly recommended whenever test results may be transmitted by the country performing these tests to the approving authorities of another country, under bi- or multi-lateral co-operation agreements. In the framework of the OIML *Certificate System for Measuring Instruments*, and the OIML *Mutual Acceptance Arrangement* (MAA), use of this report format is mandatory, in French and/or in English with translation into the national languages of the countries issuing such certificates, if appropriate.

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 76-2 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. weighing performance) 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.

Non-automatic weighing instruments

Type evaluation report

EXPLANATORY NOTES

Meaning of symbols:

I = Indication
I_n = nth indication
L = Load
ΔL = Additional load to next changeover point
P = $I + ½\ e - \Delta L$ = Indication prior to rounding (digital indication)
E = $I - L$ or = $P - L$ or = $I + ½\ e - \Delta L - L$ = Error
E_c = Corrected error
mpe = Maximum permissible error (absolute value)
EUT = Equipment under test

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:

	PASSED	FAILED
when the instrument has passed the test:	X	
when the instrument has failed the test:		X
when the test is not applicable:	–	–

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

	At start	At max	At end	
Temp.:	20.5		21.2	°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

where:
Temp. = temperature
Rel. h. = relative humidity
Bar. pres. = barometric pressure (barometric pressure is necessary for the span stability test and when specified by IEC test provisions; in other cases it may be necessary only for class I instruments).

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

In the disturbance tests (12.1 through 12.7), faults greater than e 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 (see T.5.5.6 in R 76-1); an appropriate explanation shall be given in the column "Yes (remarks)".

Numbers in brackets refer to the corresponding subclauses of OIML R 76-1.

General information concerning the type

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

☐ Complete instrument ☐ Module[1] with error fraction p_i = ☐

Accuracy class[2]: ☐ (I) ☐ (II) ☐ (III) ☐ (IIII)

☐ Self-indicating ☐ Semi-self-indicating ☐ Non-self-indicating

Min = ☐

e = ☐ Max = ☐ d = ☐ n = ☐

e_1 = ☐ Max_1 = ☐ d_1 = ☐ n_1 = ☐
e_2 = ☐ Max_2 = ☐ d_2 = ☐ n_2 = ☐
e_3 = ☐ Max_3 = ☐ d_3 = ☐ n_3 = ☐

T = + ☐ T = – ☐

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

Zero-setting device:
☐ Non-automatic
☐ Semi-automatic
☐ Automatic zero-setting
☐ Initial zero-setting
☐ Zero-tracking

Tare device:
☐ Tare balancing
☐ Tare weighing
☐ Preset tare device
☐ Subtractive tare
☐ Additive tare

☐ Combined zero/tare device

Initial zero-setting range = ☐ % of Max Temperature range: ☐ °C

Printer: ☐ Built-in ☐ Connected ☐ Not present but connectable ☐ No connection

Instrument submitted: ……
Identification no.: ……
Software version: ……
Connected equipment: ……
……
Interfaces (number, nature): ……
……
……
Evaluation period: ……
Date of report: ……
Observer: ……

Load cell: ……
Manufacturer: ……
Type: ……
Capacity: ……
Number: ……
Classification symbol: ……

Remarks: ……
……
……
……

[1] The test equipment (simulator or a part of a complete instrument) connected to the module shall be defined in the test form(s) used.
[2] Please note that the class denominations used hereafter in this Recommendation do not include the oval around the number for improved clarity of the Test Report Format's text.

General information concerning the type (continued)

Use this space to indicate additional remarks and/or information: Connection equipment, interfaces and load cells, choice of the manufacturer regarding protection against disturbances (5.1.1 a or 5.1.1 b of R 76-1), etc.

Information concerning the test equipment used for type evaluation

Summary of type evaluation

Application no.: ……
Type designation: ……

	Tests		Report page	PASSED	FAILED	Remarks
1	Weighing performance	Initial °C °C °C °C °C °C °C				
2	Temperature effect on no-load indication					
3.1	Eccentricity using weights					
3.2	Eccentricity using a rolling load					
4.1	Discrimination					
4.2	Sensitivity					
5	Repeatability					
6.1	Zero return					
6.2	Creep					
7	Stability of equilibrium	Printing, storage				
		Zero-setting, tare balancing				
8	Tilting					
9	Tare					
10	Warm-up time					
11	Voltage variations					
12.1	AC mains voltage dips and short interruptions					
12.2	Electrical bursts	a) Mains power supply lines				
		b) I/O circuits and communication lines				
12.3	Surges	a) AC mains power supply				
		b) Any other kind of power supply lines				
12.4	Electrostatic discharges	a) Direct application				
		b) Indirect application (contact discharges only)				
12.5	Immunity to radiated electromagnetic fields					
12.6	Immunity to conducted radio-frequency fields					
12.7	Electrical transients on instruments powered from a road vehicle power supply	a) Conduction along supply lines of external 12 V and 24 V batteries				
		b) Capacitive and inductive coupling via lines other than supply lines				
13	Damp heat, steady state	a) Initial test (at reference temperature)				
		b) Test at high temperature and 85 % relative humidity				
		c) Final test (at reference temperature)				
14	Span stability					
15	Endurance	a) Initial test				
		c) Final test				
	EXAMINATIONS					
16	Examination of the construction					
17	Checklist					

Remarks:

1 WEIGHING PERFORMANCE (A.4.4) (A.5.3.1)

(Calculation of the error)

Application no.: ……

Type designation: ……

Date: ……

Observer: ……

Verification scale interval, *e*: ……

Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.: (only class I)				hPa

Automatic zero-setting and zero-tracking device is:

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

Initial zero-setting > 20 % of Max: ☐ Yes ☐ No (see R 76-1, A.4.4.2)

$E = I + ½\ e - \Delta L - L$

$E_c = E - E_0$ with E_0 = error calculated at or near zero*

Load, *L*	Indication, *I*		Add. load, Δ*L*		Error, *E*		Corrected error, E_c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
	*				*				

Check if $|E_c| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

2 TEMPERATURE EFFECT ON NO-LOAD INDICATION (A.5.3.2)

Application no.: ……..
Type designation: ……..
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

Automatic zero-setting and zero-tracking device is:

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

$P = I + ½\ e - \Delta L$

Report page*	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 Temp. for two consecutive tests at different temperatures

Check if the zero-change per 5 °C is smaller than *e* (class II, III or IIII)
Check if the zero-change per 1 °C is smaller than *e* (class I)

☐ Passed ☐ Failed

Remarks:

* Give the report page of the relevant weighing test where weighing tests and temperature effect on no-load indication test are conducted together (see R 76-1, Figure 11).

3 ECCENTRICITY (A.4.7)

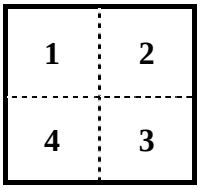
3.1 Eccentricity using weights (A.4.7.1, 2 and 3)

Application no.: ……
Type designation: ……
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa
(only class I)				

1) Test(s) performed on a mobile instrument (A.4.7.5): ☐ Yes ☐ No
2) In case of "Yes" to 1): A.4.7 and A.4.7.1 to A.4.7.4 have been applied: ☐ Yes ☐ No
3) In case of "No" to 2): Description of eccentricity test(s) (see A.4.7.5) under "Remarks"

Location of test loads: mark on a sketch (see example below) the successive locations of test loads, using numbers which shall be repeated in the table below.



Also indicate in the sketch the location of the display or of another perceptible part of the instrument.

Automatic zero-setting and zero-tracking device is:
☐ Non-existent ☐ Not in operation ☐ Out of working range

$E = I + ½\ e - \Delta L - L$
$E_c = E - E_0$ with E_0 = error calculated at or near zero* determined prior to each measurement

Location	Load, L	Indication, I	Add. load, ΔL	Error, E	Corrected error, E_c	mpe
	*			*		
1						
	*			*		
2						
	*			*		
3						
	*			*		
4						

Check if $|E_c| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

3.2 Eccentricity using a rolling load (A.4.7.4)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.: (only class I)				hPa

Number of sections of the divided load receptor ☐ ☐ Undivided load receptor

Location of test loads for each section of the load receptor: mark on a sketch (see example below) the successive locations of test loads, using numbers which shall be repeated in the table below. Also indicate in the sketch the location of the display or of another perceptible part of the instrument.

