

ORGANISATION INTERNATIONALE DE MÉTROLOGIE LÉGALE



INTERNATIONAL RECOMMENDATION

Automatic rail-weighbridges Part 2: Test report format

Ponts-bascules ferroviaires à fonctionnement automatique
Partie 2: Format du rapport d'essai

OIML R 106-2
Edition 1997 (E)

CONTENTS

Foreword	3
Introduction	4
Identification of the instrument	5
General information concerning the pattern	7
Checklist	10
Summary of the checklist	10
Checklist	12
Test report	23
Test equipment used for pattern evaluation	23
Configuration for test	24
Explanatory notes	25
Summary of test report	26
1 Checking of zero	27
1.1 Range of semi-automatic zero-setting	27
1.2 Range of automatic zero-setting	27
2 Nonautomatic tests of the control instrument	28
2.1 Accuracy of zero-setting	28
2.2 Weighing performance	29
2.3 Discrimination	30
3 Warm-up time	31
4 Influence factors	32
4.1 Static temperatures	33
4.2 Damp heat, steady state	37
4.3 Mains power supply voltage variation (AC)	40
4.4 Battery power supply voltage variation (DC)	41
5 Disturbances	42
5.1 Voltage dips and short interruptions	42
5.2 Electrical fast transients/burst immunity	43
5.3 Electrostatic discharge	45
5.4 Electromagnetic susceptibility	48
6 Span stability	50
7 In-situ tests	56
7.1 Eccentricity (integral control instrument)	56
7.2 Rail alignment calibration	57
7.3 Verification standards (reference wagon weighing)	58
7.4 In-motion weighing (coupled, uncoupled or train)	62

FOREWORD

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

The two main categories of OIML publications are:

- 1) **International Recommendations (OIML R)**, which are model regulations that establish the metrological characteristics required of certain measuring instruments and which specify methods and equipment for checking their conformity; the OIML Member States shall implement these Recommendations to the greatest possible extent;
- 2) **International Documents (OIML D)**, which are informative in nature and intended to improve the work of the metrological services.

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

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

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

OIML publications may be obtained from the Organization's headquarters:

Bureau International de Métrologie Légale
11, rue Turgot - 75009 Paris - France
Telephone: 33 (0)1 48 78 12 82 and 42 85 27 11
Fax: 33 (0)1 42 82 17 27
E-mail: biml@oiml.org

*
* *

This publication - reference OIML R 106-2, edition 1997 (E) - was developed by the OIML subcommittee TC 9/SC 2 *Automatic weighing instruments*. It was sanctioned by the International Conference of Legal Metrology in 1996.

INTRODUCTION

The *Test report format* aims at presenting, in a standardized format, the results of the various tests and examinations to which a pattern of an automatic rail-weighbridge shall be submitted with a view to its approval.

The *Test report format* consists of two parts, the *Checklist* and the *Test report*.

- The *Checklist* is a summary of the examinations carried out on the instrument. It includes the conclusions of the results of the test performed, and experimental or visual checks based on the requirements of OIML R 106-1. The words or condensed sentences aim at reminding the examiner of the requirements in OIML R 106-1 without reproducing them.
- The *Test report* is a record of the results of the tests carried out on the instrument. The test report forms have been produced based on the tests detailed in OIML R 106-1.

The “information concerning the test equipment used for pattern evaluation” shall cover all test equipment which has been used in determining the test results given in a report. The information may be a short list containing essential data (name, type, reference number for the purpose of traceability). For example:

- Verification standards (accuracy, or accuracy class, and no.);
- Simulator for testing of modules (name, type, traceability and no.);
- Climatic test and static temperature chamber (name, type and no.);
- Electrical tests, bursts (name of the instrument, type and no.);
- Description of the procedure of field calibration for the test of electromagnetic susceptibility.

All metrology services or laboratories evaluating patterns of automatic rail-weighbridges according to OIML R 106-1 or to national or regional regulations based on OIML R 106-1 are strongly advised to use this *Test report format*, directly or after translation into a language other than English or French. Its direct use in English or in French, or in both languages, is even more strongly recommended whenever test results may be transmitted by the country performing these tests to the approving authorities of another country, under bi- or multi-lateral cooperation agreements. In the framework of the *OIML Certificate System for measuring instruments*, use of the *Test report format* is mandatory.

Note concerning page numbering in this publication

In addition to the sequential numbering "R 106-2 page .." at the bottom of each page, a space has been left at the top of each page (starting on page 5) 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. For a given report, it is advisable to complete the sequential numbering of each page by indicating the total number of pages in the report.

IDENTIFICATION OF THE INSTRUMENT

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

Manufacturing documentation

(Record as necessary to identify the equipment under test)

System or module name	Drawing number or software reference	Issue level	Serial number (if different from above)
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Simulator documentation

System or module name	Drawing number or software reference	Issue level
.....
.....
.....
.....

Simulator function (summary)

Simulator description and drawings, block diagram etc. should be attached to the report if available

IDENTIFICATION OF THE INSTRUMENT (continued)

Application No:

Report date:

Pattern designation:

Manufacturer:

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

GENERAL INFORMATION CONCERNING THE PATTERN

Application No:

Pattern designation:

Manufacturer:

Applicant:

Instrument category:

Full draught weighbridge Partial weighbridge

Testing on: Complete instrument Module (*)

Accuracy class: 0.2 0.5 1 2

Minimum capacity = Minimum wagon weight = Minimum operating speed =

Maximum capacity = Maximum wagon weight = Maximum operating speed =

T = + T = - d =

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

Zero-setting device:

Semi-automatic

Automatic

Initial zero-setting

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

(*) The test equipment (simulator or part of a complete instrument) connected to the module has to be defined in the test form(s) used

(**) The voltage U_{nom} shall be as defined in IEC 1000-4-11 (1994) section 5

GENERAL INFORMATION CONCERNING THE PATTERN (continued)

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

Instrument submitted:

Identification No:

Connected equipment:

Interfaces (number, nature):

Load cell:

Manufacturer:

OIML R 60 certificate of conformity. Please tick and if "Yes" supply certificate number.

