INTERNATIONAL RECOMMENDATION

OIML R 134-2

Edition 2009 (E)

Automatic instruments for weighing road vehicles in motion and measuring axle loads

Part 2: Test report format

Instruments à fonctionnement automatique pour le pesage des véhicules routiers en mouvement et le mesurage des charges à l'essieu

Partie 2: Format du rapport d'essai

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 CIML. Thus, they do not necessarily represent the views of the OIML.

This publication - reference OIML R 134-2, edition 2009 (E) - was developed by the OIML Technical Subcommittee TC 9/SC 2 *Automatic weighing instruments*. It was approved for final publication by the International Committee of Legal Metrology in 2009.

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

This "Test report format" aims at presenting, in a standardized format, the results of the various tests and examinations to which a type of an automatic instrument for measuring axle load and the mass of road vehicles in motion 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, and 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 R 134-1 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 R 134-1.

All metrology services or laboratories evaluating types of automatic instruments for measuring axle load and the mass of road vehicles in motion according to R 134-1 or to national or regional regulations based on this OIML Recommendation are strongly advised to use this Test report format, either 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 Basic 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 the test equipment which has been used in measuring 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 the sequential numbering 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.

Automatic instruments for weighing road vehicles in motion and measuring axle loads

TYPE EVALUATION REPORT

EXPLANATORY NOTES

Symbol	Meaning
I	Indication
I_n	nth indication
L	Load
ΔL	Additional load to next changeover point
P	$I + 1/2\ d - \Delta L$ = 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_s	Stationary 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
e.m.f	Electromotive force
I/O	Input / output ports
RF	Radio frequency
V/m	Volts per metre
kV	kilovolt
DC	Direct current
AC	Alternating current
MHz	Megahertz

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:	×	
when the instrument has failed the test:		×
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:	2009-01-29	2009-01-30	yyyy-mm-dd
Time:	16:00:05	16:30:25	hh:mm:ss
Bar. pres.:			hPa

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

In the disturbance tests, faults greater than d 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 134-1.

GENERAL INFORMATION CONCERNING THE TYPE

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

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

Instrument category: .....

Testing on: ☐ Full draught weighbridge ☐ Multi-draught weighbridge
☐ Complete instrument ☐ Module[1]
☐ Static weighing mode

Accuracy class:

Single-axle load and axle-group load: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

Vehicle mass: ☐ 0.2 ☐ 0.5 ☐ 1 ☐ 2 ☐ 5 ☐ 10

Maximum capacity = ☐ Max wagon weight = ☐ n_{max} = ☐ v_{max} = ☐

Minimum capacity = ☐ Min wagon weight = ☐ n_{min} = ☐ v_{min} = ☐

T = + ☐ T = – ☐ d = ☐

U_{nom} = ☐ V U_{min} = ☐ V U_{max} = ☐ V f = ☐ Hz Battery, U = ☐ 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 sensor: ….....
Manufacturer: ….....
Type: ….....
Capacity: ….....
Number: ….....
Classification symbol: ….....
Remarks: ….....
….....
….....
….....

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

GENERAL INFORMATION CONCERNING THE TYPE (continued)

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

(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)

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.:	....	Type designation:	....
Report date:	....	Manufacturer:	....

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

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

CONFIGURATION FOR TEST

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

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

SUMMARY OF TYPE EVALUATION

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

	TESTS	Report page	Passed	Failed	Remarks
1	Zero-setting				
2	Warm-up time				
3	Influence factors				
3.1	Static temperatures				
3.2	Temperature effect on no-load indication				
3.3	Damp heat, steady-state				
3.4	AC mains voltage variation				
3.5	DC mains voltage variation				
3.6	Battery voltage (DC) variation				
3.7	Voltage variations in 12 V or 24 V road vehicle batteries				
4	Disturbances				
4.1	AC mains voltage short time power reduction				
4.2	Electrical fast transients/burst immunity on mains supply lines and on I/O circuits and communication lines				
4.3	Electrical surges on mains supply lines and on I/O circuits and communication lines				
4.4	Electrostatic discharges				
4.5	Immunity to electromagnetic fields				
4.6	Electrical transient conduction for instruments powered by 12 V or 24 V road vehicle batteries				
5	Span stability				
6	In-motion tests				
6.1	Non-automatic tests of the control instrument:				
6.1.1	Accuracy of zero-setting				
6.1.2	Determination of weighing performance				
6.1.3	Eccentricity				
6.1.4	Discrimination				
6.2	Static weighing test				
6.3	In-motion tests				
7	Examination of the construction				
8	Checklist				

SUMMARY OF TYPE EVALUATION (continued)

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

1 ZERO-SETTING (3.3.1, A.5.1)

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

$E = I + ½\ d - \Delta L$
$E = I - L$ or $P - L$ = Error

1.1 Range of zero-setting (3.3.1, A.5.1.1)

Zero-setting mode	Positive zero limit load, L_1	Negative zero limit load, L_2	Range $L_1 + L_2$	% of maximum load

☐ Passed ☐ Failed

Remarks:

1.2 Accuracy of zero-setting (3.3.1, A.5.1.2)

Zero-setting mode	ΔL	$E = ½\ d - \Delta L$	MPE

☐ Passed ☐ Failed

Remarks:

2 WARM-UP TIME (4.3.4, A.6.1)

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

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
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	MPE	R 134-1 clause
Check if:	a)	Initial zero-setting error, E_{0I}	$\leq 0.25\ d$	3.2.7, A.5.1
	b)	Maximum value of error unloaded, E_0	$\leq 0.25\ d$	
	c)	Maximum value of zero variation, $E_0 - E_{0I}$	$\leq 0.25\ d \times p_i$	
	d)	Maximum value of error loaded, $E_L - E_0$	$\leq 0.25\ d \times p_i$	

☐ Passed ☐ Failed

Remarks:

3 INFLUENCE FACTORS

3.1 Static temperatures (2.7.1.1, A.7.2.1)

3.1.1 Reference temperature of 20 ºC

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

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.1.2 Static temperatures (specified high = ... °C)

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.1.3 Static temperatures (specified low = ... °C)

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.1.4 Static temperatures (5 °C if within the specified low temperature is ≤ 0 °C)

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.1.5 Static temperatures (Reference temperature of 20 °C)

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.2 Temperature effect on no-load indication (2.7.1.2, A.7.2.2)

Application no.: .....

Type designation: .....

Observer: .....

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[2]	Date	Time	Temp. (°C)	Zero indication, *I*	Add. load, ΔL	*P*	ΔP	ΔTemp	Zero-change per 5 °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:

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

3.3 Damp heat, steady state (4.3.3, A.7.2.3)

3.3.1 Initial test (Reference temperature of 20 °C and 50 % humidity)

			At start	After 3 h	At end	
Application no.:	.....	Temp.:				°C
Type designation:	.....	Rel. h.:				%
Observer:	.....	Date:				yyyy-mm-dd
Scale interval, *d*:	.....	Time:				hh:mm:ss
Resolution during test: (smaller than *d*)	.....	Bar. pres.:				hPa

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.3.2 Upper limit temperature (..... °C) and 85 % humidity

			At start	After 3 h	At end	
Application no.:	.....	Temp.:				°C
Type designation:	.....	Rel. h.:				%
Observer:	.....	Date:				yyyy-mm-dd
Scale interval, *d*:	.....	Time:				hh:mm:ss
Resolution during test: (smaller than *d*)	.....	Bar. pres.:				hPa

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.3.3 Final test (Reference temperature of 20 °C and 50 % humidity)

			At start	After 3 h	At end	
Application no.:	.....	Temp.:				°C
Type designation:	.....	Rel. h.:				%
Observer:	.....	Date:				yyyy-mm-dd
Scale interval, *d*:	.....	Time:				hh:mm:ss
Resolution during test: (smaller than *d*)	.....	Bar. pres.:				hPa

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

3.4 Voltage supply variations (2.7.2, A.7.2.4-7.2.7)

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

☐ AC mains voltage supply, A.7.2.4

☐ DC mains voltage supply, A.7.2.5

☐ Battery voltage supply (DC), A.7.2.6

☐ 12 V or 24 V road vehicle battery voltage supply, A.7.2.7

Voltage supply[3]: U_{nom} = ☐ V U_{min} = ☐ V U_{max} = ☐ V

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 voltage supply): .....