1	2	3

Automatic zero-setting and zero-tracking device is:
☐ Non-existent ☐ Not in operation ☐ Out of working range

$E = I + ½\ e - \Delta L - L$
$E_c = E - E_0$ with E_0 = error calculated at or near zero*

Section	Direction (← / →)	Location	Load, *L*	Indication, *I*	Add. load, ΔL	Error, *E*	Corrected error, E_c	mpe
			*			*		
			*			*		
			*			*		
			*			*		

Check if $|E_c| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

4 DISCRIMINATION AND SENSITIVITY

4.1 Discrimination

4.1.1 Digital indication (A.4.8.2)

Application no.: …….
Type designation: …….
Date: …… Temp.:
Observer: ……..… Rel. h.:
Verification scale interval, *e*: ……..…… Time:
Scale interval, *d*: ……..…… Bar. pres.:

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Load, L	Indication, I_1	Removed load ΔL	Add 1/10 d	Extra load, = 1.4 d	Indication, I_2	$I_2 - I_1$

Check if $I_2 - I_1 \geq d$

☐ Passed ☐ Failed

Remarks:

4.1.2 Analog indication (A.4.8.1)

Application no.: …….
Type designation: …….
Date: …… Temp.:
Observer: ……..… Rel. h.:
Verification scale interval, *e*: ……..…… Time:
Scale interval, *d*: ……..…… Bar. pres.:

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Load, L	Indication, I_1	Extra load = |mpe|	Indication, I_2	$I_2 - I_1$

Check if $I_2 - I_1 \geq 0.7$ mpe

☐ Passed ☐ Failed

Remarks:

4.1.3 Non-self-indicating instrument (A.4.8.1)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
……
……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Load, *L*	Indication, *I*	Extra load, = 0.4 |mpe|	Visible displacement*

* Mark a visible displacement by "+"

Check if there is a visible displacement

☐ Passed ☐ Failed

Remarks:

4.2 Sensitivity (non-self-indicating instrument) (A.4.9)

Application No.: …….
Type designation: …….
Date: ……
Observer: ……
……
……

	At start	At max	At end	
Temp:				°C
Rel. h:				%
Time:				
Bar. pres:				hPa

Load L	Extra load = |mpe|	Permanent displacement of indicating element
		mm
		mm
		mm

Check if the permanent displacement is equal to or greater than:
1 mm for an instrument of accuracy class I or II
2 mm for an instrument of accuracy class III or IIII with Max ≤ 30 kg
5 mm for an instrument of accuracy class III or IIII with Max > 30 kg

☐ Passed ☐ Failed

Remarks:

5 REPEATABILITY (A.4.10)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.: (only class I)				hPa

Automatic zero-setting and zero-tracking device is:

☐ Non-existent ☐ In operation

Load (weighing 1-10) ☐ Load (weighing 11-20) ☐

$E = I + 1/2\ e - \Delta L - L$

	Indication of load, I	Add. load, ΔL	E
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

	Indication of load, I	Add. load, ΔL	E
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

$E_{max} - E_{min}$ (weighing 1-10) ☐ $E_{max} - E_{min}$ (weighing 11-20) ☐

mpe ☐ mpe ☐

Check if a) $E \leq$ mpe (3.6 of R 76-1)

b) $E_{max} - E_{min} \leq$ absolute value of mpe (3.6.1 of R 76-1)

☐ Passed ☐ Failed

Remarks:

6 TIME-DEPENDENCE

6.1 Zero return (A.4.11.2)

Application no.: ……
Type designation: ……
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp:				°C
Rel. h:				%
Time:				
Bar. pres: (only class I)				hPa

Automatic zero-setting and zero-tracking device is:

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

$P = I + ½\ e - \Delta L$

Time of reading		Load, L_0	Indication of zero, I_0	Add. load, ΔL	P
0 min					P_0 =
Load during 30 minutes =					
30 min					P_{30} =

Change after 30 minutes: $|\Delta(P_{30} - P_0)|$ =

For multiple range instruments keep instrument unloaded for further 5 minutes:

35 min					P_{35} =

Change 5 minutes later: $|\Delta(P_{35} - P_{30})|$ =

Check if a) $|\Delta(P_{30} - P_0)| \leq 0.5\ e$

b) $|\Delta(P_{35} - P_{30})| \leq e_1$ (for multiple range instruments only)

☐ Passed ☐ Failed

Remarks:

6.2 Creep (A.4.11.1)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp:				°C
Rel. h:				%
Time:				
Bar. pres:				hPa

(only class I)

$P = I + ½\ e - \Delta L$

Time of reading		Load, L	Indication, I	Add. load, ΔL	P	ΔP
	0 min					
	5 min					
	15 min					
	30 min*					
	1 h					
	2 h					
	3 h					
	4 h					

ΔP = difference between P at the start (0 min) and P at a given time.

* If condition a) is met, the test is terminated. If not, the test shall be continued for the next 3.5 hours and condition b) shall be met.

Condition a): $\Delta P \leq 0.5\ e$ after 30 minutes; and
$\Delta P \leq 0.2\ e$ between the indication obtained at 15 minutes and that at 30 minutes

Condition b): $\Delta P \leq$ absolute value of mpe during the period of 4 hours

Check if condition a) or b) is fulfilled

☐ Passed ☐ Failed

Remarks:

7 STABILITY OF EQUILIBRIUM (A.4.12)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp:				°C
Rel. h:				%
Time:				
Bar. pres:				hPa

(only class I)

Automatic zero-setting and zero-tracking device is:

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

In the case of printing or data storage:

No.	Load (about 50 % of Max)	First printed or stored weight value after disturbance and command	Reading during 5 s after print-out or storage	
			minimum value	maximum value
1				
2				
3				
4				
5				

Check if the first printed or stored weight value does not deviate more than 1 *e* from the readings during 5 seconds after print-out or storage (only two adjacent values allowed)

☐ Passed ☐ Failed

In the case of zero-setting or tare balancing:

Zero-setting		$E_0 = I_0 + ½\ e - \Delta L - L_0$			
No.*	Zero-load (< 4 % of Max)	Load, L_0 ** (10 *e*)	Indication, I_0 after zero-setting	Add. load, ΔL	Error, E_0
1					
2					
3					
4					
5					

Tare balancing		$E_0 = I_0 + ½\ e - \Delta L - L_0$			
No.*	Tare load (about 30 % of Max)	Load, L_0 ** (10 *e*)	Indication, I_0, after tare balancing	Add. load, ΔL	Error, E_0
1					
2					
3					
4					
5					

* Apply the zero or tare load, disturb the equilibrium and immediately release zero-setting or tare, apply L_0 if necessary and calculate the error according to A.4.2.3/A.4.6.2 of R 76-1. Perform this five times.

** L_0 (10 *e*) shall be applied only if an automatic zero-setting or zero-tracking device is in operation. L_0 shall be applied after releasing tare or zero-setting, immediately after zero is displayed the first time.

Check if $E_0 \leq 0.25\ e$

☐ Passed ☐ Failed

Remarks:

8 TILTING (A.5.1, A.5.1.1-A.5.1.3)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

(only class I)

☐ Instrument with leveling device and level indicator

☐ Instrument with automatic tilt sensor

☐ Instrument without level indicator or automatic tilt sensor

☐ Mobile instrument with automatic tilt sensor

☐ Mobile instrument with Cardanic suspension

Limiting value of tilting = ☐

Give (if appropriate on a separate sheet) a sketch of the load receptor showing the location of the level indicator or direction of the tilting, if provided.