Yes	<input type="checkbox"/>
-----	--------------------------

Certificate number	<input type="text"/>
--------------------	----------------------

No	<input type="checkbox"/>
----	--------------------------

Type:

Capacity:

Number:

Classification symbol:

Remarks: see following page

Date of report:

Evaluation period:

Observer:

GENERAL INFORMATION CONCERNING THE PATTERN (continued)

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

CHECKLIST

For each test, the “SUMMARY OF THE CHECKLIST” and the "CHECKLIST" shall be completed according to this example:

- when the instrument has passed the test:
- when the instrument has failed the test:
- when the test is not applicable:

Passed	Failed
X	
	X
/	/

SUMMARY OF THE CHECKLIST

Requirement	Passed	Failed	Remarks
Metrological requirements R 106-1 clause 2			
Technical requirements R 106-1 clause 3			
Requirements for electronic instruments R 106-1 clause 4			
Metrological controls R 106-1 clause 5			
On site tests methods R 106-1 clause 6			
Test report			
OVERALL RESULT			

Report page

SUMMARY OF THE CHECKLIST (continued)

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

CHECKLIST

Application No:

Pattern designation:

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
2	Metrological requirements				
2.1	Accuracy classes		Note		
2.2	Maximum permissible errors				
2.2.1		Weighing-in-motion mpe as specified in Table 1			
2.2.2		Static weighing mpe as specified in Table 2			
2.3	Scale interval				
	Observe	All indicating and printing devices shall have same scale interval	Confirm		
	Observe	Relationship between scale interval and the max wagon weight divided by scale interval as Table 3	Confirm		
2.4	Minimum capacity				
	Observe	Not less than 1 t and not greater than minimum wagon weight divided by number of partial weighings	Confirm		
2.5	Minimum wagon weight				
		Not less than 50 d			
2.6	Single axle or bogie weights				
		Indicated or printed only with a warning			
2.7	Agreement between indicating and printing devices difference				
	Observe	For digital devices, zero	Confirm		
		For analogue devices, not greater than absolute value of mpe for weighing-in-motion	Confirm		
2.8	Weighing test methods				
2.8.1	A.11.4	Static weighing:			
		Meets requirements of R 106-1, 2.8.3.2 and 2.8.1.1 to 2.8.1.6 inclusive	Confirm		
2.8.1.1		Multiple load receptors			
	Observe	Tested by static weighing method independently and Tested by static weighing method in combination	Confirm		
2.8.1.2	A.6.5.1	Zero-setting			
		To within ± 0.25 of scale interval for stationary load			
2.8.1.3	A.11.5	Eccentric loading			
		Within mpe for a given load			

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
2.8.1.4	Observe	Verification standards			
		Error of standard weights not greater 1/3 mpe for the load as specified in Table 2			
2.8.1.5	A.6.5.2.2	Test loads			
		Errors determined for test loads of:			
2.8.1.5.1	Observe	Zero	Confirm		
		Minimum capacity	Confirm		
		Maximum capacity	Confirm		
		At or near a load where the mpe changes	Confirm		
2.8.1.5.2	Observe	Distribution of test loads			
		Except eccentricity weights or masses distributed evenly	Confirm		
2.8.1.5.3	A.11.5	Eccentricity tests			
		Meets requirements with test load = 0.5 Max (rounded up to the next 1 tonne increment)			
2.8.1.6	A.6.5.3	Discrimination tests			
		Additional load of 1.4 d shall change the indication			
2.8.2	Observe	Weighing-in-motion			
2.8.2.1		Wagon weighing mpe shall be whichever is the greatest of:	Note		
		Value in R 106-1, Table 1, rounded to the nearest scale interval			
		Value in R 106-1, Table 1, rounded to the nearest scale interval for the weight of a single wagon equal to 35 % of maximum wagon weight			
		1 d			
2.8.2.2	Observe	Train weighing			
		Mpe shall be one of the following values, whichever is the greatest of:	Note		
		Value in R 106-1, Table 1, rounded to nearest scale interval			
		Value in R 106-1, Table 1, for the weight of a single wagon equal to 35 % of the maximum wagon weight, multiplied by the number of reference wagons in the train and rounded to the nearest scale interval			
		1 d for each wagon but not greater than 10 d			
2.8.3	Verification standards				
2.8.3.1		Separate control instrument: error shall not be greater than:	Confirm		
		1/3 mpe for in-motion weighing if the control instrument is verified immediately prior to the in-motion tests			
		1/5 mpe if verified at any other time			
		Instrument for partial two-axle weighing may be control instrument if alignment calibration as R 106-1, A.11.2 or Annex B has been carried out	Note use		

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
2.8.3.2		Integral control instrument: has appropriate scale interval and	Confirm		
		Complies with requirements in R 106-1, 2.8.1 and 2.8.3.1	Confirm		
		Instrument for partial two-axle weighing may be control instrument if alignment calibration as R 106-1, A.11.2 or Annex B has been carried out	Note use		
2.9	A.8	Influence quantities			
2.9.1	A.8.1	Static temperatures			
2.9.2	A.8.3	Mains power supply voltage variation (AC)			
2.9.3	A.8.4	Battery power supply voltage variation (DC)			
2.10		Conditions of use			
2.10.1	Observe	Use as a nonautomatic weighing instrument: shall meet requirements of OIML R 76-1 for Class III or Class IIII	Note Confirm		
2.10.2		Scale interval for stationary load	Note		
	Observe	If scale interval for stationary load is not equal to scale interval (d) for weighing-in-motion it shall be automatically out of service for weighing-in-motion	Confirm		
		If instrument not verified as nonautomatic scale interval for stationary load shall not be readily accessible and only used for static testing	Note		
3		Technical requirements			
3.1		Composition			
	Observe	Instrument shall include:			
		One or more load receptors			
		Aprons			
		Vehicle-type identification devices			
		Indicating device			
		Printer			
		Control unit			
3.2		Suitability for use			
	Observe	Instruments shall be designed to suit the:	Confirm		
		Vehicles			
		Site			
		Method of operation			
		Instruments constructed for partial weighing not used to weigh liquid or other unstable loads unless compensated for			