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

Voltage	*U* (V)	Load, *L*	Indication, *I*	Add. load, Δ*L*	Error, *E*	Corrected error, E_c	MPE
Reference							
Lower limit							
Upper limit							
Reference							

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

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

Voltage	*U* (V)	Load, *L*	Indication, *I*	Add. load, Δ*L*	Error, *E*	Corrected error, E_c	MPE
Reference							
Lower limit							
Upper limit							
Reference							

[3] Calculate lower and upper limits of applied voltages according to 2.7.2. If a voltage-range (U_{min} / U_{max}) is marked, use the average value as the reference value.

3.4 Voltage supply variations (continued)

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

$E = I + ½\ d - \Delta L - L$ $E_c = E - E_0$ 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							
Lower limit							
Upper limit							
Reference							

Check if $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

4 DISTURBANCES (4.1.2, A.7.3)

4.1 Short time power reduction (A.7.3.1)

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

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

Load	Disturbance				Result		
	Amplitude (% of U_{nom}[4])	Duration (cycles)	Number of disturbances	Repetition interval (s)	Indication, *I*	Significant fault (> *d*) or detection and reaction	
						No	Yes (remarks)
	without disturbance						
	0	0.5					
	0	1					
	40	10					
	70	25 / 30*					
	80	250 / 300*					
	0	250					

* These values are for 50 Hz / 60 Hz, respectively

☐ Passed ☐ Failed

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

Remarks:

[4] If a voltage-range is marked, use the average value as the reference U_{nom}

4.2 Electrical fast transients/burst immunity on the mains supply lines and on the I/O circuits and communication lines (A.7.3.2)

4.2.1 Mains supply lines

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

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

Load, *L*	Disturbance		Result		
	Disturbance	Polarity	Indication, *I*	Significant fault (> *d*) or detection and reaction	
				No	Yes (remarks)
	without disturbance				
	Live ↓ ground	pos			
		neg			
	without disturbance				
	Neutral ↓ ground	pos			
		neg			
	without disturbance				
	Protective earth ↓ ground	pos			
		neg			

☐ Passed ☐ Failed

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

Remarks:

4.2.2 I/O circuits and communication (signal) lines

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

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

Load, *L*	Disturbance		Result		
	Bursts on cable / interface (type, nature)	Polarity	Indication, *I*	Significant fault (> *d*) or detection and reaction	
				No	Yes (remarks)
	without disturbance				
		pos			
		neg			
	without disturbance				
		pos			
		neg			
	without disturbance				
		pos			
		neg			
	without disturbance				
		pos			
		neg			
	without disturbance				
		pos			
		neg			
	without disturbance				
		pos			
		neg			

Explain or make a sketch indicating where the clamp is located on the cable (use an additional page).

☐ Passed ☐ Failed

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

Remarks:

4.3 Electrical surges on mains supply lines and on I/O circuits and communication lines (A.7.3.3)

4.3.1 Mains supply lines

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

Power supply lines: test voltage 1 kV, duration of the test: 1 minute at each amplitude and polarity

Load, *L*	Disturbance						Result		
	3 positive and 3 negative surges synchronously with AC supply voltage						Indication, *I*	Significant fault (> *d*) or detection and reaction	
	Amplitude / apply on	angle 0°	angle 90°	angle 180°	angle 270°	Polarity		No	Yes (remarks)
	0.5 kV live ↓ neutral	without disturbance							
		×				pos			
						neg			
			×			pos			
						neg			
				×		pos			
						neg			
					×	pos			
						neg			
	1.0 kV live ↓ protective earth	without disturbance							
		×				pos			
						neg			
			×			pos			
						neg			
				×		pos			
						neg			
					×	pos			
						neg			
	1.0 kV neutral ↓ protective earth	without disturbance							
		×				pos			
						neg			
			×			pos			
						neg			
				×		pos			
						neg			
					×	pos			
						neg			

☐ Passed ☐ Failed

Remarks:

4.3.2 Any other kind of power supply and /or I/O circuits and communication lines[5]

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

Load, *L*	Disturbance		Result		
	3 positive and 3 negative surges.		Indication, *I*	Significant fault (> *d*) or detection and reaction	
	Amplitude / apply on	Polarity		No	Yes (remarks)
	without disturbance				
	0.5 kV live ↓ neutral	pos			
		neg			
	without disturbance				
	1.0 kV live ↓ protective earth	pos			
		neg			
	without disturbance				
	1.0 kV neutral ↓ protective earth	pos			
		neg			

Use another page for additional test setup information.

☐ Passed ☐ Failed

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

Remarks:

[5] Test voltage 0.5 kV (line to line) and 1.0 kV (line to earth) for 1 minute at each amplitude and polarity

4.4 Electrostatic discharge (A.7.3.4)

4.4.1 Direct application

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

☐ Contact discharges ☐ Paint penetration

☐ Air discharges Polarity[6]: ☐ pos ☐ neg

Load	Discharges			Result		
	Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Indication, *I*	Significant fault (> *d*) or detection and reaction	
					No	Yes (remarks, test points)
	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:

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

4.4.2 Indirect application (contact discharges only)

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

Polarity[7]: ☐ pos ☐ neg

Horizontal coupling plane

Load, *L*	Discharges			Result		
	Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Indication, *I*	Significant fault (> *d*) or detection and reaction	
					No	Yes (remarks)
	without disturbance					
	2					
	4					
	6					

Vertical coupling plane

Load, *L*	Discharges			Result		
	Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Indication, *I*	Significant fault (> *d*) or detection and reaction	
					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:

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

4.4 Electrostatic discharge (continued)

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

a) Direct application

Contact discharges:

Air discharges:

b) Indirect application

4.5 Immunity to electromagnetic fields (A.7.3.5)

4.5.1 Immunity to radiated electromagnetic fields (A.7.3.5.1)

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

Rate of sweep: ☐

Load: ☐ Test load: ☐

Disturbances				Result		
Antenna	Frequency range (MHz)	Polarization	EUT facing	Indication, *I*	Significant fault (> *d*) 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			

Test severity

Frequency range: 80 MHz* to 2 000 MHz

RF amplitude (50 ohms): 10 V/m

Modulation: 80 % AM, 1 kHz, sine wave

* Lower limit is 26 MHz if the test according to A.7.3.5.2 cannot be applied due to lack of mains or I/O ports.