Automatic zero-setting and zero-tracking device is:

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

$E_v = I_v + ½\ e - \Delta L_v - L$ (v = 1, 2, 3, 4, 5), I_v = Indication, ΔL_v = additional load

$E_{c\,v} = E_v - E_{v\,0}$ with $E_{v\,0}$ = error calculated at or near zero

Load, *L*		Reference position 1	Tilted position with the limiting value of tilting 2	3	4	5	
unloaded	I_v =						
	ΔL_v =						$2\ e$ =
	E_{v0} =						$\lvert E_{1\,0} - E_{v\,0}\rvert_{max}$ =
L =	I_v =						
	ΔL_v =						
	E_v =						mpe =
	$E_{c\,v}$ =						$\lvert E_{c\,1} - E_{c\,v}\rvert_{max}$ =
(Max)	I_v =						
	ΔL_v =						
	E_v =						mpe =
	$E_{c\,v}$ =						$\lvert E_{c\,1} - E_{c\,v}\rvert_{max}$ =

Check if the differences are a) ≤ 2 *e* for the unloaded instrument (not valid for class II instruments, if they are not used for direct sales to the public)

b) ≤ absolute value of mpe for the loaded instrument

☐ Passed ☐ Failed

Remarks:

9 TARE (WEIGHING TEST) (A.4.6.1)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

(only class I)

Automatic zero-setting and zero-tracking device is:

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

$E = I + ½\ e - \Delta L - L$

$E_c = E - E_0$ with E_0 = error calculated at or near zero*

First tare load ☐

Load, *L*	Indication, *I* ↓	Indication, *I* ↑	Add. load, Δ*L* ↓	Add. load, Δ*L* ↑	Error, *E* ↓	Error, *E* ↑	Corrected error, E_c ↓	Corrected error, E_c ↑	mpe
	*				*				

Second tare load ☐

	*				*				

Check if $|E_c| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

10 WARM-UP TIME (A.5.2)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.: (only class I)				hPa

Automatic zero-setting and zero-tracking device is:

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

Duration of disconnection before test: ☐ hours

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

	Time*		Load, L	Indication, I	Add. load, ΔL	Error, E	$E_L - E_0$	mpe =
Unloaded		0 min						
Loaded								
Unloaded		5 min						
Loaded								
Unloaded		15 min						
Loaded								
Unloaded		30 min						
Loaded								

* counted from the moment an indication has first appeared.

Check if $|E_L - E_0| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

11 VOLTAGE VARIATIONS (A.5.4)

Application no.: ……
Type designation: ……
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

(only class I)

☐ Mains power supply (AC), A.5.4.1

☐ External or plug-in power supply device (AC or DC), A.5.4.2

☐ Rechargeable battery power supply, (re)charge during the operation of the instrument is possible, A.5.4.2

☐ Non-rechargeable and rechargeable battery power supply, (re)charge during the operation of the instrument is not possible, A.5.4.3

☐ 12 V or 24 V road vehicle battery power supply, A.5.4.4

U_{nom} = ☐ V U_{min} = ☐ V U_{max} = ☐ V

Calculate lower and upper limits of applied voltages according to A.5.4. If a voltage-range (U_{min} / U_{max}) is marked, use the average value as reference value.

Automatic zero-setting and zero-tracking device is:

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

Category of power supply (if an instrument has more than one power supply): .....

$E = I + ½\ e - \Delta L - L$ $E_c = E - E_0$ with E_0 = error calculated at or near zero

Voltage	*U*, (V)	Load, *L*	Indication, *I*	Add. load, ΔL	Error, *E*	Corrected error, E_c	mpe
Reference value		10 *e* =					
Lower limit		10 *e* =					
Upper limit		10 *e* =					

Category of power supply (if an instrument has more than one power supply): .....

$E = I + ½\ e - \Delta L - L$ $E_c = E - E_0$ with E_0 = error calculated at or near zero

Voltage	*U*, (V)	Load, *L*	Indication, *I*	Add. load, ΔL	Error, *E*	Corrected error, E_c	mpe
Reference value		10 *e* =					
Lower limit		10 *e* =					
Upper limit		10 *e* =					

Check if $|E_c| \leq |mpe|$

☐ Passed ☐ Failed

Remarks:

12 ELECTRICAL DISTURBANCES

12.1 AC mains voltage dips and short interruptions (B.3.1)

Application no.: ……

Type designation: ……

Date: ……

Observer: ……

Verification scale interval, *e*: ……

Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Mains power supply voltage: U_{nom} [V] U_{min} [V] U_{max} [V]

Power supply voltage for the test: U_{test} [V] = U_{nom} or the average value of U_{min} and U_{max}

Load	Disturbance				Result		
	Amplitude of U_{test}	Duration / number of cycles	Number of disturbances ≥ 10	Repetition interval (s) ≥ 10 s	Indication, *I*	Significant fault (> *e*) or detection and reaction	
						No	Yes (see remarks)
	Without disturbance						
	0 %	0.5					
	0 %	1					
	40 %	10					
	70 %	25					
	80 %	250					
	0 %	250					

Check if a significant fault occurred

☐ Passed ☐ Failed

Remarks:

12.2 Electrical bursts (B.3.2)

a) Mains power supply lines

Application no.: ……
Type designation: ……
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Mains power supply voltage: U_{nom} ____ V U_{min} ____ V U_{max} ____ V

Power supply voltage for the test: U_{test} ____ V = U_{nom} or the average value of U_{min} and U_{max}

Test voltage (bursts) on each connection of the mains power supply lines: 1 kV

Duration of the test at connection and each polarity: 1 min

Load	Disturbance				Result		
	Bursts on connection			Polarity	Indication, *I*	Significant fault (> *e*) or detection and reaction	
	L ↓ ground	N ↓ ground	PE ↓ ground			No	Yes (see remarks)
	Without disturbance						
	X			positive			
				negative			
	Without disturbance						
		X		positive			
				negative			
	Without disturbance						
			X	positive			
				negative			

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

Check if a significant fault occurred

☐ Passed ☐ Failed

Remarks:

b) I/O circuits and communication lines

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Test voltage (bursts) on each cable/interface (I/O signals, data and control lines): 0.5 kV

Duration of the test at each cable/interface and each polarity: 1 min

Load	Disturbance		Result		
	Bursts on cable/interface (Type, nature)	Polarity/ disturbance	Indication, *I*	Significant fault (> *e*) or detection and reaction	
				No	Yes (see remarks)
	1	Without disturbance			
		positive			
		negative			
	2	Without disturbance			
		positive			
		negative			
	3	Without disturbance			
		positive			
		negative			
	4	Without disturbance			
		positive			
		negative			
	5	Without disturbance			
		positive			
		negative			
	6	Without disturbance			
		positive			
		negative			
	7	Without disturbance			
		positive			
		negative			
	8	Without disturbance			
		positive			
		negative			
	9	Without disturbance			
		positive			
		negative			

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

☐ Passed ☐ Failed

Remarks:

12.3 Surges (B.3.3)

a) AC mains power supply

Application no.: ……
Type designation: ……
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*):

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Surges on AC mains power supply lines

Load	Disturbance						Result		
	3 positive and 3 negative surges synchronously with AC supply voltage					Polarity	Indication, *I*	Significant fault (> *e*) or detection and reaction	
	amplitude/ apply on	angle 0°	90°	180°	270°			No	Yes (see remarks)
		Without disturbance							
	0.5 kV L ↓ N	X				pos			
						neg			
			X			pos			
						neg			
				X		pos			
						neg			
					X	pos			
						neg			
	1 kV L ↓ PE	Without disturbance							
		X				pos			
						neg			
			X			pos			
						neg			
				X		pos			
						neg			
					X	pos			
						neg			
	1 kV N ↓ PE	Without disturbance							
		X				pos			
						neg			
			X			pos			
						neg			
				X		pos			
						neg			
					X	pos			
						neg			

L = phase, N = neutral, PE = protective earth
Check if a significant fault occurred

☐ Passed ☐ Failed
Remarks:

b) Any other kind of power supply

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Kind or type of power supply ☐

DC ☐ Other form ☐ Voltage ☐

Surges on other power supply lines

Load	Disturbance			Result		
	3 positive and 3 negative surges		Polarity	Indication, *I*	Significant fault (> *e*) or detection and reaction	
	apply on	amplitude			No	Yes (see remarks)
	L ↓ N	Without disturbance				
		0.5 kV	pos			
			neg			
	L ↓ PE	Without disturbance				
		1 kV	pos			
			neg			
	N ↓ PE	Without disturbance				
		1 kV	pos			
			neg			

L = positive conductor , N = negative or neutral conductor, PE = protective earth

Check if a significant fault occurred

☐ Passed ☐ Failed

Remarks:

12.4 Electrostatic discharges (B.3.4)

a) Direct application

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

☐ Contact discharge ☐ Paint penetration

☐ Air discharges

Load	Discharges				Result		
	Test voltage (kV)	Polarity	Number of discharges ≥ 10	Repetition interval ≥ 10 s	Indication, *I*	Significant fault (> *e*) or detection and reaction	
						No	Yes (remarks, test points)
	Without disturbance						
	2	pos.					
	4	pos.					
	6	pos.					
	8 (air discharges)	pos.					
	Without disturbance						
	2	neg.					
	4	neg.					
	6	neg.					
	8 (air discharges)	neg.					