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
3.3		Security of operation			
3.3.1	Observe	Accidental maladjustment			
		Constructed such that accidental maladjustment likely to disturb metrological performance cannot normally take place without effect being easily detected	Confirm		
3.3.2	Observe	Interlocks			
		Prevent use of control device that may alter weighing operation	Confirm		
3.3.3	Observe	Uncoupled wagon weighing			
		Instruments recognize and indicate:			
		(a) passage of 2 or more coupled wagons	Confirm		
		(b) passage of 2 or more uncoupled wagons so close as to cause malfunction or errors exceeding mpe	Confirm		
3.3.4	Observe	Use as a nonautomatic weighing instrument			
		Complies with OIML R 76-1 for Class III or Class IIII	Note		
		Equipped with a device that prevents automatic operation and in-motion weighing	Confirm		
3.3.5	A.6.2 Observe	Zero-setting device			
		Is equipped for each load receptor with:			
		a semi-automatic zero-setting device or	Note type		
		an automatic zero-setting device	Confirm		
		which operates only when instrument is in stable equilibrium and	Confirm		
		when rate of correction is no more than 0.5 d/s and	Confirm		
		the range shall not exceed 4 % Max	Confirm		
3.4		Indicating and printing devices			
3.4.1	Observe	self indicating and reliable	Confirm		
		simple	Confirm		
		unambiguous	Confirm		
		simple juxtaposition	Confirm		
		name or symbol of appropriate unit of mass	Confirm		
3.4.2	Observe	Printing			
		At least printout for each wagon weight in the case of wagon weighing, or total train weight in the case of train weighing	Confirm		
3.4.3	Observe	Weighing range			
		Instrument shall not indicate or print any weighing result less than Min or greater than Max + 9 d	Confirm		
3.4.4	A.11.6.2 A.11.6.4	Operating speed			
		Printer shall not print weight of a wagon outside operating speeds: appropriate indication appears on printout in this case	Confirm Confirm		

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
3.4.5	A.11.6.2 A.11.6.4	Rollback			
		In case of rollback, either no indication/printout or indication/printout accompanied by clear indication that weight result may not be correct	Confirm		
3.5		Installation			
3.5.1	Observe	Ease of static testing			
		Accessible to vehicles for moving test weight if used as control instrument	Confirm		
3.5.2	Observe	Drainage			
		Provision so that no portion of the instrument becomes submerged or partially submerged in water or any other liquid	Confirm		
3.6	A.3.2	Descriptive markings			
3.6.1	Observe	Markings shown in full:			
		identification mark of the manufacturer	Confirm		
		identification mark of the importer (if applicable)	Confirm		
		designation of the instrument	Confirm		
		serial number of the instrument (on each load receptor, if applicable)	Confirm		
		weighing method	Confirm		
		maximum wagon weight - kg or t	Confirm		
		minimum wagon weight - kg or t	Confirm		
		not to be used to weigh liquid products (if applicable)	Confirm		
		full draught or number of partial weighings per wagon	Confirm		
		maximum transit speed - km/h	Confirm		
		direction of weighing (if applicable)	Confirm		
		wagons pushed/pulled (whichever is applicable)	Confirm		
		scale interval for stationary load (if applicable) - kg or t	Confirm		
		electric power supply voltage - V	Confirm		
electric power supply frequency - Hz	Confirm				
3.6.2.1	Observe	Markings shown in code for all instruments			
		pattern approval sign in accordance with national requirements	Confirm		
		indication of the accuracy class (for each weighing method, if applicable) 0.2 0.5 1 or 2	Confirm		
		maximum capacity Max - kg or t	Confirm		
		minimum capacity Min - kg or t	Confirm		
		scale interval d - kg or t	Confirm		
		maximum operating speed v_{max} - km/h	Confirm		
minimum operating speed v_{min} - km/h	Confirm				

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
3.6.2.2	Observe	Markings shown in code for coupled wagon and train weighing:			
		maximum number of wagons per train - n_{max}	Confirm		
		minimum number of wagons per train - n_{min}	Confirm		
3.6.3	Observe	Supplementary markings			
		As required	Confirm		
3.6.4	Observe	Other markings			
		Designation of liquid(s), if applicable	Confirm		
3.6.5	Observe	Presentation of markings			
		Indelible	Confirm		
		Easily readable	Confirm		
		Grouped together in a clearly visible place	Confirm		
		Possible to seal the plate unless removal will result in destruction	Confirm		
3.7		Verification marks			
3.7.1	Observe	Position			
		Part on which the marks are located cannot be removed without damaging them	Confirm		
		Easy application without changing metrological characteristics	Confirm		
		Visible	Confirm		
3.7.2	Observe	Mounting			
		Which ensures conservation of the mark	Confirm		
		If adhesive transfer, a space shall be provided	Confirm		
4		Requirements for electronic instruments			
4.1		General requirements			
4.1.1		Rated operating conditions			
		Errors do not exceed mpe			
4.1.2	A.9	Disturbances			
	A.9.1	Voltage dips and short interruptions			
	A.9.2	Electrical fast transients/burst immunity			
	A.9.3	Electrostatic discharges			
	A.9.4	Electromagnetic susceptibility			
		Manufactured and designed so that when exposed to disturbances either:			
		significant faults do not occur, or	Confirm		
		significant faults are detected and acted upon (fault equal to or less than 1 d allowed)	Confirm		