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

☐ Passed ☐ Failed

Remarks:

4.5.2 Immunity to conducted electromagnetic fields (A.7.3.5.2)

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

Rate of sweep: ____

Load: ____ Test load: ____

Disturbance			Result		
Frequency range (MHz)	Cable/interface	Level (Volts RMS)	Indication, *I*	Significant fault (> *d*) or detection and reaction	
				No	Yes (remarks)
without disturbance					
without disturbance					
without disturbance					
without disturbance					
without disturbance					
without disturbance					

Test severity;

Frequency range: 0.15 MHz to 80 MHz

RF amplitude (50 ohms): 10 V (e.m.f.)

Modulation: 80 % AM, 1 kHz, sine wave

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

☐ Passed ☐ Failed

Remarks:

4.5 Immunity to electromagnetic fields (continued)

Include a description of the setup of the EUT, e.g. by photos or sketches.

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

Radiated:

Conducted:

4.6 Electrical transient conduction for instruments powered from a road vehicle battery (A.7.3.6)

4.6.1 Electrical transient conduction along supply lines of 12 V or 24 V batteries (A.7.3.6.1)

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

Load: ☐

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

☐ 12 V battery voltage ☐ 24 V battery voltage ☐ Other voltage supply

Disturbance				Result		
Voltage conditions, U_{nom}	Test pulse	Pulse voltage, U_s	Number of pulses applied / duration	Indication, *I*	Significant fault (> *d*) or detection and reaction	
					No	Yes (remarks) [8]
without disturbance						
12 V	2a	+50 V				
	2b[9]	+10 V				
	3a	–150 V				
	3b	+100 V				
	4	–7 V				
24 V	2a	–50 V				
	2b[14]	+20 V				
	3a	–200 V				
	3b	+200 V				
	4	–16 V				
Other voltage supply						
without disturbance						

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

☐ Passed ☐ Failed

Remarks:

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

[9] 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.

4.6.2 Transient conduction by capacitive and inductive coupling via lines other than supply lines (A.7.3.6.2)

Load: ☐

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

☐ 12 V battery voltage ☐ 24 V battery voltage ☐ Other voltage supply

Disturbance				Result		
Voltage conditions, U_{nom}	Test pulse	Pulse voltage, U_s	Number of pulses applied / duration	Indication, I	Significant fault (> d) or detection and reaction	
					No	Yes (remarks) [10]
without disturbance						
12 V	a	–60 V				
	b	+40V				
24 V	a	–80 V				
	b	+80 V				
Other voltage supply						
without disturbance						

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

☐ Passed ☐ Failed

Remarks:

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

5 SPAN STABILITY (6.14.3, A.8)

Application no.: .....

Type designation: .....

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

Zero load: ☐ Test load : ☐

Automatic span adjustment device:

☐ Non-existent ☐ In operation

Measurement no. 1: Initial measurement

Application no.: .....

Type designation: .....

Observer: .....

	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[11]
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 $|(E_L - E_0)_{max} - (E_L - E_0)_{min}| \leq 0.1\ d$, the loading and reading will be sufficient for each of the subsequent measurements.

Remarks:

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

5 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

☐ the damp heat test, the EUT having been stabilized for at least 16 h

☐ the EUT has been disconnected from the mains for at least 8 h and then stabilized for at least 5 h

☐ any change in the test location

☐ any other specific condition: ……....

Measurement no. 2:

Application no.: .....

Type designation: .....

Observer: .....

	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[12]
1								
2								
3								
4								
5								

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

Remarks:

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

5 Span stability (continued)

Measurement no. 3:

		At start	At end	
Application no.:	Temp.:			°C
Type designation:	Rel. h.:			%
Observer:	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[13]
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	
Application no.:	Temp.:			°C
Type designation:	Rel. h.:			%
Observer:	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[13]
1								
2								
3								
4								
5								

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

Remarks:

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

5 Span stability (continued)

Measurement no. 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

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

	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[14]
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	
Application no.:	.....	Temp.:			°C
Type designation:	.....	Rel. h.:			%
Observer:	.....	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[14]
1								
2								
3								
4								
5								

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

Remarks:

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

5 Span stability (continued)

Measurement no. 7:

		At start	At end	
Application no.:	.....	Temp.:		°C
Type designation:	.....	Rel. h.:		%
Observer:	.....	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								

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

Remarks:

Measurement no. 8:

		At start	At end	
Application no.:	.....	Temp.:		°C
Type designation:	.....	Rel. h.:		%
Observer:	.....	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								

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

Remarks:

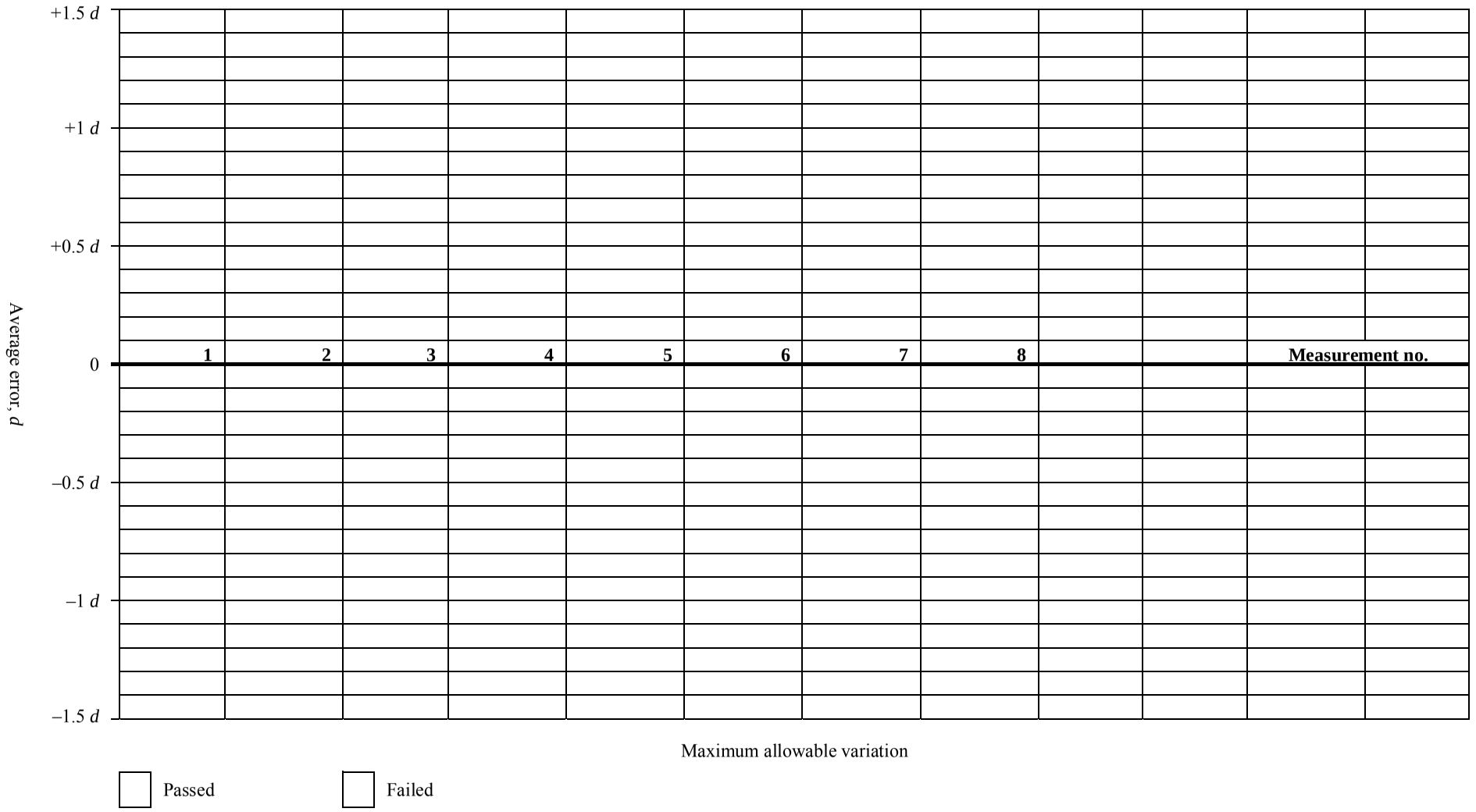
[15] When applicable, necessary corrections resulting from variations of temperature, pressure, etc. See remarks.