Check if a significant fault occurred

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

Remarks:

b) Indirect application (contact discharges only)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Horizontal coupling plane

Load	Discharges				Result		
	Test voltage (kV)	Polarity	Number of discharges ≥ 10	Repetition interval ≥ 10 s	Indication, *I*	Significant fault (> *e*) or detection and reaction	
						No	Yes (remarks, test points)
	Without disturbance						
	2	pos.					
	4	pos.					
	6	pos.					
	Without disturbance						
	2	neg.					
	4	neg.					
	6	neg.					

Vertical coupling plane

Load	Discharges				Result		
	Test voltage (kV)	Polarity	Number of discharges ≥ 10	Repetition interval ≥ 10 s	Indication, *I*	Significant fault (> *e*) or detection and reaction	
						No	Yes (remarks, test points)
	Without disturbance						
	2	pos.					
	4	pos.					
	6	pos.					
	Without disturbance						
	2	neg.					
	4	neg.					
	6	neg.					

Check if a significant fault occurred

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

Remarks:

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

a) Direct application

Contact discharges:

Air discharges:

b) Indirect application

12.5 Immunity to radiated electromagnetic fields (B.3.5)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

☐ Frequency range 26-2000 MHz if the test according to B.3.6 cannot be applied (no mains or I/O ports available)

☐ Frequency range 80-2000 MHz if the test according to B.3.6 is performed (see form no. 12.6)

Rate of sweep: ☐ Material of load: ☐

Load	Disturbance				Result		
	Antenna	Frequency range (MHz)	Polarization	Facing EUT	Indication, *I*	Significant fault (> *e*) or detection and reaction	
						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			

Frequency range: 26-2000 MHz or 80-2000 MHz
Field strength: 10 V/m
Modulation: 80 % AM, 1 kHz, sine wave

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

Check if a significant fault occurred

☐ Passed ☐ Failed

Remarks:

Description of the set-up of EUT, e.g. by photos or sketches:

12.6 Immunity to conducted radio-frequency fields (B.3.6)

Application no.: ……
Type designation: ……
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Rate of sweep: ☐

Load: ☐ Material of load: ☐

Cable / Interface	Frequency range (MHz)	Result		
		Indication, *I*	Significant fault (> *e*) or detection and reaction	
			No	Yes (remarks)
	without disturbance			
	without disturbance			
	without disturbance			
	without disturbance			
	without disturbance			
	without disturbance			
	without disturbance			
	without disturbance			
	without disturbance			
	without disturbance			

Frequency range: 0.15-80 MHz RF amplitude (50 ohms): 10 V (e.m.f.) Modulation: 80 % AM, 1 kHz, sine wave
Check if a significant fault occurred.
Note: If the EUT fails, the frequency at which this occurs shall be recorded

☐ Passed ☐ Failed

Remarks:

12.7 Electrical transients on instruments powered from a road vehicle power supply (B.3.7)

a) Conduction along supply lines of external 12 V and 24 V batteries

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

☐ 12 V battery voltage ☐ 24 V battery voltage

12 V battery voltage					
Load	Disturbance		Result		
	Test pulse	Conducted voltage	Indication, *I*	Significant fault (> *e*) or detection and reaction	
				No	Yes (remarks)
	Without disturbance				
	2a	+50 V			
	2b*	+10 V			
	3a	–150 V			
	3b	+100 V			
	4	–7 V			

24 V battery voltage					
Load	Disturbance		Result		
	Test pulse	Conducted voltage	Indication, *I*	Significant fault (> *e*) or detection and reaction	
				No	Yes (remarks)
	Without disturbance				
	2a	+50 V			
	2b*	+20 V			
	3a	–200 V			
	3b	+200 V			
	4	–16 V			

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

Check if a significant fault occurred

☐ Passed ☐ Failed

Remarks:

b) Capacitive and inductive coupling via lines other than supply lines

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

☐ 12 V battery voltage ☐ 24 V battery voltage

12 V battery voltage						
Kind or type of other lines (no power supply lines)	Disturbance			Result		
	Load	Test pulse	Conducted voltage	Indication, *I*	Significant fault (> *e*) or detection and reaction	
					No	Yes (remarks)
		Without disturbance				
		a	–60 V			
		b	+40 V			
		Without disturbance				
		a	–60 V			
		b	+40 V			
		Without disturbance				
		a	–60 V			
		b	+40 V			

24 V battery voltage						
Kind or type of other lines (no power supply lines)	Disturbance			Result		
	Load	Test pulse	Conducted voltage	Indication, *I*	Significant fault (> *e*) or detection and reaction	
					No	Yes (remarks)
		Without disturbance				
		a	–80 V			
		b	+80 V			
		Without disturbance				
		a	–80 V			
		b	+80 V			
		Without disturbance				
		a	–80 V			
		b	+80 V			

Check if a significant fault occurred.
Note: If EUT fails, the frequency at which this occurs shall be recorded

☐ Passed ☐ Failed

Remarks:

13 DAMP HEAT, STEADY STATE (B.2)

a) Initial test (at reference temperature)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Automatic zero-setting and zero-tracking device is:

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

$E = I + ½\ e - \Delta L - L$
$E_c = E - E_0$ with E_0 = error calculated at or near zero*

Load, *L*	Indication, *I*		Add. load, Δ*L*		Error, *E*		Corrected error, E_c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
*					*				

Check if $|E_c| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

b) Test at high temperature and 85 % relative humidity

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Automatic zero-setting and zero-tracking device is:

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

$E = I + ½\ e - \Delta L - L$
$E_c = E - E_0$ with E_0 = error calculated at or near zero*

Load, *L*	Indication, *I*		Add. load, Δ*L*		Error, *E*		Corrected error, E_c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
*					(*)				

Check if $|E_c| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

c) Final test (at reference temperature)

Application no.: …….
Type designation: …….
Date: ……
Observer: ……
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Automatic zero-setting and zero-tracking device is:

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

$E = I + ½\, e - \Delta L - L$
$E_c = E - E_0$ with E_0 = error calculated at or near zero*

Load, *L*	Indication, *I*		Add. load, Δ*L*		Error, *E*		Corrected error, E_c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
*					*				

Check if $|E_c| \leq |\text{mpe}|$

☐ Passed ☐ Failed

Remarks:

14 SPAN STABILITY (B.4)

Application no.: ……..
Type designation: ……..
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

Automatic zero-setting and zero-tracking device is:

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

Zero load = ☐ Test load = ☐

Automatic span adjustment device:

☐ Existent ☐ Non-existent

Measurement no. 1: Initial measurement

Date: ……
Observer: ……
Location: ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

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

0.1 *e* = ☐

If $|(E_L - E_0)_{max} - (E_L - E_0)_{min}| \leq 0.1\ e$, the 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:

Subsequent measurements

Measurement no. 2:

			At start	At max	At end	
Date:	……	Temp.:				°C
Observer:	……	Rel. h.:				%
Location:	……	Time:				
		Bar. pres.:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

Remarks:

Measurement no. 3:

			At start	At max	At end	
Date:	……	Temp.:				°C
Observer:	……	Rel. h.:				%
Location:	……	Time:				
		Bar. pres.:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

Remarks:

Subsequent measurements

Measurement no. 4:

			At start	At max	At end	
Date:	……	Temp.:				°C
Observer:	……	Rel. h.:				%
Location:	……	Time:				
		Bar. pres.:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

Remarks:

Measurement no. 5:

			At start	At max	At end	
Date:	……	Temp.:				°C
Observer:	……	Rel. h.:				%
Location:	……	Time:				
		Bar. pres.:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

Remarks:

Subsequent measurements

Measurement no. 6:

			At start	At max	At end	
Date:	……	Temp:				°C
Observer:	……	Rel. h:				%
Location:	……	Time:				
		Bar. pres:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

Remarks:

Measurement no. 7:

			At start	At max	At end	
Date:	……	Temp:				°C
Observer:	……	Rel. h:				%
Location:	……	Time:				
		Bar. pres:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

Remarks:

Subsequent measurements

Measurement no. …. :

			At start	At max	At end	
Date:	……	Temp.:				°C
Observer:	……	Rel. h.:				%
Location:	……	Time:				
		Bar. pres.:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

Remarks:

Measurement no. …. :

			At start	At max	At end	
Date:	……	Temp.:				°C
Observer:	……	Rel. h.:				%
Location:	……	Time:				
		Bar. pres.:				hPa

☐ Measurement after the temperature test ☐ Measurement after the damp heat test
☐ Measurement after disconnection from the mains ☐ Measurement after change in test location
☐ Other condition: ……....