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
4.1.3	Observe	Requirements in 4.1.1 and 4.1.2 are met durably	Confirm		
4.1.4	Observe	Evaluation for compliance. Pattern complies with requirements of 4.1.1, 4.1.2 and 4.1.3 (passes examination and tests in Annex A)			
4.2	Application				
4.2.1	Observe	Requirements in R 106-1, 4.1.2 may be applied separately to the following:			
		(a) each individual cause of significant fault, and/or			
		(b) each part of the electronic instrument			
4.2.2		Choice of (a) or (b) above left to manufacturer	Note above		
4.3	Functional requirements				
4.3.1	Observe	Acting on a significant fault			
		Visual or audible signal until user takes action or fault disappears			
		Totalized load information is retained			
4.3.2		Switch-on procedure			
		All relevant signs of the indicator in active and nonactive states can be easily observed by operator			
4.3.3	See 2.9	Influence factors			
		Complies with R 106-1, 2.9	Confirm		
		Maintains metrological and technical characteristics at a relative humidity of 85 % at upper limit of temperature range			
4.3.4	Observe	Disturbances			
		Difference between indications with and without the disturbance, does not exceed 1 d			
		Instrument detects and acts upon significant fault			
4.3.5	A.7.1	Warm-up time			
		No indication or transmission of weighing result			
		Automatic operation is inhibited			
4.3.6		Interface			
		Does not affect metrological functions			
4.3.7		Mains power supply			
		Maintains information for 24 hours after power failure	Confirm		
		Emergency power supply switch-over does not cause significant fault	Note use		
4.3.8	A.8.4	Battery power supply			
		Functions correctly during a voltage drop, or			
		is automatically put out of service during a voltage drop			

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
4.4		Examination and tests			
4.4.1		Examinations			
		General appraisal of design and construction			
4.4.2	Observe	Performance tests: operates as specified in Annex A			
4.4.3	A.10	Span stability			
		When subjected to span stability tests in A.10:			
		The max allowable variation in errors of indication not to exceed half absolute value of mpe in 2.2.2 Table 2 for test load applied to any of n measurements			
		Where difference of the results indicates a trend more than half allowed above, tests shall continue until trend comes to rest or reverses or until error exceeds max allowable variation			
5		Metrological controls			
5.1	A.5.1	Pattern evaluation			
5.1.1	Observe	Documentation provides following:			
		metrological characteristics	Confirm		
		specifications for the instrument	Confirm		
		functional description of components	Confirm		
		drawings	Confirm		
		technical description with schematic diagrams	Confirm		
5.1.2	Observe	General requirements			
		At least 1 instrument completely installed at a site			
		At least 1 instrument or major component of an instrument submitted for simulation testing			
5.1.3		Pattern evaluation tests			
		Complies with R 106-1, clause 2	Confirm		
		2.8.1 excluded unless instrument is used as integral control	Note		
		Complies with R 106-1, clause 3	Confirm		
		Complies with R 106-1, clause 4 if it is an electronic instrument	Confirm		
		Test conducted without unnecessary commitment of resources	Note		
		Metrological authority permit the results of these tests to be assessed for initial verification	Note		
5.1.3.1	Observe	In-motion tests			
		Tested according to provisions in R 106-1, 2.8.2, complies with R 106-1, 2.7			
		Range of speeds used are in accordance with the pattern specification			

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
5.1.3.1.1	A.11.7	Uncoupled wagons			
		Not less than 5 reference wagons used with range of loads from zero to fully loaded			
		A minimum of 5 weight indications of each wagon used to assess compliance with R 106-1, 2.8.2.1			
5.1.3.1.2	A.11.6	Coupled wagons			
		Use test train of empty reference wagons and test train of full and partially filled reference wagons			
		Each test train comprise not less than 5 (not normally more than 15) reference wagons and shall be			
		weighed repeatedly in each direction (if applicable) to yield not less than 60 wagon weights or equivalent in total train weight, or is			
		tested according to requirements in R 106-1, 5.2.2			
		Results comply with R 106-1, 2.8.2.1 or 2.8.2.2			
5.1.3.2		Simulation tests			
		Complies with R 106-1, 2.9			
		Complies with R 106-1, clause 4 for electronic instruments			
		Tests on load cell or electronic device with analogue component mpe for device shall be 0.7 times value in Table 2			
		Load cell complies with OIML R 60			
5.1.3.3	Observe	Examples of means to determine compliance			
		Adaptation of indicating device to give greater resolution than that of the scale interval	Note		
		Use of scale interval for stationary loads	Note		
		Use of change points	Note use		
		Other means	Detail		
5.1.3.3		Tests for compliance with technical requirements			
		Complies with requirements in R 106-1, 3.3 and 3.4			
5.1.4		Provision of means for testing			
		Appropriate equipment supplied by applicant	Confirm		
		Instrument may be used as integral control instrument in which case it complies with R 106-1, clause 2.8.3.2	Note use Confirm		
5.1.5		Place of testing			
		Site at which all necessary tests can be conducted and agreed upon between the metrological authority and the applicant	Note site		
		A laboratory considered appropriate by the metrological authority	Note		
		Another suitable place mutually agreed upon by the metrological authority and the applicant	Note		

Requirement of R 106-1	Test procedure	Automatic rail-weighbridges	Passed	Failed	Remarks
6	On site test methods				
6.1	Proportion of reference wagons in a test train				
		In accordance with R 106-1 Table 4			
6.2	In-motion tests with coupled wagons				
		Reference wagons distributed throughout the train			
6.3	In-motion tests with liquid load				
		Tests consistent with intended use of the instrument			

Report page

CHECKLIST (continued)

Use this page to detail remarks from the checklist

TEST REPORT

Test equipment used for pattern evaluation

Application No:

Report date:

Pattern designation:

Manufacturer:

List all test equipment used in this report

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

Configuration for test

Application No:

Report date:

Pattern designation:

Manufacturer:

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

Explanatory notes

Meaning of symbols:

- I = Indication
- I_n = nth indication
- L = Load
- ΔL = Additional load to next changeover point
- P = $I + 0.5 d - \Delta L$ = Indication prior to rounding (digital indication)
- E = $I - L$ or $P - L$ = 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.