5 SPAN STABILITY (A.8)

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**



☐ Passed ☐ Failed

6 IN-MOTION TESTS (A.9)

6.1 Non-automatic tests of the control instrument (integral) (3.4, A.5.2, A.9.2)

6.1.1 Accuracy of zero-setting (3.4.1, A.5.2.1.1)

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

ΔL	$E = ½\ d - \Delta L$	MPE

☐ Passed ☐ Failed

Remarks:

6.1 Non-automatic tests of the control instrument (integral)

6.1.2 Determination of weighing performance (6.3, A.5.2.2.2)

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

Automatic zero-setting device is:

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

Initial zero-setting > 20 % of Max: ☐ Yes ☐ No

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

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

Check if $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

6.1.3 Eccentricity (3.4.2, 6.3.3, A.5.2.3)

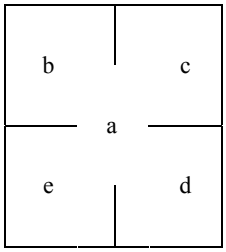
6.1.3.1 Eccentricity using weights

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

Note: If operating conditions are such that no eccentricity can occur, eccentricity tests need not be performed.

Load ($^1/_3$ Max): ☐

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



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

Automatic zero-setting device is:

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

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

Load, *L*	Location	Indication, *I*	Add. load, ΔL	Error	Corrected error, E_c	MPE
*				*		

Check if $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

6.1.3.2 Eccentricity rolling loads

			At start	At end	
Application no.:	.....	Temp.:			°C
Type designation:	.....	Rel. h.:			%
Observer:	.....	Date:			yyyy-mm-dd
Scale interval, *d*:	.....	Time:			hh:mm:ss
Resolution during test: (smaller than *d*)	.....				
Load ($^1/_3$ Max):					

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 letters which shall be repeated in the table below.

a	b	c

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

Automatic zero-setting device is:

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

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

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

Check if $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

6.1.4 Discrimination (3.4.3, A.5.2.4)

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

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

☐ Passed ☐ Failed

Remarks:

6.2 Static weighing (A.9.3.1)

6.2.1 Static weighing test (A.9.3.1.1)

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

Automatic zero-setting device is:

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

$E = I + ½\ d - \Delta L - L$
$E_c = E - E_0$ 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 $E_c \leq$ MPE

☐ Passed ☐ Failed

Remarks:

6.2 Static weighing (continued)

6.2.2 Full-draught weighing of reference vehicles (6.5, A.9.3.1.2)

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

Vehicle is: ☐ Unloaded ☐ Loaded with standard test weights

Control instrument is: ☐ Integral ☐ Separate

Summary of reference vehicles

Reference vehicle identification	Vehicle type	Number of axles	Tractor/trailer axle configuration	Tractor/trailer linkage system	Suspension system

Reference vehicle mass

	Reference vehicle identification	Vehicle unloaded or loaded	Vehicle mass (kg)	Remarks
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Note: When loaded reference vehicle mass is obtained by loading an unloaded reference vehicle of known mass with standard test loads, this should be noted in the table above.

6.2.3 Determining static reference single-axle loads for the two-axle rigid reference vehicle (A.9.3.1.3)

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

Vehicle is: ☐ Unloaded ☐ Loaded with standard test weights

Control instrument is: ☐ Integral ☐ Separate

Summary of two-axle reference vehicle mass

Test No.	Direction of vehicle facing	Axle load (kg)		Vehicle mass, VM (kg)	Remarks
		Axle no. 1	Axle no. 2		
1	initial				
2	initial				
3	initial				
4	initial				
5	initial				
6	opposite				
7	opposite				
8	opposite				
9	opposite				
10	opposite				
Mean					
Corrected mean axle (1)				(2)	
Reference vehicle mass (VM_{ref}): See note below					

☐ Passed ☐ Failed

Remarks:

Note 1: The corrected mean single-axle load is taken as the conventional true value of the static reference single-axle loads (T.3.1.10, A.9.3.1.3 paragraph 4) for the two-axle rigid reference vehicle:

$$\overline{\text{CorrAxle}_i} = \overline{\text{Axle}_i} \times \frac{\text{VM}_{\text{ref}}}{\overline{\text{VM}}}$$

Note 2: For traceability the sum of the corrected mean axle loads shall be equal to the reference vehicle mass (A.9.3.1.3 paragraph 5).

Note 3: VM_{ref} is the conventional true value of the two-axle reference vehicle mass determined by full-draught weighing (A.9.3.1.2).

6.3 In-motion tests (A.9.3.2)

6.3.1 In-motion test with the two-axle rigid reference vehicle (A.9.3.2.2.1)

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

Accuracy class: Total mass: ☐ Axle: ☐

(All mass values in kg)

Reference vehicle type identification: .....

Reference vehicle mass (VM_{ref}): See note below ..... ☐ Unloaded ☐ Loaded

Reference vehicle tested: ☐ Loaded with standard test loads ☐ Control weighing of loaded vehicle

Summary of site configuration:

Operating speed: Maximum: ☐ Minimum: ☐ Site: ☐

Direction of weighing (if applicable): ☐ Single ☐ Dual

Use this space to record relevant information regarding the installation, e.g. apron construction, length, etc.:

6.3.1 In-motion test with the two-axle rigid reference vehicle (continued)

Test number: ..... (All mass values in kg)

Reference vehicle type identification: .....

Reference vehicle mass (VM_{ref}): See note below .....

☐ Unloaded ☐ Loaded

Reference vehicle tested: ☐ Loaded with standard test loads ☐ Control weighing of loaded vehicle

Run no.	Speed (km/h)	Location (middle / left / right)	Axle load		Vehicle mass (VM)	Remarks
			Axle no. 1	Axle no. 2		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
Mean						
Corrected mean [1]						
Maximum deviation[2]						
MPE[3]						

☐ Passed ☐ Failed

Remarks:

Notes:

1 Conventional true value of the static reference single-axle load (corrected mean single-axle load):

$$\overline{CorrAxle_i} = \overline{Axle_i} \times \frac{VM_{ref}}{\overline{VM}} \quad \text{(A.9.3.1.3, paragraph 3)}$$

2 For axle load, maximum deviation between the corrected mean single-axle load and the indicated axle loads from the test runs (A.9.3.2.2.2, par 5). For vehicle mass, maximum deviation between the reference vehicle mass (VM_{ref}) and the indicated vehicle mass (VM) from the test runs (5.1.3.2.1, A.9.3.2.1).

3 No maximum deviation in (2) above shall exceed the MPE in 2.2.1.2.1 (A.9.3.2.2.1) for axle-load, and the MPE in 2.2.1.1 (A.9.3.2.1) for vehicle mass.

4 VM_{ref} is the conventional true value of the two-axle reference vehicle mass determined by full-draught weighing (A.9.3.1.2).

6.3.2 In-motion test with all other reference vehicle types (A.9.3.2.2.2)

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

Accuracy class: Total: ☐ Axle: ☐ Group: ☐

Summary of site configuration:

Maximum operating speed: ☐ Site operating speed: ☐

Minimum operating speed: ☐ Maximum number of axes (n): ☐

Direction of weighing (if applicable): ☐ Single ☐ Dual

Use this space to record relevant information regarding the installation, e.g. apron construction, length, etc.:

6.3.2 In-motion test with all other reference vehicle types (continued)

Note: Reproduce this page, as appropriate, for the required number of tests

Test number: ..... (All mass values in kg)

Reference vehicle type identification: .....

Reference vehicle mass (VM_{ref}): See note below .....

☐ Unloaded ☐ Loaded

Reference vehicle tested: ☐ Loaded with standard test loads ☐ Control weighing of loaded vehicle

Run No	Speed (km/h)	Location (middle /left /right)	Axle load							Axle-group load		Vehicle mass, VM
			Axle no. 1	Axle no. 2	Axle no. 3	Axle no. 4	Axle no. 5	Axle no. 6	Axle no. 7	Axle nos.	Axle nos.	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
Mean												
Corrected mean[1]												
Maximum deviation[2]												
MPD/MPE[3]												

☐ Passed ☐ Failed

Remarks:

Notes:

1 Corrected mean axle load or axle-group load: $\overline{\text{CorrAxle}_i \text{ or CorrGroup}_i} = \overline{\text{Axle}_i \text{ or Group}_i} \times \frac{VM_{ref}}{\overline{VM}}$

2 For axle load and axle-group load, the maximum deviation between corrected mean and the recorded loads from the test runs (A.9.3.2.2.2, paragraph 5). For the vehicle mass, the maximum deviation between the reference vehicle mass (VM_{ref}) and the recorded vehicle mass (VM) from the test runs (A.9.3.2.1).

3 No deviation in (2) above shall exceed the MPE in 2.2.1.2.2 (A.9.3.2.2.2 paragraph 6) for axle-load and axle-group, and the MPE in 2.2.1.1 (A.9.3.2.1) for vehicle mass.

4 See Annex A for sample example of completed test form.

7 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 remarks 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's description.

Description:

Remarks:

8 CHECKLIST

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 134-1 and shall not be considered as substitution for these requirements.

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 non-existent, also check the boxes to indicate that the tests are not applicable.

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

8 CHECKLIST (continued)

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

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring	Passed	Failed	Remarks
2		**METROLOGICAL REQUIREMENTS**			
2.7.1		**Temperature**			
		Minimum temperature range of 30 °C for the climatic environment			
2.7.2		**Power supply**			
		AC mains power			
		DC mains power			
		Battery power supply (DC)			
		12 V or 24 V road vehicle battery (DC) power			
2.8	**A.1.2**	**Units of measurement**			
		Kilogram (kg); tonne (t)			
2.9		**Scale interval for stationary load**			
		Instrument automatically disabled for weigh in motion if the scale interval for stationary load is not equal to *d*			
		Not readily accessible and only useable for static testing if the instrument is not verified for use as a non-automatic measuring instrument			
2.10		**Operating speed**			
		Operating speed interlock marked on the WIM instrument			
		Operating speed shall be indicated and/or printed only after the entire vehicle has been weighed in motion			
3	**A.1.3**	**TECHNICAL REQUIREMENTS**			
3.2		**Security of operation**			
3.2.1		**Fraudulent use:**			
		The instrument has no characteristics likely to facilitate its fraudulent use			
3.2.2		**Accidental maladjustment**			
		Effect of accidental breakdown or maladjustment is evident			
3.2.3		**Interlocks**			
		Prevent or indicate the operation of the instrument outside the specified working conditions			
		Interlocks provided for the following:			
		▪ minimum operating voltage (2.7.2)			
		▪ vehicle recognition (3.5.7)			
		▪ wheel position on the load receptor (3.5.8)			
		▪ direction of travel (3.5.8)			
		▪ range of operating speeds (3.5.9)			
3.2.4		**Use as a non-automatic weighing instrument**			
		Comply with the requirements of OIML R 76-1 for class III or IIII non-automatic weighing instruments			
		Equipped with enabling device for non-automatic operation that prevents automatic operation and in-motion measurement			

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring	Passed	Failed	Remarks
3.2.5		**Automatic operation**			
		Instrument designed to ensure operational compliance with the requirements of R 134-1 for at least one year of normal use			
		Any malfunction shall be automatically and clearly indicated			
		Documentation submitted by the manufacturer (A.1.1) includes a description of how this requirement is met			
3.3	**A.5.1**	**Zero setting devices**			
		Zero-setting and zero-tracking	Existent	Non-existent	
		Initial zero-setting	[ ]	[ ]	
		Automatic zero-setting	[ ]	[ ]	
		Semi-automatic zero-setting	[ ]	[ ]	
		Non-automatic zero-setting	[ ]	[ ]	
		Zero-tracking	[ ]	[ ]	
3.3.1	A.5.1.2	**Accuracy of zero-setting**			
		Sets zero to ±0.25 *d*			
		Overall effect of			
		Zero-setting = ... %			
		Initial zero-setting = ... %			
		Non-automatic or semi-automatic zero-setting inoperable during automatic operation			
		Semi-automatic or automatic zero-setting functions only in stable equilibrium			
3.3.2		**Zero-tracking operation**			
		When indication is at zero			
		Stability criteria are fulfilled			
		Corrections are not more than 0.5 *d*/second			
		Within a range of 4 % of Max around zero			
3.4	**A.5.2**	**Use as an integral control instrument**			
3.4.1		Capable of setting zero to ±0.25 *d* for a stationary load			
3.4.2		**Eccentric loading**			
		Different loading positions of the same load comply with the MPEs for the given load			
3.4.3		**Discrimination**			
		Change in indication for additional load of 1.4 scale interval for stationary load when placed or withdrawn gently from the load receptor			
3.4.4		**Repeatability**			
		Difference between several weighings of the same load is not greater than the absolute value of the MPE of the instrument for that load			
3.5	A.1.3	**Indicating, printing and storage devices**			
3.5.1		**Quality of indication**			
		Primary indications are reliable, easy and unambiguous under normal operating conditions			
		Overall inaccuracy of analog indication ≤ 0.2 *d*			
		Figures, units and designations forming the primary indications are of a size, shape and clarity for easy reading			