☐ Automatic span adjustment device activated (if existent)

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

	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								

* When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

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

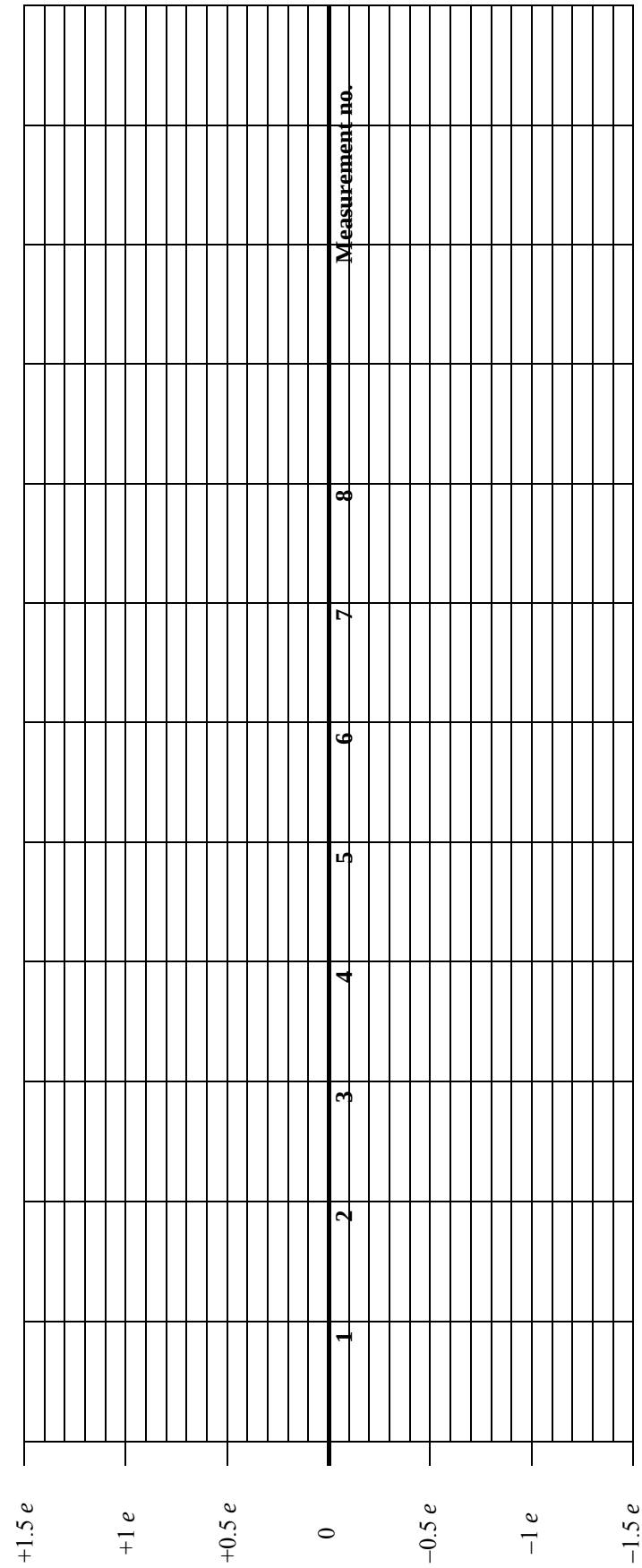
Remarks:

14 SPAN STABILITY (B.4)

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)



15 ENDURANCE (A.6)

Application no.: ……..
Type designation: ……..
Verification scale interval, *e*: ……
Resolution during test (smaller than *e*): ……

a) Initial test

Date: ……
Observer: ……
Location: ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Automatic zero-setting and zero-tracking device is:

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

$E = I + ½\ e - \Delta L - L$
$E_c = E - E_0$ with E_0 = error calculated at or near zero*

Load, *L*	Indication, *I*		Add. load, ΔL		Error, *E*		Corrected error, E_c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
	*				*				

b) Performance of the test

Number of loadings: ☐ Load applied: ☐

c) Final test

Date: ……
Observer: ……
Location: ……

	At start	At max	At end	
Temp.:				°C
Rel. h.:				%
Time:				
Bar. pres.:				hPa

Automatic zero-setting and zero-tracking device is:

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

$E = I + ½\ e - \Delta L - L$

$E_c = E - E_0$ with E_0 = error calculated at or near zero*

Durability error due to wear and tear = $|E_{c\ initial} - E_{c\ final}|$**

Load, L	Indication, I		Add. load, ΔL		Error, E		Corrected error, E_c		mpe	Durability error due to wear and tear**
	↓	↑	↓	↑	↓	↑	↓	↑		
*					*					

Check if the durability error due to wear and tear is ≤ mpe

☐ Passed ☐ Failed

Remarks:

16 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 verification of individual instruments built according to the type. It may also include references to the manufacturer.

Description:

Remarks:

CHECKLIST

This checklist has been developed based on the following principles:

- to include requirements that cannot be tested according to tests 1 through 15 above, but that shall be checked experimentally, e.g. the operating range of the tare device (4.6.4), or visually, e.g. the descriptive markings (7.1);
- to include requirements which indicate prohibitions of some functions, e.g. automatic tare device for instruments for direct sales to the public (4.13.3.3);
- to include neither general requirements, e.g. suitability for use (4.1.1.2), nor weights and verification devices, e.g. auxiliary verification devices (4.9);
- not to include requirements that allow functions or devices to be used, e.g. a combined semi-automatic zero-setting and tare device operated by the same key (4.5.4).

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 76-1, and they shall not be considered as a substitution to these requirements.

As for non-self-indicating instruments, clause 6 of R 76-1 shall be followed in lieu of this checklist.

The requirements that are not included in this type evaluation report (tests 1-15 and checklist 17) are considered to be globally covered by the type approval or OIML Certificate (e.g. classification criteria [3.2 and 3.3], suitability for application, use and verification [4.1.1.1, 4.1.1.2 and 4.1.1.3]).

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 “existent” indicates that the device exists and that it complies with the definition given in the terminology. When indicating that a device is non-existent, also check the boxes to indicate that the tests are not applicable (see page 5).

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

17 CHECKLIST

Application no.: ……
Type designation: ……

17.1 All types of weighing instruments except non-self-indicating instruments (6.1-6.9, R 76-1)

Requirement	Testing procedures		PASSED	FAILED	Remarks
Descriptive markings					
7.1.1	**A.3**	**Compulsory in all cases:**			
		manufacturer's mark or name			
		accuracy class			
(+3.3.1)		maximum capacity, Max, Max_1, Max_2,...			
		minimum capacity, Min			
(+3.3.1)		verification scale interval, e, e_1, e_2, ...			
7.1.2	**A.3**	**Compulsory if applicable:**			
		name or mark of manufacturer's agent			
		serial number			
		identification marks on separate but associated units			
		type approval mark			
		scale interval, d ($d < e$)			
		software identification (if applicable)			
		maximum tare effect, T (subtractive tare only if T ≠ Max)			
		maximum safe load, Lim (if Lim > Max + T)			
		special temperature limits			
		counting ratio			
		ratio between weight platform and load platform			
		range of plus/minus indication			
7.1.3	**A.3**	**Additional markings:**			
		not to be used for direct sales to the public			
		to be used exclusively for:			
		the stamp does not guarantee ..... / guarantees only			
		to be used only as follows:			
3.2		special applications clearly marked (weighings ranges in classes I and II or II and III)			
4.15		near display "not to be used for direct sales to the public" (for instruments similar to those used for direct sales to the public)			
7.1.4	**A.3**	**Presentation of markings:**			
		indelible			
		easily readable			
		grouped together in a clearly visible place			
		Max, Min, e and d (if $d \neq e$) on or near display permanently shown in a clearly visible position			
		possible to seal and apply a control mark/removal will result in destruction			
		markings B and G			
7.1.4 and 7.1.1 B, 7.1.2 G		additional information shown alternatively on a plate or displayed by a software solution either permanently or accessed by a simple manual command			
7.1.5.1	**A.3**	**Instruments with several load receptors and load measuring devices:**			
		identification mark, Max, Min and e of each load receptor on relating load measuring device (Lim and T = + if applicable)			