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

	At start	At end	
Temp:	20.5	21.1	°C
Rel. h:			%
Date:	96:12:02	96:12:03	yy:mm:dd
Time:	16:00:05	16:30:05	hh:mm:ss

where:

Temp = temperature

Rel. h = relative humidity

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

In the disturbance tests, faults greater than 1 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)".

Numbers in brackets refer to the corresponding subclauses of OIML R 106-1.

Summary of test report

Application No:

Pattern designation:

R 106-2	Tests	Report page	Passed	Failed	Remarks
1	Checking of zero				
1.1	Range of semi-automatic zero-setting				
1.2	Range of automatic zero-setting				
2	Nonautomatic tests of the control instrument				
2.1	Accuracy of zero-setting				
2.2	Weighing performance				
2.3	Discrimination				
3	Warm-up time				
4	Influence factors				
4.1	Static temperatures				
4.2	Damp heat, steady state				
4.3	Mains power supply voltage variation (AC)				
4.4	Battery power supply voltage variation (DC)				
5	Disturbances				
5.1	Voltage dips and short interruptions				
5.2	Electrical fast transients/burst immunity				
5.3	Electrostatic discharge				
5.4	Electromagnetic susceptibility				
6	Span stability				
7	In-situ tests				
7.1	Eccentricity (integral control instrument)				
7.2	Rail alignment calibration				
7.3	Verification standards (reference wagon weighing)				
7.4	In-motion weighing (coupled, uncoupled or train)				

1 Checking of zero (R 106-1, 3.3.5 & A.6.2)

1.1 Range of semi-automatic zero-setting (R 106-1, 3.3.5 & A.6.2.1.1)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Positive zero limit load L_1	Negative zero limit load L_2	Range $L_1 + L_2$	% of maximum load

1.2 Range of automatic zero-setting (R 106-1, 3.3.5 & A.6.2.1.2)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Positive zero limit load L_1	Negative zero limit load L_2	Range $L_1 + L_2$	% of maximum load

2 Nonautomatic tests of the control instrument (R 106-1, 2.8.1 & A.6.5)

2.1 Accuracy of zero-setting (R 106-1, 2.8.1.2 & A.6.5.1)

2.1.1 Semi-automatic zero-setting (R 106-1, 2.8.1.2 & A.6.5.1.1)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

ΔL	$E = 0.5 d - \Delta L$	E/d

Remarks:

2.1.2 Automatic zero-setting (R 106-1, 2.8.1.2 & A.6.5.1.2)

ΔL	$E = 0.5 d - \Delta L$	E/d

Remarks:

2.3 Discrimination (R 106-1, 2.8.1.6 & A.6.5.3)

Application No:

Pattern designation:

Observer:

Scale interval (d):

Resolution during test:
(smaller than d)

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

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

Remarks:

3 Warm-up time (R 106-1, 4.3.5 & A.7.1)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)
 Duration of disconnection
 before test:

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

Automatic zero-setting device is:

Non existent Not in operation Out of working range In operation

$$E = I + 0.5 d - \Delta L - L$$

E_0 = error calculated at zero or near zero (unloaded)

E_L = error calculated at load (loaded)

Time (*)	Load	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

Initial zero-setting error	E_{0i}	
Maximum value of error unloaded	E_0	
Maximum value of error loaded	$E_L - E_0$	

Remarks:

4.1.3 Static temperature (specified low = °C)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Automatic zero-setting device is:

Non existent Not in operation Out of working range In operation

$$E = I + 0.5 d - \Delta L - L$$

$$E_c = E - E_0 \text{ with } E_0 = \text{error calculated at or near zero (*)}$$

Load L	Indication I		Add. load ΔL		Error E		Corrected error E _c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

Remarks:

4.1.4 Static temperature (5 °C)

Application No:

Pattern designation:

Observer:

Scale interval (d):

Resolution during test:
(smaller than d)

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

Automatic zero-setting device is:

Non existent Not in operation Out of working range In operation

$$E = I + 0.5 d - \Delta L - L$$

$$E_c = E - E_0 \text{ with } E_0 = \text{error calculated at or near zero (*)}$$

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

Remarks:

4.1.5 Static temperature (20 °C)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Automatic zero-setting device is:

Non existent Not in operation Out of working range In operation

$E = I + 0.5 d - \Delta L - L$
 $E_c = E - E_0$ with $E_0 =$ error calculated at or near zero (*)

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

Remarks:

4.2 Damp heat, steady state (R 106-1, 4.3.3 & A.8.2)

Application No:

Pattern designation:

Observer:

Scale interval (d):

Resolution during test:
(smaller than d)

Automatic zero-setting is:

Non existent
 Not in operation
 Out of working range
 In operation

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

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

$$E = I + 0.5 d - \Delta L - L$$

$$E_c = E - E_o \text{ with } E_o = \text{error calculated at or near zero (*)}$$

Load L	Indication I		Add. load ΔL		Error E		Corrected error E _c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					(*)				

4.2 Damp heat, steady state (continued)

Test at upper limit temperature (°C), relative humidity of 85 %

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

$$E = I + 0.5 d - \Delta L - L$$

$E_c = E - E_o$ with E_o = error calculated at or near zero (*)

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

4.2 Damp heat, steady state (continued)

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

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

$$E = I + 0.5 d - \Delta L - L$$

$E_c = E - E_o$ with E_o = error calculated at or near zero (*)

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

4.3 Mains power supply voltage variation (AC) (R 106-1, 2.9.2 & A.8.3)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Automatic zero-setting is:

Non existent Not in operation Out of working range In operation

Marked nominal voltage, U_n , or voltage range: V

Reference voltage: (**) V

$$E = I + 0.5 d - \Delta L - L$$

$$E_c = E - E_0 \text{ with } E_0 = \text{error calculated at or near zero } (*)$$