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring	Passed	Failed	Remarks
3.5.2		**Indication and printing for normal operation**			
		Minimum indication or printout from each normal weighing operation is dependent upon the application of the instrument			
		Scale interval of indications or printouts for the vehicle mass, the single-axle load or the axle-group load is scale interval, *d*			
		Results contain names or symbols of the units of mass			
		Minimum printouts for applications are as follows:			
		▪ For vehicle mass, minimum printout is the vehicle mass, the date and the time, and the operating speed with an associated clear warning message, if applicable. Axle or axle-group loads shall not be printed without an associated clear warning			
		▪ For single-axle loads, minimum printout is the single-axle loads, the vehicle mass, the date and the time, and the operating speed with an associated clear warning message, if applicable. The criteria for defining axle-groups need not be specified for the instrument. The axle-group loads shall not be printed without an associated clear warning			
		▪ For axle-group loads, minimum printout is the single-axle loads (when appropriate), the axle-group loads, the vehicle mass, the date and the time, and the operating speed with an associated clear warning message, if applicable. The criteria for defining axle-groups shall be specified for the instrument			
3.5.3		**Limits of indication**			
		No indication or printout of single-axle loads, axle-group loads or the vehicle mass when single-axle load (partial weighment) is less than Min or greater than Max + 9 *d*			
3.5.4		**Printing device** Present [ ] Not present [ ]			
		Printing clear and permanent for the intended use			
		Printed figures at least 2 mm high			
		Name or symbol of the measurement unit is printed either to the right of the value or above a column of values, or placed according to national regulations			
3.5.5		**Data storage** Present [ ] Not present [ ]			
		Data transfer and storage adequately protected against intentional and unintentional changes, and			
		Stored data contains all relevant information necessary to reconstruct an earlier measurement			
		For securing data storage, the following apply:			
		a) Software transmission and downloading process is secured in accordance with requirements in 3.8.2			
		b) Storage devices identification and security attributes shall be verified to ensure integrity and authenticity			
		c) Exchangeable storage media is sealed against removing in accordance with 3.8.1			
		d) Device-specific parameters are not stored on the standard storages of the universal computer but in separate hardware that can be sealed in accordance with 3.8.1			
		e) When storage capacity is exhausted, new data shall replace oldest data when both of the following conditions are met: ▪ data shall be deleted in the same order as the recording order and the rules established for the particular application are respected ▪ authority to delete the data has been provided by the user or owner of data to be deleted			

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring		Passed	Failed	Remarks
		f) National regulations may specify other requirements for securing stored data which provide sufficient integrity				
3.5.6	A.1.3	**Totalizing device:** Present [ ] Not present [ ]				
		Operation is automatic in conjunction with a vehicle recognition device, or				
		Semi-automatic following a manual command				
3.5.7		**Vehicle recognition device:** Present [ ] Not present [ ]				
		Detects the presence and the weighment of the vehicle in the weigh zone				
3.5.8		**Vehicle guide device:** Present [ ] Not present [ ]				
		No indication or printout if any of the wheels of a vehicle did not pass fully over the load receptor				
		If only one direction of travel is permitted:	an error message is given if a vehicle travels in the wrong direction, or			
			barriers or other traffic control prevent vehicles travelling in the wrong direction			
3.5.9		**Operating speed:**				
		No indication or printout if a vehicle travels over the load receptor at a speed outside the specified range of operating speeds without an associated clear warning				
3.6		**Software:** Present [ ] Not present [ ]				
		Legally relevant software must be present in such a form in the instrument that alteration of the software is not possible without breaking a seal, or any change in the software can be signalled automatically by means of an identification code				
		The software documentation provided with the instrument includes:				
		a) Description of the legally relevant software				
		b) Description of the accuracy of the measuring algorithms (e.g. programming modes)				
		c) Description of the user interface, menus and dialogues				
		d) The unambiguous software identification				
		e) Overview of the system hardware, e.g. topology block diagram, type of computer(s), source code for software functions, etc., if not described in the operating manual				
		f) Means of securing the software				
		g) Operating manual				
3.6.1		**The following means of securing legally relevant software apply:**				
		a) Access is allowed to authorized people, e.g. by means of a code (key-word) or of a special device (hard key, etc.); the code must be changeable				
		b) It is possible to memorize, access and display the information in the last intervention				
		c) The stored record shall include at least the ten most recent accesses or changes, the date, and a means of identifying the authorized person making the intervention (see (a) above)				
		d) Traceability of the last intervention shall be assured for at least two years, if it is not overwritten on the occasion of a further intervention				
		e) If it is possible to memorize more than one intervention, and if deletion of a previous intervention must occur to permit a new record, the oldest record shall be deleted				
		f) Downloading of legally relevant software shall be through appropriate protective interface (T.2.9) connected to the instrument				

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring	Passed	Failed	Remarks
		g) The software shall be assigned with appropriate software identification (T.2.6.4). This software identification shall be adapted in the case of every software change that may affect the functions and accuracy of the instrument			
		h) Functions that are performed or initiated via a software interface shall meet the relevant requirements and conditions of 4.3.5			
3.7		**Installation:**			
		The WIM instrument is installed so as to minimize any adverse effects of the installation environment			
		Where particular details of installation have an effect on the weighing operation (e.g. site levels, length of aprons), these details shall be recorded in the test report			
3.7.2		**Drainage:**			
		Provision for drainage to ensure that no portion of the instrument becomes submerged or partially submerged in water or other liquid			
3.7.3	A.1.3	**Heating:**			
		Provision for heating to ensure that the modules operate within the operating conditions specified by the manufacturer			
3.8	**A.2.3**	**Securing of components, interfaces and preset controls**			
3.8.1		General			
		Components, interfaces, software devices and preset controls that are not intended to be adjusted or removed by the user are:			
		▪ Fitted with a securing means, or			
		▪ Enclosed			
		If enclosed, the enclosure is sealed			
		National prescribed types of securing are provided			
		Seals are easily accessible			
		Securing provided on all parts of the instrument which cannot be materially protected in any other way against operations liable to affect the measurement accuracy			
		Any device for changing the parameters of the measurement results, particularly for correction and calibration, is sealed			
3.8.2		**Means of securing:**			
		a) Access shall be restricted to authorized people, e.g. by means of a code (key-word) or of a special device (hard key, etc.); the code must be changeable			
		b) Software functions are secured against intentional, unintentional and accidental changes in accordance with the appropriate requirements of 3.6			
		c) Transmission of legally relevant data via interfaces is secured against intentional, unintentional and accidental changes in accordance with the appropriate requirements of 4.3.5.2			
		d) The securing possibilities available in an instrument shall be such that separate securing of the settings is possible			
		e) Stored data shall be secured against intentional, unintentional and accidental changes in accordance with the appropriate requirements of 3.5.5			
3.9	**A.2.2**	**Descriptive markings, variable according to national regulations**			
3.9.1		**Markings shown in full:**			
		▪ Identification mark of the manufacturer			
		▪ Identification mark of the importer (if applicable)			

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring	Passed	Failed	Remarks
		▪ Type designation of the instrument			
		▪ Serial number of the instrument (on each load receptor, if applicable)			
		▪ Not to be used to determine the mass of vehicles carrying liquid products (if applicable)			
		▪ Maximum transit speed: km/h			
		▪ Direction of weighing (if applicable)			
		▪ Scale interval for stationary load (if applicable): kg or t			
		▪ Electrical power supply voltage: V			
		▪ Electrical power supply frequency: Hz			
		▪ Temperature range (when not –10 °C to +40 °C): °C			
		▪ Software identification (if applicable)			
3.9.2	A.2.2	**Markings shown in code:**			
		▪ Accuracy class vehicle mass: 0.2, 0.5, 1, 2, 5 or 10			
		▪ Accuracy class single-axle (where applicable): A, B, C, D, E or F			
		▪ Accuracy class axle-group (where applicable): A, B, C, D, E or F			
		▪ Maximum capacity: Max = kg or t			
		▪ Minimum capacity: Min = kg or t			
		▪ Scale interval: d = kg or t			
		▪ Maximum operating speed: v_{max} = km/h			
		▪ Minimum operating speed: v_{min} = km/h			
		▪ Maximum number of axles per vehicle (where applicable): n_{max} =			
		▪ Type approval sign in accordance with national regulations			
3.9.3		**Supplementary markings:**			
		Are required	enter in remarks		
3.9.4		**Presentation of descriptive markings:**			
		Indelible			
		Size, shape and clarity that allows easy reading			
		Grouped together in a clearly visible place			
		Shown in an official language in accordance with national regulations			
		Plate or sticker bearing markings fixed permanently near the indicating or non-removable part of the instrument			
		It is possible to seal the plate bearing the markings, unless it cannot be removed without being destroyed			
		Alternatively, descriptive markings simultaneously displayed by a software solution either permanently or on manual command			
		▪ At least Max, Min and d shall be displayed as long as the instrument is switched on			
		▪ Other markings may be shown on manual command			
		▪ It is described in the type approval Certificate			
		In the case of software solution, means shall be provided for any access to reprogramming of the markings to be automatically and non-erasably recorded and made evident by an audit trail			

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring	Passed	Failed	Remarks
		Software controlled display markings need not be repeated on the data plate, if they are shown on or indicated near the display of the measurement result, with the exception of the following markings which shall be shown on the data plate: ▪ type and class designation of the instrument ▪ name or identification mark of the manufacturer ▪ type approval number ▪ voltage supply ▪ voltage supply frequency ▪ pneumatic / hydraulic pressure, (if applicable)			
3.10	A.2.3	**Verification marks:**			
3.10.1		**Position:**			
		The part where the verification marks are located cannot be removed from the instrument without damaging the marks			
		Allows easy application of the marks without changing the metrological qualities of the instrument			
		Visible when the instrument is in service			
3.10.2		**Mounting:**			
		Verification mark support to ensure conservation of the marks			
		Support is of the correct construction			
4		**REQUIREMENTS FOR ELECTRONIC INSTRUMENTS**			
4.3	A.1.4	**Functional requirements:**			
4.3.1		**Acting upon a significant fault:**			
		By verifying the compliance with documents or by simulating faults check that:			
		Either the instrument is made inoperative automatically, or			
		Visual or audible indication is provided automatically and continues until the user takes action or the fault disappears			
4.3.2	A.5.4	**Switch-on procedure:**			
		Relevant signs of indicator are active and non-active for sufficient time to be checked by operator			
4.3.4	A.6.1	**Warm-up time:**			
		No indication or transmission of weighing results			
		Automatic operation is inhibited			
4.3.5	A.7.1.2.3	**Interfaces:**			
		When an interface is used:			
		▪ instrument continues to function correctly, and			
		▪ metrological functions and data are not influenced by peripheral devices or other connected instrument or disturbance			
4.3.5.1		Interface documentation submitted with instrument includes:			
		a) A list of all commands (e.g. menu items)			
		b) Description of the software interface			
		c) A list of all the commands together			
		d) Brief description of their meaning and their effect on the functions and data of the instrument			
4.3.5.2		Securing of interfaces			
		Interface through which the metrological functions cannot be performed or initiated, need not be secured			

Requirement from R 134-1	Test procedure	Automatic instruments for weighing road vehicles in motion and axle load measuring	Passed	Failed	Remarks
		Other interfaces shall be secured as follows:			
		a) Data is protected (e.g. with a protective interface as in T.2.9) against accidental or deliberate interference during the transfer			
		b) All functions in the software interface shall comply with the requirements for securing software in 3.8.2			
		c) All functions in the hardware interface shall comply with the requirements for securing hardware in 3.8			
		d) Metrologically relevant parts of the target instrument shall be included in the initial verification			
		e) Easily possible to verify the authenticity and integrity of data transmitted to and from the instrument			
		f) Functions performed or initiated by other connected instruments through the interfaces shall meet the appropriate requirements of R 134-1			
		Other instruments required by national regulation to be connected to the interfaces of an instrument shall be secured to automatically inhibit the operation of the instrument for reasons of the non-presence or improper functioning of the required device			
4.3.6		**Functionality below the minimum operating voltage:**			
		Instrument operating from the following voltage supply shall, whenever the voltage drops below the minimum operating voltage (2.7.2), either continue to function correctly or show an error message or is automatically put out of service:			
		▪ DC mains voltage supply			
		▪ Battery voltage supply (DC)			
		▪ 12 V or 24 V road vehicle battery voltage supply			
5		**METROLOGICAL CONTROLS**			
5.1.1	A.1.1	**Type approval 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 (if applicable), explaining the construction and operation, and			
		▪ Any document or other evidence that the design and construction of the instrument complies with the requirements of the Recommendation			
5.1.3		**Type examination of:**			
		Documents			
		Functional checks			
		Test reports from other authorities			

Use this space to detail remarks from the Checklist:

Annex A Examples of completed test forms

6.3.1 In-motion tests with the two-axle rigid reference vehicle (A.9.3.2.2.1)

			At start	At end	
Application no.:	1226	Temp.:	20	21	°C
Type designation:	MOT	Rel. h.:			%
Observer:	John Brown	Date:	2009-09-21	2009-09-21	yyyy-mm-dd
Scale interval, *d*:	10 kg	Time:	14:45:00	15:45:00	hh:mm:ss
Resolution during test: (smaller than *d*)	5 kg				

Accuracy class: Total mass: 0.5 Axle: C

(All mass values in kg)

Reference vehicle type identification: 2 axle rigid

Reference vehicle mass (VM_{ref}): See note below: 40 005 kg ☐ Unloaded ✓ Loaded

Reference vehicle tested: ☐ Loaded with standard test loads ☐ Control weighing of loaded vehicle

Summary of site configuration:

Operating speed: Maximum: 10 Minimum: 1 Site: 5

Direction of weighing (if applicable): ☐ Single ✓ Dual

Use this space to record relevant information regarding the installation, e.g. apron construction, length, etc.:

6.3.1 In-motion tests with the two-axle rigid reference vehicle (continued)

Test number: 1 (All mass values in kg)

Reference vehicle type identification: 2 axle rigid

Reference vehicle mass (VM_{ref}): See note below: 40 005 kg ☐ Unloaded ☑ Loaded

Reference vehicle tested: ☐ Loaded with standard test loads ☑ Control weighing of loaded vehicle

Run no.	Speed (km/h)	Location (middle / left / right)	Axle load		Vehicle mass (VM)	Remarks
			Axle no. 1	Axle no. 2		
1	5	Middle	19 995	20 005	40 000	
2	5	Middle	19 995	20 000	39 995	
3	5	Middle	19 990	20 005	39 995	
4	5	Left	20 005	20 050	40 055	
5	5	Right	20 020	20 050	40 070	
6	5	Middle	19 995	20 010	40 005	
7	5	Left	19 990	20 050	40 040	
8	5	Right	20 000	19 995	39 995	
9	5					
10	5					
Mean			19 999	20 020	40 019	
Corrected mean [1]			19 992	20 013		
Maximum deviation[2]			–28	–37	–65	
MPE[3]			150	150	100	

☒ Passed ☐ Failed

Remarks:

Notes:

1 Conventional true value of the static reference single-axle load (corrected mean single-axle load):

$$\overline{\text{CorrAxle}_i} = \overline{\text{Axle}_i} \times \frac{VM_{ref}}{\overline{VM}} \quad \text{(A.9.3.1.3, paragraph 3)}$$

2 For axle load, maximum deviation between the corrected mean single-axle load and the indicated axle loads from the test runs (A.9.3.2.2.2, par 5). For vehicle mass, maximum deviation between the reference vehicle mass (VM_{ref}) and the indicated vehicle mass (VM) from the test runs (5.1.3.2.1, A.9.3.2.1).

3 No maximum deviation in (2) above shall exceed the MPE in 2.2.1.2.1 (A.9.3.2.2.1) for axle-load, and the MPE in 2.2.1.1 (A.9.3.2.1) for vehicle mass.

4 VM_{ref} is the conventional true value of the two-axle reference vehicle mass determined by full-draught weighing (A.9.3.1.2).

6.3.2 In-motion test with all other reference vehicle types (A.9.3.2.2.2)

			At start	At end	
Application no.:	124	Temp.:	20	21	°C
Type designation:	XYZ	Rel. h.:			%
Observer:	John Brown	Date:	2009-09-24	2009-09-24	yyyy-mm-dd
Scale interval, *d*:	10 kg	Time:	10:00:00	11:00:00	hh:mm:ss
Resolution during test: (smaller than *d*)	5 kg				

Accuracy class:	Total:	1	Axle:	B	Group:	C

Summary of site configuration:

Maximum operating speed:	9 km/h	Site operating speed:	5 km/h
Minimum operating speed:	1 km/h	Maximum number of axles (n):	6

Direction of weighing (if applicable): ✓ Single ☐ Dual

Use this space to record relevant information regarding the installation, e.g. apron construction, length, etc.:

6.3.2 In-motion test with all other reference vehicle types (continued)

Test number: 1 (All mass values in kg)

Reference vehicle type identification: 6 axles / 2 axle groups

Reference vehicle mass (VM_{ref}): See note below: 41 950 kg ☐ Unloaded ☑ Loaded

Reference vehicle tested: ☐ Loaded with standard test loads ☑ Control weighing of loaded vehicle

Run No	Speed (km/h)	Location (middle /left /right)	Axle load							Axle-group load		Vehicle mass, VM
			Axle no. 1	Axle no. 2	Axle no. 3	Axle no. 4	Axle no. 5	Axle no. 6	Axle no. 7	Axle nos.	Axle nos.	
1	5	Middle	7 040	7 015	7 010	7 000	6 995	7 035		14 025	21 030	42 095
2	5	Middle	6 995	7 050	6 990	6 980	7 000	7 005		14 040	20 985	42 020
3	5	Middle	7 015	6 995	6 995	7 010	6 900	7 050		13 950	20 960	41 925
4	5	Left	7 025	7 010	7 010	7 005	7 010	7 010		14 020	21 025	42 070
5	5	Right	7 000	7 020	6 970	7 020	7 020	7 020		13 990	21 060	42 050
6	5	Middle	6 995	7 050	6 960	7 040	7 000	6 990		14 010	21 030	42 035
7	5	Left	7 025	7 010	6 970	7 005	6 970	7 010		13 980	20 985	41 990
8	5	Right	7 015	6 955	6 995	7 010	6 900	7 000		13 950	20 910	41 875
9	5											
10	5											
Mean			7 014	7 008	6 988	7 009	6 974	7 015		13 996	20 998	42 008
Corrected mean[1]			7 004	6 999	6 978	6 999	6 965	7 005		13 976	20 969	
Maximum deviation[2]			36	51	32	41	65	45		64	91	–145
MPD/MPE[3]			±70	±70	±70	±70	±70	±70		210	315	210

☒ Passed ☐ Failed

Remarks:

Notes:

1 Corrected mean axle load or axle-group load: $\overline{\text{CorrAxle}_i \text{ or CorrGroup}_i} = \overline{\text{Axle}_i \text{ or Group}_i} \times \frac{VM_{ref}}{\overline{VM}}$

2 For axle load and axle-group load, the maximum deviation between the corrected mean and the recorded loads from the test runs (A.9.3.2.2.2, paragraph 5). For the vehicle mass, the maximum deviation between the reference vehicle mass (VM_{ref}) and the recorded vehicle mass (VM) from the test runs (A.9.3.2.1).

3 No deviation in (2) above shall exceed the MPE in 2.2.1.2.2 (A.9.3.2.2.2 paragraph 6) for axle-load and axle-group, and the MPE in 2.2.1.1 (A.9.3.2.1) for vehicle mass.

4 See Annex A for a sample example of a completed test form.

6.3.2 In-motion test with all other reference vehicle types (continued)

Test number: 1 (All mass values in kg)

Reference vehicle type identification: 6 axles / 2 axle groups

Reference vehicle mass (VM_{ref}): See note below: 41 950 kg ☐ Unloaded ☑ Loaded

Reference vehicle tested: ☐ Loaded with standard test loads ☑ Control weighing of loaded vehicle

Run No	Speed (km/h)	Location (middle /left /right)	Axle load							Axle-group load		Vehicle mass, VM
			Axle no. 1	Axle no. 2	Axle no. 3	Axle no. 4	Axle no. 5	Axle no. 6	Axle no. 7	Axle nos.	Axle nos.	
1	5	Middle	7 040	7 015	7 010	7 000	6 995	7 035		14 025	21 030	42 095
2	5	Middle	6 995	7 050	6 990	6 980	7 000	7 005		14 040	20 985	42 020
3	5	Middle	7 015	6 995	6 995	7 010	6 900	7 050		13 950	20 960	41 925
4	5	Left	7 025	7 010	7 010	7 005	7 010	7 010		14 020	21 025	42 070
5	5	Right	7 000	7 020	6 970	7 020	7 020	7 020		13 990	21 060	42 050
6	5	Middle	6 995	7 050	6 960	7 040	7 000	6 990		14 010	21 030	42 035
7	5	Left	7 025	7 010	6 970	7 005	6 970	7 010		13 980	20 985	41 990
8	5	Right	7 015	6 955	6 995	7 010	6 900	7 000		13 950	20 910	41 875
9	5											
10	5											
Mean			7 014	7 008	6 988	7 009	6 974	7 015		13 996	20 998	42 008
Corrected mean[1]			7 004	6 999	6 978	6 999	6 965	7 005		13 976	20 969	
Maximum deviation[2]			36	51	32	41	65	45		64	91	–145
MPD/MPE[3]			±70	±70	±70	±70	±70	±70		210	315	210

☒ Passed ☐ Failed

Remarks:

Notes:

1 Corrected mean axle load or axle-group load: $\overline{\text{CorrAxle}_i \text{ or CorrGroup}_i} = \overline{\text{Axle}_i \text{ or Group}_i} \times \frac{VM_{ref}}{\overline{VM}}$

2 For axle load and axle-group load, the maximum deviation between the corrected mean and the recorded loads from the test runs (A.9.3.2.2.2, paragraph 5). For the vehicle mass, the maximum deviation between the reference vehicle mass (VM_{ref}) and the recorded vehicle mass (VM) from the test runs (A.9.3.2.1).

3 No deviation in (2) above shall exceed the MPE in 2.2.1.2.2 (A.9.3.2.2.2 paragraph 6) for axle-load and axle-group, and the MPE in 2.2.1.1 (A.9.3.2.1) for vehicle mass.

4 See Annex A for a sample example of a completed test form.