Requirement	Testing procedures		PASSED	FAILED	Remarks
7.1.5.2	**A.3**	**Separately-built main parts:**			
		identification mark repeated in descriptive markings			
4.1.1.3		**Suitability for verification:**			
		identification of devices which have been subject to separate type examination			
		Verification marks and sealing			
7.2	**A.3**	**Verification mark:**			
		cannot be removed			
		easy application			
		visibility without the instrument to be moved when it is in service			
7.2.2		**Verification mark support or space:**			
		which ensures conservation of the mark			
		for stamp, stamping area ≥ 150 mm^2			
		for self-adhesive type, ø ≥ 15 mm			
4.1.2.4	**A.3**	**Securing of components and preset controls:**			
		location			
		form			
4.1.2.4		**Securing with software means**			
4.1.2.4 a		legal status of the instrument recognizable			
		evidence of any intervention			
4.1.2.4 b		protection against changes of parameters and the reference numbers			
4.1.2.4 c		facilities for affixing the reference number			
4.1.2.5		**Span adjustment device (automatic or semi-automatic):** Existent ☐ Non-existent ☐			
		external influence impossible after securing			
4.1.2.6		**Gravity compensation:** Existent ☐ Non-existent ☐			
		external influence on or access to impossible after securing			
		Documentation			
8.2.1	**A.1**	**Technical information and data:**			
8.2.1.1,		characteristics of the instrument			
3.10.2		specifications of modules			
3.10.2.1		fractions, p_i (modules tested separately)			
3.10.4		specifications of families			
		specifications of components			
8.2.1.2		applicable descriptive documents (according to nos. 1-11)			
5.3.6.1	**A.1**	specific declaration of the manufacturer			
3.9.1.1		limiting value of tilting defined by the manufacturer			
8.2.2	**A.2**	**Examination of:**			
		documents			
		functions (spot checks)			
		test reports from other authorities			
		Indicating device			
4.2.1		**Reading:**			
		reliable, easy and unambiguous			
		overall inaccuracy ≤ 0.2 *e* (analog indication)			
		size, shape and clarity			
		by simple juxtaposition			
4.2.2.1	**A.3**	**Units of:**			
		mass			
		price			

Requirement	Testing procedures		PASSED	FAILED	Remarks
4.2.2.1		**Form of indication:**			
		for one indication, one unit of mass			
		scale interval in the form (1, 2 or 5) × 10^k			
		same scale interval for all indicating devices, printing devices and tare weighing devices			
4.2.2.2		**Form of digital indication:**			
		at least one figure at right			
		Decimal sign:			
		shall maintain its position (scale interval changed automatically)			
		separate at least one figure to the left and all to the right			
		on one line with the bottom of the figures			
		Zero:			
		only one non-significant zero to the right			
		for values with decimal sign, non-significant zero only in third position			
4.2.3		**Limits:**			
		preventing of indication above Max + 9 *e*			
		preventing of indication below zero unless a tare device is in operation (–20 *d* is accepted)			
4.2.4		**"Approximate" displaying device:** Existent ☐ Non-existent ☐			
		scale interval > Max/100 without being smaller than 20 *e*			
4.2.5		**Semi-self indicating instruments:**			
		extension of self-indication range ≤ self-indication capacity			
		Analog indication:			
4.3.1		thickness and length of scale marks			
4.3.2		scale spacing			
4.3.3		limit of movement below zero and above capacity of self-indication			
4.3.4		damping of oscillations of displaying component			
4.4.1		**Changing of digital indication:**			
		after change in load, previous indication not longer than 1 s			
4.4.2		**Stable equilibrium of digital indication:**			
		printed or stored weight values do not deviate more than 1 e from the final weight value			
		zero or tare operations are within their accuracy requirements			
		no printing, data storage, zero-setting, or taring during continuous or temporary disturbance of equilibrium			
4.4.3		**Extended digital indication:** Existent ☐ Non-existent ☐			
		not allowed when there is a differentiated scale division			
		displaying a smaller scale interval only during pressing a key			
		at most, 5 s after manual command			
		prevention of printing while the device is in operation			
4.4.4		**Digital indications other than primary indications:** Existent ☐ Non-existent ☐			
		additional indications do not lead to any ambiguity to primary indications			
		quantities identified by units, symbols, signs or designations thereof			
		weight values (not weighed) shall be clearly identified or			
		display only temporarily on manual command and			
		shall not be printed			
		the inoperative weighing mode is clear and unambiguously recognizable			

Requirement	Testing procedures		PASSED	FAILED	Remarks
4.4.5		**Digital printing:** Existent ☐ Non-existent ☐			
		clear and permanent			
		figures ≥ 2 mm high			
		name or symbol of units to the right of the value			
		above column of values			
		printing impossible when equilibrium not stable			
4.4.6		**Memory storage:** Existent ☐ Non-existent ☐			
		storage, transfer, totalizing, etc. inhibited when equilibrium not stable			
3.4.1		**Auxiliary indicating device (Classes I and II only; not allowed on multi-interval instruments)** Existent ☐ Non-existent ☐			
		If existent, type: rider ☐ interpolation ☐ complementary ☐ differentiated scale division ☐			
		only to the right of decimal sign			
3.4.2		$d < e \leq 10\ d$, $e = 10^k$ kg or $e = 1$ mg for class I with $d < 1$ mg			
		Differences between results			
3.6.3		**Differences:**			
		between multiple indications: ≤ mpe			
		between digital indications and printout: zero			
3.6.4		between two results: ≤ mpe for same load when method of balancing changed (semi-self-indicating)			
3.9.1.1		**Tilting of instrument of class** II, III or IIII			
		a marking on the level indicator shows the limiting value of tilting			
		level indicator fixed firmly in a place clearly visible to the user			
		an automatic tilt sensor releases a display switch-off or other appropriate alarm signal			
		and inhibits the printout and data transmission			
		Zero-setting, -tracking and -indicating Existent / Non-existent			
		Initial zero-setting ☐ ☐			
		Automatic zero-setting ☐ ☐			
		Semi-automatic zero-setting ☐ ☐			
		Non automatic zero-setting ☐ ☐			
		Zero-tracking ☐ ☐			
		Zero-indicating ☐ ☐			
4.5.1		Effect shall not alter Max			
	A.4.2.1	Overall effect of: zero-setting			= %
		zero-tracking			
		initial zero-setting			= %
4.5.2	**A.4.2.3**	**Accuracy:**			
		deviation ≤ 0.25 *e*			
4.5.3		**Multiple range:** Existent ☐ Non-existent ☐			
		effective for greater weighing range (if switching when loaded possible)			
4.5.4		**Control of zero-setting:**			
		separate from that of tare weighing device			
		Semi-automatic zero-setting: functions only			
		in stable equilibrium and			
		if it cancels any previous tare operation			