Voltage	Load L	Indication I	Add. load ΔL	Error E	Corrected error E_c
Reference voltage				(*)	
Reference voltage -15 %					
Reference voltage +10 %					
Reference voltage					

Remarks:

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

4.4 Battery power supply voltage variation (DC) (R 106-1, 2.9.3 & A.8.4)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Automatic zero-setting is:

Non existent Not in operation Out of working range In operation

Marked nominal voltage: V

Lower limit voltage: (**) V

$$E = I + 0.5 d - \Delta L - L$$

$$E_c = E - E_o \text{ with } E_o = \text{error calculated at or near zero (*)}$$

Voltage	Load L	Indication I	Add. load ΔL	Error E	Corrected error E_c
Nominal voltage				(*)	
Lower limit voltage					
Nominal voltage					

Remarks:

(**) The lower limit voltage shall be the voltage at which the EUT clearly ceases to function +2 % of this voltage

5 Disturbances (R 106-1, 4.1.2 & 4.3.4 & A.9)

5.1 Voltage dips and short interruptions (R 106-1, A.9.1)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):

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

Automatic zero-setting is:

Non existent Not in operation Out of working range In operation

Marked nominal voltage, U_n , or voltage range: V

Reference voltage: (*) V

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

Note 1: If significant faults are detected and acted upon, the test point at which this occurs shall be recorded

Note 2: If the EUT fails the test point at which this occurs shall be recorded

Remarks:

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

5.2 Electrical fast transients/burst immunity (R 106-1, A.9.2)

5.2.1 Power lines

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):

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

Automatic zero-setting is:

Non existent Not in operation Out of working range In operation

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

Disturbance connection and polarity		Load ()	Indication I ()	Significant fault	
				No	Yes (remarks)
				without disturbance	
Live ↓ ground	pos				
	neg				
without disturbance					
Neutral ↓ ground	pos				
	neg				
without disturbance					
Protective earth ↓ ground	pos				
	neg				

Note 1: If significant faults are detected and acted upon, the test point at which this occurs shall be recorded

Note 2: If the EUT fails the test point at which this occurs shall be recorded

Remarks:

5.2 Electrical fast transients/burst immunity (continued)

5.2.2 I/O circuits and communication lines

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):

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

Automatic zero-setting is:

Non existent Not in operation Out of working range In operation

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

Cable/Interface and polarity	Load ()	Indication I ()	Result	
			Significant fault	
			No	Yes (remarks)
without disturbance				
	pos			
	neg			
without disturbance				
	pos			
	neg			
without disturbance				
	pos			
	neg			
without disturbance				
	pos			
	neg			
without disturbance				
	pos			
	neg			

Note 1: If significant faults are detected and acted upon, the test point at which this occurs shall be recorded

Note 2: If the EUT fails the test point at which this occurs shall be recorded

Note 3: Explain, or make a sketch indicating where the clamp is located on the cable; if necessary, use an additional page

Remarks:

5.3 Electrostatic discharge (R 106-1, A.9.3)

5.3.1 Direct application

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):

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

Automatic zero-setting is:

Non existent Not in operation Out of working range In operation

Contact discharges Paint penetration

Air discharges Polarity: (*) pos neg

Discharges			Results			
Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Load ()	Indication I ()	Significant fault	
					No	Yes (remarks)
without disturbance						
2						
4						
6						
8 (air discharges)						

Note 1: If significant faults are detected and acted upon, the test point at which this occurs shall be recorded

Note 2: If the EUT fails the test point at which this occurs shall be recorded

Remarks:

(*) IEC 1000-4-2 specifies that the test should be conducted at the most sensitive polarity

5.3 Electrostatic discharge (continued)

5.3.2 Indirect application (contact discharge only)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):

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

Automatic zero-setting is:

Non existent Not in operation Out of working range In operation

Polarity: (*) pos neg

Horizontal coupling plane

Discharges			Result			
Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Load ()	Indication I ()	Significant fault	
					No	Yes (remarks)
without disturbance						
2						
4						
6						

Vertical coupling plane

Discharges			Result			
Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Load ()	Indication I ()	Significant fault	
					No	Yes (remarks)
without disturbance						
2						
4						
6						

Note 1: If significant faults are detected and acted upon, the test point at which this occurs shall be recorded

Note 2: If the EUT fails the test point at which this occurs shall be recorded

Remarks:

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

5.3 Electrostatic discharges (continued)

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

a) Direct application

Contact discharges:

Air discharges:

b) Indirect application

5.4 Electromagnetic susceptibility (R 106-1, A.9.4)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):

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

Rate of sweep :

Disturbance				Result			
Antenna	Frequency range (MHz)	Polarization	Facing EUT	Load ()	Indication I ()	Significant fault	
						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- 1000 MHz
 Field strength: 3 V/m
 Modulation: 80 % AM, 1 kHz sine wave

Note 1: If significant faults are detected and acted upon, the test point at which this occurs shall be recorded

Note 2: If the EUT fails the test point at which this occurs shall be recorded

Remarks:

5.4 Electromagnetic susceptibility (continued)

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

6 Span stability (R 106-1, 4.4.3 & A.10)

Application No:
 Pattern 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

Test load =

Measurement No. 1: Initial measurement

Observer:
 Location:

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

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

(*) 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 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:

6 Span stability (continued)

Subsequent measurements

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

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

Measurement No. 2:

Observer:

Location:

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

Conditions of the measurement:

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

(*) 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:

6 Span stability (continued)

Measurement No. 3:

Observer:
 Location:

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

Conditions of the measurement:

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

(*) 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. 4:

Observer:
 Location:

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

Conditions of the measurement:

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

(*) 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:

6 Span stability (continued)

Measurement No. 5:

Observer:
 Location:

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

Conditions of the measurement:

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

(*) 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. 6:

Observer:
 Location:

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

Conditions of the measurement:

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

(*) 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:

6 Span stability (continued)

Measurement No. :

Observer:

Location:

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

Conditions of the measurement:

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

(*) 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. :

Observer:

Location:

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

Conditions of the measurement:

$$E_0 = I_0 + 0.5 d - \Delta L_0 - L_0$$

$$E_L = I_L + 0.5 d - \Delta L - L$$

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

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

If five loadings and readings have been performed:

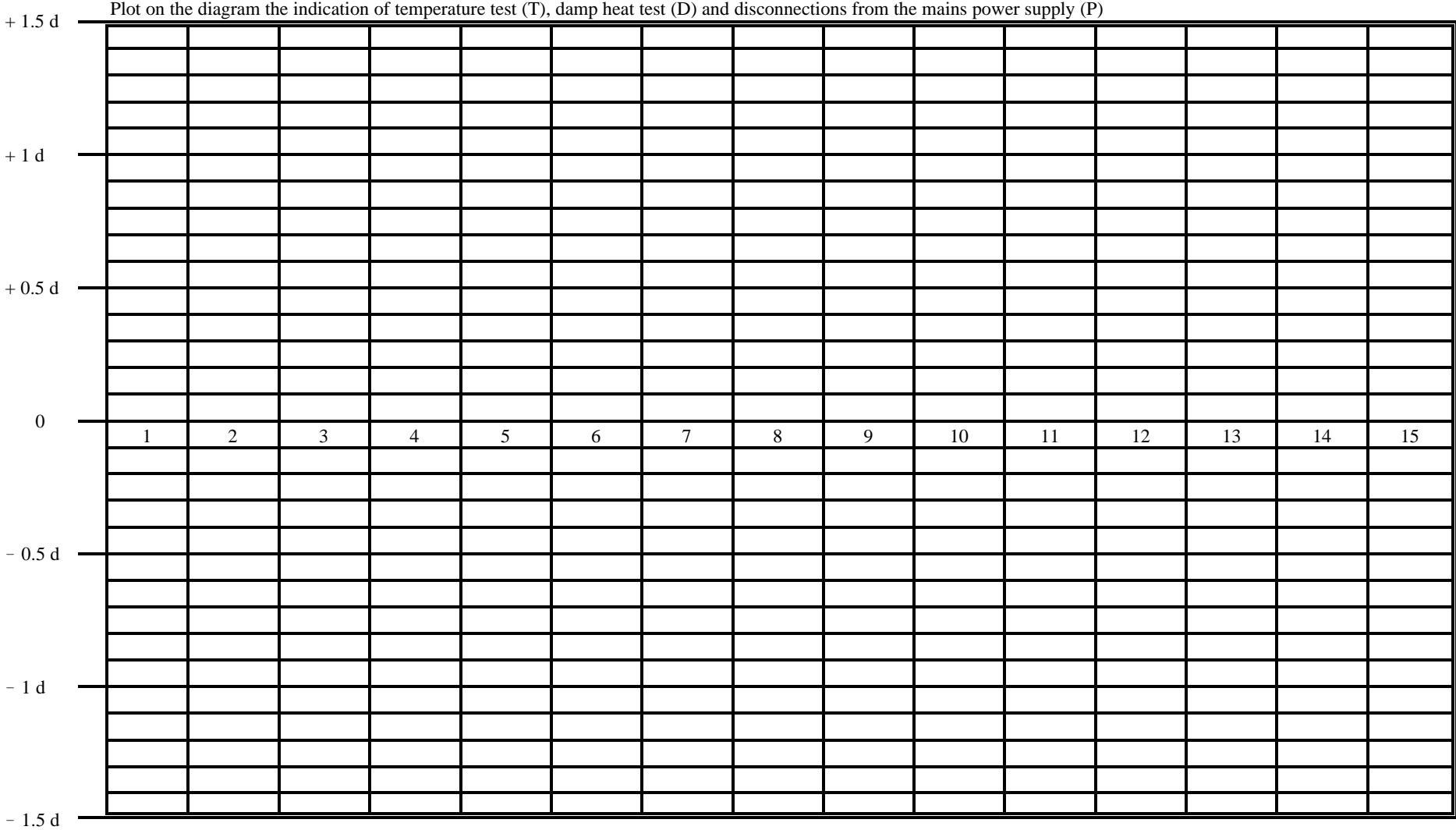
Average error = average ($E_L - E_0$) =

Remarks:

6 Span stability (continued)

Application No:

Pattern designation:



Maximum allowable variation:

7.2 Rail alignment calibration (R 106-1, Annex B)

Application No:
 Pattern designation:
 Observer:

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

Accuracy class:
 Maximum capacity: (a)
 Typical wagon tare weight: (b)
 Mass of standard weights required: (c)
 (a - 1.5 b, rounded down)
 Scale interval:
 Scale interval for static load:

Note: The use of the letters (a) to (f) correlate to the table below and the example in R 106-1, Annex B.5 (to avoid confusion the scale interval reference d has been omitted)

	Position on load receptor	Indicated weight	
		Empty wagon ()	Loaded wagon ()
First axle	Leading end		
	Middle		
	Trailing end		
Second axle	Leading end		
	Middle		
	Trailing end		
Total of six weighings		d =	e =
Divide total by three			
Derived mass of standard weights ()		f = e - d =	
Calibration correction ()		c - f =	

Remarks:

7.3 Verification standards (reference wagon weighing) (R 106-1, 2.8.3 & A.11.6.1 & A.11.6.3 & A.11.7.1)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Control instrument is: Integral Separate Partial weighing Full weighing

7.3.1 Partial weighing using separate or integral control instrument (R 106-1, 2.8.3.1 or 2.8.3.2 & A.11)

7.3.1.1 Coupled static weighing (empty) (R 106-1, 5.1.3.1.2 & A.11.6.1)

Wagon	Reference wagon identification	1 st partial weight ()	2 nd partial weight ()	Total ()	Corrected total (*) ()
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