Requirement	Testing procedures		PASSED	FAILED	Remarks
4.5.5	**A.4.2.2**	**Zero-indicating device (digital indication):**			
		shows deviation ≤ 0.25 *e*			
		not mandatory if auxiliary indicating device or rate of zero-tracking ≥ 0.25 *d*/s			
4.5.6		**Automatic zero-setting:**			
		operates only when equilibrium stable and			
		indication has remained stable below zero at least 5 seconds			
4.5.7		**Zero-tracking:**			
		operates only when indication at zero or			
		at negative net value equivalent to gross zero and			
		equilibrium stable			
		corrections ≤ 0.5 *d*/s			
		when operates after tare, the overall effect may be 4 % of Max			
		Tare devices Existent ☐ Non-existent ☐ Tare weighing ☐ ☐ Tare balancing ☐ ☐ Combined zero-setting and tare balancing ☐ ☐ Tare indicating ☐ ☐ Type: Subtractive ☐ Additive ☐			
4.6.1		applicable requirements from 4.1 through 4.4 are fulfilled			
4.6.2		**Tare weighing device:**			
		$d_T = d$			
4.6.3	**A.4.6.2**	**Accuracy:**			
		±0.25 *e* (electronic instruments and instruments with analog indication), $e = e_1$ for multi-interval			
		better than ±0.5 *d* (mechanical instruments with digital indication			
4.6.4		**Operating range:**			
		prevention of operation at its zero effect			
		or below its zero effect			
		prevention of operation above its maximum indicated			
4.6.5		**Visibility of operation:**			
		operation indicated			
		net with sign "NET", "Net", "net" or complete word (digital indication)			
		NET disappears if gross displayed temporarily			
		tare value or letter "T" (mechanical additive tare device)			
4.6.6		**Subtractive tare:**			
		prevention of use above Max or indication that capacity is reached			
4.6.7		**Multiple range:**			
		operation effective in greater weighing ranges if switching when loaded possible			
		tare values are rounded to the scale interval of the actual weighing range which is in operation			
4.6.8		**Semi-automatic or automatic tare:**			
		operation only in stable equilibrium			
4.6.9		**Combined zero/tare:**			
		accuracy (4.5.2)			
		zero indicating device (4.5.5)			
		zero-tracking (4.5.7)			

Requirement	Testing procedures		PASSED	FAILED	Remarks
4.6.10		**Consecutive tare operations:**			
		indicated or printed tare weight values clearly designated (if tare devices operative at the same time)			
4.6.11		**Printing net or gross:**			
		without designation			
		designation: by G or B (gross)			
		by N (only net printed)			
		designation of net and tare by N and T (if net printed with gross and/or tare)			
		instead of G, B, N and T, complete words			
		printing separately net and tare with identification (determined by different tare devices)			
		Preset tare	Existent ☐ Non-existent ☐		
4.7.1		$d_T = d$ or automatically rounded to d			
		transferred from one range to another one with larger e_i, shall be rounded to the latter (multiple range)			
		tare value ≤ Max_1 for the same net weight value (multi-interval) and calculated net value rounded to the scale interval for the same net weight value			
4.7.2		4.6.10 applies			
		cannot be modified/cancelled if tare operated after the preset tare is still in use			
		operates automatically if clearly identified with load			
4.7.3		4.6.5 applies			
		possibility to indicate preset tare			
		if calculated net printed then preset tare value is printed as well			
		4.6.11 applies			
		designation of preset tare by PT or complete word			
		Locking devices	Existent ☐ Non-existent ☐		
4.8.1		**Positions:**			
		only two stable positions			
		weighing only in ‘weigh” position			
4.8.2		positions clearly shown			
		Multiple ranges	Existent ☐ Non-existent ☐		
4.10		**Selection of weighing ranges:**			
		range in operation clearly indicated			
		selection from smaller to greater range possible at any load (manual)			
		selection from smaller to the following greater range (automatic) possible only for load ≥ Max_i of smaller range			
		selection from a greater to a smaller range (manually) or to the smallest range (automatically) only ▪ at no load when zero or negative net value is indicated			
		▪ tare is cancelled automatically			
		▪ zero is set to ±0.25 e_1 automatically			
		Selection between load receptors, transmitting and measuring devices	Existent ☐ Non-existent ☐		
4.11, 4.11.1		compensation for unequal no-load effect			
4.11.2		zero-setting without ambiguity and in accordance with 4.5			
4.11.3		weighing impossible while selection			
4.11.4		combinations easy identifiable			

Requirement	Testing procedures		PASSED	FAILED	Remarks
4.12		**"Plus and minus" comparator instruments**			
4.12.1		**Distinction of zones:**			
		"+" and "–" signs (analog indication)			
		by inscription (digital indication)			
4.12.2		**Scale:**			
		with at least one scale division, $d = e$ on either side of zero and			
		value of $d = e$ shown at either end			
		Mechanical counting instruments with unit weigh receptor			
4.17.1		**Scale:**			
		with at least one scale division, $d = e$ on either side of zero and			
		value of $d = e$ shown on the scale			
4.17.2		**Counting ratio:**			
		shown clearly above each counting platform or			
		each counting scale mark			
4.20		**Modes of operation:**			
		clearly identification of mode which is actually in operation			
		manual switching back to weighing mode in any mode and at any time possible			
		automatic selection of mode only within a weighing sequence			
		automatic switching back to the weighing mode at the end of the weighing sequence			
		zero indication after returning from switch-off condition			
		automatic check of zero position before returning from switch-off condition			

17.2 Instruments for direct sales to the public and price computing and labeling instruments

Requirement	Testing procedures		PASSED	FAILED	Remarks
Miscellaneous checks (direct sales to the public)					
4.5.4		**Combined semi-automatic zero-setting device and semi-automatic tare-balancing device operated by the same key:**			
		not allowed			
4.8.1		**"Preweigh" position:**			
		not allowed			
4.13.10		**Counting ratio:**			
		1/10 or 1/100 (mechanical counting instrument)			
4.13.5		**Impossibility of weighing during:**			
		locking operation			
		adding or subtracting weights			
4.13.7		**Auxiliary and extended indicating device:**			
		not allowed			
4.13.9		**When significant fault has been detected**[1] **(electronic instruments):**			
		visible or audible alarm provided for customer and			
		data transmission prevented			
		until user takes action or cause disappears			
Indication device (direct sales to the public)					
4.13.1, 4.13.6		**Primary indications to both vendor and customer:**			
		two display sets, one vendor- and one customer display: Yes ☐ No ☐			
		one display set for vendor and customer Yes ☐ No ☐			
		weight			
		information about correct zero position			
		tare operation			
		preset tare operation			
		height of numerical figures displayed to the customer ≥ 9.5 mm			
		Instruments to be used with weights:			
		value of weights possible to distinguish			
Zero-setting device (direct sales to the public)					
4.13.2		**Non-automatic zero-setting:**			
		only allowed when operated with a tool			
Tare device (direct sales to the public)					
4.13.3		not allowed on mechanical instrument with weights receptor			
		on instruments with one platform public can see whether: - tare is in use			
		- tare setting is altered			
		only one tare shall be in operation at any given time			
		while tare or preset tare is in operation recalling of gross values is prohibited			
4.13.3.1		**Non-automatic tare:**			
		displacement of 5 mm at most *e*			
4.13.3.2		**Semi-automatic tare:**			
		reduction of value of tare not permitted and			
		canceling of tare effect only if no load on the receptor			
		One of the following condition fulfilled:			
		tare value indicated permanently in a separate display			

[1] Checked by verifying the compliance with documents or by simulating faults; this check does not duplicate the disturbance tests 12.1-12.7.

Requirement	Testing procedures		PASSED	FAILED	Remarks
		indicated with sign "–" when no load on the receptor			
		tare effect cancelled automatically when unloading after net weighing			
4.13.3.3		**Automatic tare:**			
		not allowed			
4.13.4		**Preset tare:**			
		indicated on separate display clearly differentiated from weight display			
		reduction of tare value not permitted and			
		canceling of tare effect only if no load on the receptor			
		impossible to operate if tare device in operation			
		cancelled at the same time as PLU if associated with PLU			
4.13.11		**Self-service instruments:** with one set of scales or displays ☐ two sets of scales or displays ☐			
		instrument has two sets of scales or displays			
		Primary indications shall include the product designation if a ticket is printed			
Price computing instruments and price scales (direct sales to the public)					
4.14 **4.14.1**		Requirements of 4.13 for direct sales to the public are met			
		Supplementary primary indications (4.13.6)			
		unit price			
		price to pay			
		if applicable number, unit price and price to pay for non-weighed articles, price totals			
4.14.2 **4.2** **4.3.1-4.3.3**		**Price scales:**			
		4.2 and 4.3.1-4.3.3			
		error of price scale $\lvert W \times U - P \rvert \leq e \times U$			
4.14.3		**Price computing:**			
		multiplication of indicated weight and unit price as indicated			
		rounding to the nearest interval of price to pay			
		unit price: price/100 g or price/kg			
		Indications of weights, unit price and price to pay visible:			
		while load on load receptor and for at least 1 s after stable weight indication or after any introduction of unit price			
		freezing for ≤ 3 s after removing load and not possible to introduce or change unit price (if indication has been stable before and would otherwise be zero)			
		printing weight, unit price and price to pay			
		Stored in memory:			
		before printing			
		same data not to be printed twice for customer			
4.14.4		**Additional functions for trade and management:**			
		all transactions are printed for customer			
		they shall not lead to confusion			
4.14.4.1		**Prices-to-pay (positive or negative) of non-weighed articles:**			
		weight indication zero or			
		weighing mode inoperative			
		prices shall be shown on price-to-pay display			
		Prices for more than one equal articles:			
		number of articles shown on weight display without being taken for a weight			
		price for one article shown on unit price display			

Requirement	Testing procedures		PASSED	FAILED	Remarks
		supplementary display for number of articles and/or article prices			
4.14.4.2		**Totalization of transactions on one or several tickets:**			
		price total indicated on price-to-pay display and			
		printed accompanied by a special word or symbol and			
		reference to commodities whose prices are totalized if a separate ticket is issued for total			
		all prices-to-pay shall be printed and price total shall be the algebraic sum of these printed prices			
		Totalization of transactions from linked instruments:			
		price-to-pay scale intervals of all connected instruments identical			
4.14.4.3		**Instrument used by several vendors or to serve more than one customer at the same time:**			
		connection between transactions and vendor or customer identified			
4.14.4.4		**Canceling previous transactions:**			
		transaction is already printed: the price-to-pay cancelled shall be printed with comment			
		transaction not yet printed and displayed to customer: transaction clearly differentiated from normal transactions			
4.14.4.5		**Printing additional information:**			
		clearly correlated to transaction and			
		does not interfere with assignment of weight value to unit symbol			
Price labeling instruments					
4.16		requirements 4.13.8, 4.14.3 (paragraphs 1 and 5), 4.14.4.1 (paragraph 1) and 4.14.4.5 are met			
		Display:			
		for weight			
		possibility to verify values of unit price and preset tare during the use of the instrument			
		Printing:			
		prevention of printing below Min			
		labels with fixed values of weight, unit price and price-to-pay allowed provided weighing mode is inoperative			
Mobile instruments used outside					
4.18.1		means to indicate that the limiting value of tilting has been exceeded and to inhibit printout and data transmission			
		automatic zero-setting or tare balancing operation after each moving of the vehicle			
		Weighing window	Existent ☐	Non-existent ☐	
		indication when instrument is not in the weighing window and the printout and data transmission is inhibited			
		equipped with an appropriate protection system if the load measuring device is sensitive to moving or driving influences			
		prevention of wrong weighing results if the cardanic suspension system or load receptor comes into contact with the surrounding frame construction			
4.18.2		**Other mobile instruments not to be used outside** with a leveling device and a level indicator			
		the leveling device shall be operated easily without tools			
		appropriate inscription pointing the user to the necessity of leveling after each movement			

17.3 Electronic weighing instruments

Requirement	Testing procedures		PASSED	FAILED	Remarks
Disturbances					
5.1.1		indication of significant faults in the display does not lead to confusion with other messages			
5.2		**Acting upon significant faults in case 5.1.1 b):**			
		instrument made automatically inoperative[1], or			
		visual or audible indication until user takes action or fault disappears[1]			
Display check					
5.3.1		**Upon switch-on:**			
		signs of indication are active and non-active long enough to be checked by operator			
External equipment					
5.3.6		**Interfaces (mechanical, electrical, logical) do not allow:**			
		▪ functions and measurement data to be inadmissibly influenced by peripheral devices, or other connected instruments, or disturbances			
5.3.6.1		▪ displaying data which could be mistaken for a weighing result			
		▪ falsifying weighing results (displayed, processed, stored)			
		▪ changing adjustment factor or adjusting the instrument (except authorized cases)			
		▪ falsifying displayed primary indications (direct sales)			
5.3.6.2		interfaces that do not fulfill 5.3.6.1 can be secured			
5.3.6.3		interfaces transmit data so that peripheral device can meet requirements			
5.3.6		metrologically relevant functions performed or initiated through the interface meet relevant requirements of R 76-1			

[1] Checked by verifying the compliance with documents or by simulating faults; this check does not duplicate the disturbance tests 12.1-12.7.

17.4 Software-controlled digital devices and instruments

Requirement	Testing procedures		PASSED	FAILED	Remarks
Devices with embedded software				Existent ☐	Non-existent ☐
5.5.1	**G.1**	declaration of the manufacturer that the software: ▪ is used in a fixed hardware and software environment, and			
		▪ cannot be modified or uploaded by any means after securing/ verification			
		the software documentation contains: ▪ description of the legally relevant functions			
		▪ description of the securing means (evidence of an intervention)			
		▪ software identification			
		▪ description how to check the actual software identification			
		the software identification is: ▪ clearly assigned to the legally relevant software and functions			
		▪ provided by the instrument as documented			
Personal computers, instruments with PC components, and other instruments, devices, modules, and elements with programmable or loadable legally relevant software				Existent ☐	Non-existent ☐
5.5.2.2 d	**G.2.1**	the legally relevant software is: ▪ documented with all relevant information			
5.5.2.2 a		▪ protected against accidental or intentional changes			
5.5.2.2 a		evidence of intervention is available until the next verification / inspection			
5.5.2.2	**G.2.2.1**	**Operation system / programs not accessible for the user**			
		description of all commands via keys or interfaces			
		declaration of completeness of commands			
5.5.2.2	**G.2.2.2**	**Operating system / programs accessible for the user**			
		checksum or signature generated over the machine code of the legally relevant software			
		legally relevant software cannot be started if the code is falsified			
	G.2.2.3	**In addition to the cases G.2.2.1 or G.2.2.2**			
		device-specific parameters sufficiently protected			
		audit trail for the protection of the parameters and description			
		some practical spot checks performed			
5.5.2.2 b	**G.2.3**	**Software interfaces**			
		if there is associated software providing other than measuring functions, the legally relevant software part: ▪ is separated from associated software			
		▪ identified			
		▪ cannot be influenced by the associated software			
		program modules of legally relevant software are defined and separated from the modules of associated software by a defined protective software interface			
		protective software interface itself is part of the legally relevant software			
		description and definition of functions of the legally relevant software that can be released via the protective software interface			
		description and definition of parameters that may be exchanged via the protective software interface			

Requirement	Testing procedures		PASSED	FAILED	Remarks
		description of the functions and parameters conclusive and complete			
		each documented function and parameter does not contradict with the requirements of this Recommendation			
		appropriate instructions for the application programmer concerning the protectiveness of the software interface			
5.5.2.2 c	**G.2.4**	**Software identification**			
		the legally relevant software is identified by a software identification			
		the software identification: ▪ covers all program modules of the legally relevant software and the type-specific parameters at runtime of the instrument			
		▪ is easily provided by the instrument			
		▪ can be compared with the reference identification fixed at type approval			
		spot checks whether the checksums (signatures) are generated and work as documented			
		there exists an effective audit trail			
Data storage devices (DSD)					Existent ☐ Non-existent ☐
5.5.3	**G.3.1**	DSD realized with embedded software (examine software acc. to G.1)			Yes ☐ No ☐
		DSD realized with programmable/loadable software (examine software acc. to G.1)			Yes ☐ No ☐
		documentation with all relevant information			
5.5.3.1	**G.3.2**	sufficient storage capacity for the intended purpose			
		data are stored and given back correctly			
		sufficient description of measures to prevent data loss			
5.5.3.2	**G.3.3**	storage of all relevant information necessary to reconstruct an earlier weighing, i.e. gross, net, tare values, decimal signs, units, identifications of the data set, instrument number, load receptor, (if applicable), checksum / signature of the data set stored			
5.5.3.3	**G.3.4**	protection of the stored legally relevant data against accidental or intentional changes			
		protection of the stored legally relevant data at least with a parity check during transmission to the storage device			
		protection of the stored legally relevant data at least with a parity check of a storage device with embedded software (5.5.1)			
		protection of the stored legally relevant data by an adequate checksum or of a storage device with programmable or loadable software (5.5.2)			
5.5.3.4	**G.3.5**	identification and indication of the stored legally relevant data with an identification number			
		record of the identification number on the official transaction medium, i.e. on the print-out			
5.5.3.5	**G.3.6**	automatic storage of the legally relevant data			
5.5.3.6	**G.3.7**	a device subject to legal control prints or displays the stored legally relevant data for verifying			