(*) Total to be corrected where rail alignment calibration specified in R 106-1, Annex B has been conducted
 (Corrected total = Total - Calibration correction)

7.3.1.2 Coupled static weighing (full) (A.11.6.3)

	Reference wagon identification	1 st partial weight ()	2 nd partial weight ()	Total ()	Corrected total (*) ()
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

(*) Total to be corrected where rail alignment calibration specified in R 106-1, Annex B has been conducted
(Corrected total = Total - Calibration correction)

Remarks:

7.3.2 Full draught weighing using separate or integral control instrument (R 106-1, 2.8.3.1 & 2.8.3.2 & A.11)

7.3.2.1 Coupled static weighing (empty)

	Reference wagon identification	Total wagon weight ()	Remarks
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

7.3.2.2 Coupled static weighing (full)

	Reference wagon identification	Total wagon weight ()	Remarks
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

Remarks:

7.3.2.3 Uncoupled static weighing (R 106-1, 5.1.3.1.1 & A.11.7.1)

	Reference wagon identification	Total wagon weight ()	Remarks
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Remarks:

7.4 In-motion weighing (coupled, uncoupled or train) (R 106-1, 5.1.3.1 & 5.2.2 & A.11)

Application No:
 Pattern designation:
 Observer:
 Scale interval (d):
 Resolution during test:
 (smaller than d)

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

Pre and post test data:

Modes of operation tested	
Uncoupled (R 106-1, 5.1.3.1.1 & A.11.7)	
Coupled (R 106-1, 5.1.3.1.2 & A.11.6)	
Train (R 106-1, 5.1.3.2 & A.11.8)	
Direction of coupled wagons or train (R 106-1, 5.1.3.1.2) (single or dual)	

Operating speed (*) (R 106-1, 5.1.3.1 & A.11.6.4)	
Maximum operating speed v_{max}	
Minimum operating speed v_{min}	

Coupled wagon and train weighing	
Maximum number of wagons per train (R 106-1, 3.6.2.2) n_{max}	
Minimum number of wagons per train (R 106-1, 3.6.2.2) n_{min}	
Total number of wagons coupled	
Number of reference wagons coupled	

Data for calculating maximum permissible errors for coupled or uncoupled wagon weighing (R 106-1, 2.2.1)

	Run 1 Speed			Run 2 Speed			Run 3 Speed			Run 4 Speed			Run 5 Speed			Run 6 Speed			
	Max	Site	Min	Max	Site	Min	Max	Site	Min	Max	Site	Min	Max	Site	Min	Max	Site	Min	
Percentage of reference wagons within mpe																			
Percentage of reference wagons within twice mpe																			

Data for calculating maximum permissible errors for train weighing (R 106-1, A.11.8)

	Run 1 Speed			Run 2 Speed			Run 3 Speed			Run 4 Speed			Run 5 Speed			Run 6 Speed			
	Max	Site	Min	Max	Site	Min	Max	Site	Min	Max	Site	Min	Max	Site	Min	Max	Site	Min	
Sum of reference wagon weights in train																			

- (*) The operating speed should not differ from those:
 (a) stated in the *General information concerning the pattern*, and
 (b) on the descriptive marking shown in code

7.4.1 Coupled wagon or train weighing (R 106-1, 5.1.3.1.2 & A.11.6)

7.4.1.1 Run 1, Run 2, Run 3 (single speed or near $v_{max} =$ km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 1		Run 2		Run 3		Remarks (include direction if dual)
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Note: A continuation report page is available for reproduction at the end of this section

Remarks:

7.4.1.1 Run 4, Run 5, Run 6 (single speed or near $v_{max} =$ km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 4		Run 5		Run 6		Remarks (include direction if dual)
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Note: A continuation report page is available for reproduction at the end of this section

Remarks:

7.4.1.2 Run 1, Run 2, Run 3 (Typical site operating speed = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 1		Run 2		Run 3		Remarks (include direction if dual)
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Note: A continuation report page is available for reproduction at the end of this section

Remarks:

7.4.1.2 Run 4, Run 5, Run 6 (Typical site operating speed = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 4		Run 5		Run 6		Remarks (include direction if dual)
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Note: A continuation report page is available for reproduction at the end of this section

Remarks:

7.4.1.3 Run 1, Run 2, Run 3 (speed near v_{min} = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 1		Run 2		Run 3		Remarks (include direction if dual)
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Note: A continuation report page is available for reproduction at the end of this section

Remarks:

7.4.1.3 Run 4, Run 5, Run 6 (speed near v_{min} = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 4		Run 5		Run 6		Remarks (include direction if dual)
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Note: A continuation report page is available for reproduction at the end of this section

Remarks:

7.4.2 Uncoupled wagon weighing (R 106-1, 5.1.3.1.1 & A.11.7)

7.4.2.1 Run 1, Run 2, Run 3 (single speed or near $v_{max} =$ km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 1		Run 2		Run 3		Remarks
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Remarks:

7.4.2.1 Run 4, Run 5, Run 6 (single speed or near $v_{max} =$ km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 4		Run 5		Run 6		Remarks
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Remarks:

7.4.2.2 Run 1, Run 2, Run 3 (typical site operating speed = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 1		Run 2		Run 3		Remarks
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Remarks:

7.4.2.2 Run 4, Run 5, Run 6 (typical site operating speed = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 4		Run 5		Run 6		Remarks
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Remarks:

7.4.2.3 Run 1, Run 2, Run 3 (speed near v_{min} = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 1		Run 2		Run 3		Remarks
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Remarks:

7.4.2.3 Run 4, Run 5, Run 6 (speed near v_{min} = km/h)

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run 4		Run 5		Run 6		Remarks
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Remarks:

7.4.3 Continuation report page

Continuation of report page

	Reference wagon ID	No. of axles	Reference wagon weight (static) ()	Run		Run		Run		Remarks
				Ind. weight ()	Error	Ind. weight ()	Error	Ind. weight ()	Error	
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57										
58										
59										
60										

Remarks: