Third Committee Draft (3CD)
for vote and comment

Clean version

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Contents- TO BE FINALISED ON PUBLICATION

Foreword

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Introduction

The “Test report format”, the subject of OIML R xx-3, aims at presenting, in a standardized format, the results of the various tests and examinations to which a type of a continuous totalizing automatic weighing instrument of the arched chute type shall be submitted with a view to its approval.

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

The “Checklist” is a summary of the examinations carried out on the instrument. It includes the conclusions of the results of the tests performed, experimental or visual checks based on the required performance criteria and associated tests in OIML R xx-1 and -2. The words or condensed sentences intend to remind the examiner of the requirements of R xx-1 and -2 without reproducing them.

The “Test report” is a record of the results of the tests carried out on the instrument. The “test report” forms have been produced based on the tests detailed in the performance test procedures (OIML R xx-2).

The “information concerning the test equipment used for type evaluation” shall cover all test equipment which has been used in determining the test results given in a report. The information may be a short list containing 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 electromagnetic susceptibility test.

All metrology services or laboratories evaluating types of continuous totalizing automatic weighing instruments according to OIML R xx-1 and -2 or to national or regional regulations based on OIML R xx-1 and -2 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.

Explanatory notes

Symbols	Meaning
I	Indication of the instrument
I_n	nth indication
L	Static load
ΔL	Additional static load to next changeover point
P	Indication of the instrument prior to rounding (digital indication): $P = I + 0.5\ d - \Delta L$
E	$I - L$ or *P-L or I-T*
T	Totalized load (calculated for simulation tests or controlled load for product tests) $T = \frac{\text{Totalizing time} \times L}{\text{Totalizing time}} [calculation\ for\ simulation]$
E %	$(P - L)$ /L% or $(I - T) / T$ %
E_0	Error at zero load
d	Totalization scale interval
d_c	Scale interval of the control instrument
p_i	Fraction of the mpe applicable to a module of the instrument which is examined separately
mpe	Maximum permissible error (absolute value)
EUT	Equipment under test
sf	Significant fault
Max	Maximum capacity of the instrument
Min	Minimum capacity of the 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
T_{min}	Minimum totalizing time
e.m.f	Electromotive force
I/O	Input / output ports
RF	Radio frequency

Note: For simulation tests, T is calculated from the product of the static load, L, and the totalization time span for the test.

For product tests, T is the indication of the control instrument prior to rounding, thus for product tests $T = P$.

The calculation of P is only relevant to the control instrument and the subsequent determination of T for product tests.

Explanatory notes (continued)

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

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

	At start	At end	
Temp.:	20.5	21.1	°C
Rel. h.:			%
Date:	2014-10-15	2014-10-15	yyyy-mm-dd
Time:	16:00:05	16:30:05	hh:mm:ss

where: Temp. = temperature
Rel. h. = relative humidity

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

In the disturbance tests, significant faults are faults greater than the absolute value of the appropriate maximum permissible error for influence factor tests for a load equal to Σ_{min}, for the designated class of the arched chute weigher.

Identification of the instrument

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

Documentation from the manufacturer

(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.

Identification of the instrument (continued)

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

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

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

General information concerning the type

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

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

Instrument category: .....

Testing on: ☐ Complete instrument ☐ Module*

Accuracy class: ☐ 0.2 ☐ 0.5 ☐ 1 ☐ 2

Qm_{min} = ☐ Qm_{max} = ☐ Σ_{min} = ☐

Max = ☐ d = ☐ W_L = ☐ m

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

Zero-setting device: ☐ Non-automatic ☐ Semi-automatic ☐ Automatic

Temperature range ☐ °C

Printer: ☐ Built-in ☐ Connected ☐ Non present but connectable ☐ No connection

Instrument submitted: .....

Identification no.: .....

Software version: .....

Connected equipment: .....

.....

.....

Interfaces (number, nature): .....

.....

Evaluation period: .....

Date of report: .....

Observer: .....

Force transducer: .....

Manufacturer: .....

Type: .....

Capacity: .....

Number: .....

Classification symbol:

OIML R 60 Certificate of conformity. Please tick. If "Yes" supply certificate number.

Yes	No

Certificate number: .....

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

** The voltage U_{nom} shall be as defined in IEC 61000-4-11 section 5

General information concerning the type (continued)

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

Testing on: ☐ Complete instrument ☐ Module*

Use this space to indicate additional remarks and/or information: connecting equipment, interfaces and force transducers, choice of the manufacturer regarding protection against disturbances, etc.

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

Information concerning the test equipment used for type evaluation

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

Report date: ..... Manufacturer: .....

List all test equipment used in this report (including descriptions of the equipment 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, force transducers, EMC protection options etc., for the instrument and/or simulator.

Summary of the checklist

For each test, the “Summary of the checklist” below and the “Checklist” in clause 3 shall be completed according to this example:

	Passed	Failed
When the instrument has passed the test:	X	
When the instrument has failed the test:		X
When the test is not applicable:	/	/

Summary of the checklist:

Requirement	**Passed**	**Failed**	**Remarks**
Metrological requirements R xx-1 clause 3			
Technical requirements R xx-1 clause 4			
Requirements for arched chute weighers with respect to their environment R xx-1 clause 5			
Metrological controls R xx-1 clause 6			
Performance tests R xx-1 clause 7.2			
Overall result			

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

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

Summary of type evaluation tests

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

R xx-3	Tests	Report page	Passed	Failed	Remarks
1	Simulation tests				
1.1	Warm-up time				
1.2	Variation of infeed mass flowrate				
1.3	Eccentric loading				
1.4	Zero-setting device				
1.4.1	Zero-setting (range)				
1.4.2	Zero-setting (semi-automatic and automatic)				
1.5	Influence quantities				
1.5.1	Static temperatures				
1.5.2	Temperature effect at no load or zero mass flowrate				
1.5.3	Damp heat				
1.5.3.1	Damp heat, steady state (non-condensing)				
1.5.3.2	Damp heat, cyclic (condensing)				
1.5.4	Mains voltage variation				
1.5.4.1	AC mains voltage variation				
1.5.4.2	DC mains voltage variation				
1.5.5	Battery voltage variation, not mains connected (DC)				
1.6	Disturbances				
1.6.1	AC mains voltage dips, short interruptions and reductions				
1.6.2	Bursts (fast transient tests) on:				
1.6.2.1	- AC and DC mains power lines				
1.6.2.2	- signal, data and control lines				
1.6.3	Surges on:				
1.6.3.1	- AC and DC mains power lines				
1.6.3.2	- signal, data and control lines				
1.6.4	Electrostatic discharge				
1.6.4.1	- Direct application				
1.6.4.2	- Indirect application (contact discharges only)				
1.6.5	Immunity to electromagnetic fields:				
1.6.5.1	- radiated electromagnetic fields				
1.6.5.2	- conducted electromagnetic fields				

1.6.6	DC mains voltage dips, short interruptions and (short term) variations				
1.6.7	Ripple on DC mains power				
1.7	Metrological characteristics				
1.7.1	Repeatability				
1.7.2	Discrimination of the totalization indicating device				
1.7.3	Discrimination of the totalization indicating device used for zero totalization				
1.7.4	Short- and long-term stability of zero				
1.8	In-situ tests				
2	In-situ product tests				
2.1	Accuracy of control instrument				
2.2	Repeatability				
	mpe for type evaluation				
	mpe for initial verification and in-service inspection				

1 Simulation tests (R xx-1, 7.3, R xx-2, 5.4)

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

Report date: ..... Observer: .....

Simulation tests

Data	Derivation	Ref	Value	Units
Maximum mass flowrate	Max	$Q\mathrm{m}_{max}$		/h
Totalization scale interval		d		t
Zero-setting scale interval				
Simulator resolution*		d		t
Max capacity	To obtain $Q\mathrm{m}_{max}$	Max		kg
Weighing segment length		W_L		m
Totalizing time				/s
Other relevant data**				

* Where: Simulator resolution, d, is obtained in line with R xx-2, 3.7.1 and 7.11. Whichever means are used, they should be noted below in description of simulator.

** Insert other relevant data as necessary.

Totalized quantity for simulation tests:

$$\mathrm{T} = \frac{\text{Totalizing time} \times \mathrm{L}}{\text{Totalizing time}}$$

Where L is the static load used for the simulation test

The time sent by the internal clock to totalize the minimum totalized quantity, $\Sigma_{\min}$

DESCRIPTION OF SIMULATOR:

(Shall include details of any deviations from actual instruments when installed, including the accuracy determining parameters)

1.1 Warm-up time (R xx-1, 5.5.4 and R xx-2, 5.2)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Duration of disconnection before test .....

Automatic zero-setting:

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

Mass flowrate (Qm) (R xx-1, 3.5)	Test load, L	Time	Indication I	Test duration	Calculated indication,	Indicated totalization	Error,(*)
Qm_{min}		0 min					
Max							
Qm_{min}		5 min					
Max							
Qm_{min}		15 min					
Max							
Qm_{min}		30 min					
Max							

☐ Passed ☐ Failed

Remarks:

Include information that affects the test condition, as indicated in R xx-2, 7.1.

(*) See the “explanatory notes” section for the error calculation

1.2 Variation of infeed mass flowrate (R xx-1, 3.7.1 & R xx-2, 5.4)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Infeed mass flowrate =_____

Test load, L	Mass flowrate (*Q*m)	Totalization				Error, $E^{(*)}$
		Time	Calculated $T^{(**)}$	Indicated, *I*	Difference, *I-T*	

☐ Passed ☐ Failed

(*) See the "explanatory notes" section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.3 Eccentric loading (R xx-1, 3.7.2 & R xx-2, 5.5)

Application no.: .....

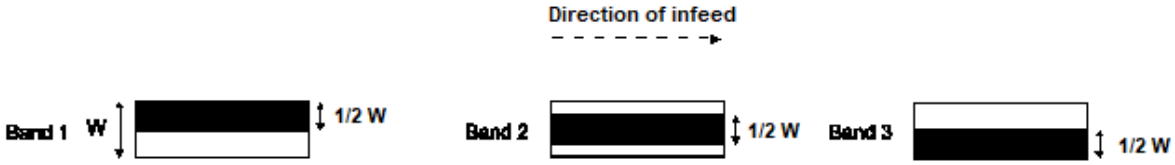
Type designation: .....

Observer: .....

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

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

Location of test loads:



		Totalization				
Band	Test load, *L*	Time	Calculated, $T^{(**)}$	Indicated, *I*	Difference, *I-T*	Error, $E^{(*)}$

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the "explanatory notes" section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.4 Zero-setting device (R xx-1, 4.4)

1.4.1 Zero-setting (range) (R xx-1, 4.4.1, 4.5.1 & R xx-2, 5.6)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Modes of zero-setting	Present
Non-automatic	
Semi-automatic	
Automatic operation	

Positive portion, L_1		Negative portion, L_2		Zero-setting range $L_1 + L_2$
Test load	Re-zero Yes/no	Test load removed	Re-zero Yes/no	

☐ Passed ☐ Failed

Where: L_1 is the maximum load that can be re-zeroed (positive portion)
L_2 is the maximum load that can be removed while the instrument can still be re-zeroed (negative portion)

Check: $L_1 + L_2 \leq 4$ % of Max

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.4.2 Zero-setting (semi-automatic and automatic) (R xx-1, 4.4.1 & R xx-2, 5.6.2)

Application no.: .....

Type designation: .....

Observer: .....

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

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

		Totalization				
Zero-setting range	Test load, *L*	Time	Calculated, $T^{(**)}$	Indicated, *I*	Difference, *I-T*	Error, $E^{(*)}$
L_1						
L_2						
L_3						
L_4						

☐ Passed ☐ Failed

Where: L_1 = 50 % of positive zero-setting range
L_2 = 100 % of positive zero-setting range
L_3 = –50 % of negative zero-setting
L_4 = –100 % of negative zero-setting

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the "explanatory notes" section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5 Influence quantities (R xx-1, 3.7.3 & R xx-2, 7)

1.5.1 Static temperatures (R xx-1, 3.7.3.1 & R xx-2, 7.2.1)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Automatic zero-setting:

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

		Totalization				
Mass flowrate (Qm)	Test load, L	Totalizing time	Calculated, $T^{(**)}$	Indicated, I	Difference, I-T	Error, $E^{(*)}$
Qm_{min}						
Qm_{int}						
Qm_{max}						
Qm_{min}						

☐ Passed ☐ Failed

(*) See the "explanatory notes" section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.1 Static temperatures (continued)

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

Automatic zero-setting:

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

Test 2 - Static temperature specified high (°C)

Result sheet A

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.1 Static temperatures (continued)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Automatic zero-setting:

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

Test 3 - Static temperature specified low (°C)

Result sheet A

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.1 Static temperatures (continued)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Automatic zero-setting:

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

Test 4 - Static temperature 5 °C

Result sheet A

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.1 Static temperatures (continued)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Automatic zero-setting:

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

Test 5 - Static temperature 20 °C

Result sheet A

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

(*) See the “explanatory notes” section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test conditions, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.2 Temperature effect at no load or zero mass flowrate (R xx-1, 3.7.3.2 & R xx-2, 7.2.2)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Automatic zero-setting device is:

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

	Temp. °C	Time*	Indication, *I*, at start	Indication, *I*, at end	Change in indication**	Rate of change	Report page***	Date	Time
Start temp.									
End temp.									
Start temp.									
End temp.									
Start temp.									
End temp.									
Start temp.									
End temp.									
Start temp.									
End temp.									

☐ Passed ☐ Failed

The rate of temperature change between indications shall not exceed 5 °C per hour.

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

* Test time

** Difference of totalization for two consecutive tests at different temperatures

*** Indicate the report page of the relevant test where the temperature effect at zero mass flowrate and static temperature tests are conducted together.

1.5.3 Damp heat (R xx-1, 5.5.3 & R xx-2, 7.2.3)

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

Damp heat tests are performed according to one of the options in R xx-1, 5.5.3. The results for the option chosen are recorded in 1.5.3.1 or 1.5.3.2 below accordingly.

1.5.3.1 Damp heat, steady state (non-condensing) (R xx-1, 5.5.3 & R xx-2, 7.2.3.1)

Automatic zero-setting:

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

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

Result sheet A

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.3.1 Damp heat, steady state (non-condensing) (continued)

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

Test at specified high temperature (°C), relative humidity 85 %

Result sheet A

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.3.1 Damp heat, steady state (non-condensing) (continued)

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

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

Result sheet A

Load *L*	Indication *I*		Add load *ΔL*		Error		Corrected error E_c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					**Error! Bookmark not defined.**				

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.3.2 Damp heat, cyclic (R xx-1, 5.5.3 & R xx-2, 7.2.3)

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

Final test at reference temperature 95 °C, relative humidity

Result sheet A

Load *L*	Indication *I*		Add load *ΔL*		Error		Corrected error E_c		mpe
	↓	↑	↓	↑	↓	↑	↓	↑	
(*)					**Error! Bookmark not defined.**				

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.3.2 Damp heat, cyclic (condensing) (continued)

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

Specified high temperature at 93 % RH

Result sheet A

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.3.2 Damp heat, cyclic (condensing) (continued)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Temperature drop to reference at 95 % RH

Result sheet A

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.4 Mains voltage variation (R xx-1, 3.7.3.3 & 5.5.5)

1.5.4.1 AC mains voltage variation (R xx-2, 7.2.4)

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

Automatic zero-setting:

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

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max}[1] = ... / V

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

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

Voltage conditions	U (V)	Load L	Indication I	Add load ΔL	Error	Corrected error E_c
U_{nom}				(*)		
Lower limit						
Upper limit						

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
Test 1 at reference voltage[2]						
$Q\text{m}_{max}$						
Test 2 at reference voltage: $0.85 \times U_{nom}$ or $0.85 \times U_{min}$						
$Q\text{m}_{max}$						
Test 3 at reference voltage: $1.10 \times U_{nom}$ or $1.10 \times U_{max}$						
$Q\text{m}_{max}$						
Test 4 at reference voltage						
$Q\text{m}_{max}$						

(*) Exact duration of the test
(**) Totalized quantity for simulation tests. See the simulation page in clause 1
(***) See the “explanatory notes” section for the E calculation

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation
(**) Totalized quantity for simulation tests. See the simulation page in clause 1
[2] The reference voltage shall be as defined in IEC 61000-4-11

1.5.4.2 DC mains voltage variation (R xx-2, 7.2.5)

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

Automatic zero-setting:

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

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max}[3] = ... / V

Pre-test information

	Mass flowrate (/h)	Time to Σ_{min}	Static load, L, for Σ_{min} ( )
Qm_{max}			

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

Voltage conditions	U (V)	Load L	Indication I	Add load ΔL	Error E	Corrected error E_c
U_{nom}				(*)		
Lower limit						
Upper limit						

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
$Q\text{m}_{min}$						
$Q\text{m}_{int}$						
$Q\text{m}_{max}$						
$Q\text{m}_{min}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

1.5.5 Battery voltage variation, not mains connected (DC) (R xx-1, 3.7.3.3, 5.5.6 & R xx-2, 7.2.6)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Automatic zero-setting:

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

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max}[4] = ... / V

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

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

Voltage conditions	U (V)	Load L	Indication I	Add load ΔL	Error	Corrected error E_c
U_{nom}				(*)		
Lower limit						
Upper limit						

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

(*) See the "explanatory notes" section for the error calculation

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

		Totalization				
Mass flowrate (Qm)	Test load, L	Time	Calculated, $T^{(**)}$	Indication, I	Difference, I-T	Error, $E^{(*)}$
Test 1 at minimum operating voltage						
$Q\text{m}_{max}$						
Test 2 at reference voltage, U_{nom}[5] or U_{max}						
$Q\text{m}_{max}$						
Test 3 at lower limit: minimum operating voltage						
$Q\text{m}_{max}$						
Test 4 at reference voltage, U_{nom}						
$Q\text{m}_{max}$						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

(*) See the “explanatory notes” section for the error calculation

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

[5] The minimum battery supply voltage is to be specified by the manufacturer of the instrument

1.6 Disturbances (R xx-1, 5.5.2 & R xx-2, 7.3)

1.6.1 AC mains voltage dips, short interruptions and reductions (R xx-2, 7.3.1)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Marked nominal voltage, U_{nom} = ... V or voltage range, U_{min} / U_{max} [6] = ... / V

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

Disturbance						Result		
Amplitude (% of U_{nom} [7])	Duration (cycles)	Number of disturbances	Test load	Repetition interval	Totalizing time	Indicated totalization, I	Significant fault	
							No	Yes (remarks)
without disturbance								
0	0.5	10						
0	1	10						
40	10	10						
70	25/30 [8]	10						
80	250/300 [9]	10						
0	250/300 [9]	10						

(*) Test time, if applicable

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

[7] The reference voltage shall be as defined in IEC 61000-4-11.

[8] These values are for 50 Hz/60 Hz, respectively.

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Disturbance	Result						
Amplitude % of U_{nom}	Test load	Calculated totalization, $T^{(**)}$	Totalization before adding load	Totalization after adding load	Indicated change in totalization	Significant fault	
						No	Yes (remarks)
without disturbance							
0							
0							
40							
70							
80							
0							

(**) Totalized quantity for simulation tests. See the simulation page in clause 1

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.2 Bursts (fast transient tests) on mains power lines and on signal, data and control lines (R xx-2, 7.3.2)

1.6.2.1 Bursts on AC and DC mains power lines

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

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

Kind or type of voltage supply: ____

DC ____ Other form ____ Voltage ____

Power supply lines: test voltage 2.0 kV, duration of the test: 1 min at each polarity

Connection			Polarity	Test load	Indication, *I*	Significant fault	
L	N	PE					
↓ ground	↓ ground	↓ ground				No	Yes (remarks)
without disturbance							
X			pos				
			neg				
without disturbance							
	X		pos				
			neg				
without disturbance							
		X	pos				
			neg				

Where L = line, N = neutral, PE = protective earth

1.6.2.1 Bursts on AC and DC mains power lines (continued)

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Connection	Polarity	Result						
		Load	Calculated change in totalization	Totalization before adding load	Totalization after adding load	Indicated change in totalization	Significant fault	
							No	Yes (remarks)
without disturbance								
Live ↓ ground	pos							
	neg							
without disturbance								
Neutral ↓ ground	pos							
	neg							
without disturbance								
Protective earth ↓ ground	pos							
	neg							

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.2 Bursts (fast transient tests) on mains power lines and on signal, data and control lines (R xx-2, 7.3.2)

1.6.2.2 Bursts on signal, data and control lines

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

I/O signals, data and control lines: test voltage 1.0 kV, duration of the test: 1 min at each polarity

Cable/interface	Polarity	Test load	Indicated totalization, *I* ( )	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				
without disturbance					
	pos				
	neg				

1.6.2.2 Bursts on signal, data and control lines (continued)

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Cable/ Interface	Polarity	Result						
		Test load	Calculated change in totalization	Totalization before adding load	Totalization after adding load	Indicated change in totalization	Significant fault	
							No	Yes (remarks)
without disturbance								
C/1,1	pos							
	neg							
without disturbance								
C/1,2	pos							
	neg							
without disturbance								
C/1,3	pos							
	neg							
without disturbance								
C/1,4	pos							
	neg							
without disturbance								
C/1,5	pos							
	neg							
without disturbance								
C/1,6	pos							
	neg							

☐ Passed ☐ Failed

Remarks (including additional test set-up information), as indicated in R xx-2, 7.1

1.6.3 Surges on AC and DC mains power lines and on signal, data and control lines (R xx-2, 7.3.3)

1.6.3.1 Surges on AC and DC mains power lines

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

Kind or type of voltage supply: ☐

DC ☐ Other form ☐ Voltage ☐

Test load, *L*	Disturbance			Result		
	3 positive and 3 negative surges (for each of the angles 0°, 90°, 180° and 270° in case of AC supply).			Indicated totalization, *I*	Significant fault	
	Amplitude / apply on		Polarity		No	Yes (remarks)
	without disturbance					
	1.0 kV	Line ↓ neutral	pos			
			neg			
	without disturbance					
	2.0 kV	Line ↓ PE	pos			
			neg			
	without disturbance					
	2.0 kV	Neutral ↓ PE	pos			
			neg			

Where PE = protective earth

☐ 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:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.3.1 Surges on AC and DC mains power lines (continued)

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

Use this page for additional test set-up information.

1.6.3.2 Surges on signal, data and control lines

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

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, *L*, for Σ_{min}
Qm_{max}			

Signal and communication lines: test voltage 1.0 kV, 3 positive and 3 negative surges

Cable/interface	Polarity	Result			
		Load	Indicated totalization, *I*	Significant fault	
				No	Yes (remarks)
without disturbance					
C/1,1	pos				
	neg				
without disturbance					
C/1,2	pos				
	neg				
without disturbance					
C/1,3	pos				
	neg				
without disturbance					
C/1,4	pos				
	neg				
without disturbance					
C/1,5	pos				
	neg				
without disturbance					
C/1,6	pos				
	neg				

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Cable/Interface	Polarity	Result						
		Test load	Calculated change in totalization	Totalization before adding load	Totalization after adding load	Indicated change in totalization	Significant fault	
							No	Yes (remarks)
without disturbance								
C/1,1	pos							
	neg							
without disturbance								
C/1,2	pos							
	neg							
without disturbance								
C/1,3	pos							
	neg							
without disturbance								
C/1,4	pos							
	neg							
without disturbance								
C/1,5	pos							
	neg							
without disturbance								
C/1,6	pos							
	neg							

Note 1: Explain or make a sketch indicating where the clamp is located on the cable; if necessary, add additional pages.
Note 2: The cell references C/1,1 to C/1,6 should be used to cross-reference the cable or interface between Tables A and B.

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.3.2 Surges on signal, data and control lines (continued)

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

Use this page for additional test set-up information, as indicated in R xx-2, 7.1

1.6.4 Electrostatic discharge (R xx-2, 7.3.4)

1.6.4.1 Direct application

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

☐ Contact discharge ☐ Paint penetration

☐ Air discharge Polarity*: ☐ positive ☐ negative

Discharges			Test duration	Indicated totalization, I ( )	Significant fault	
Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)			No	Yes (remarks)
without disturbance						
2						
4						
6						
8 (air discharges)						

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

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

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

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

☐ Passed ☐ Failed

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

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.4 Electrostatic discharge test (continued)
1.6.4.2 Indirect application (contact discharges only)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

Polarity*: ☐ positive ☐ negative

Horizontal coupling plane

Test load, L	Discharges				Significant fault	
	Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Indicated totalization, I	No	Yes (remarks)
	without disturbance					
	2					
	4					
	6					

Vertical coupling plane

Test load, L	Discharges				Significant fault	
	Test voltage (kV)	Number of discharges ≥ 10	Repetition interval (s)	Indicated totalization, I	No	Yes (remarks)
	without disturbance					
	2					
	4					
	6					

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

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

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Horizontal coupling plane

Discharges			Result						
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Totalization					Significant fault	
			Load	Calculated change	Before adding load	After adding load	Indicated change	No	Yes (remarks)
without disturbance									
2									
4									
6									

Vertical coupling plane

Discharges			Result						
Test Voltage (kV)	Number of discharges ≥ 10	Repetition Interval (s)	Totalization					Significant fault	
			Load	Calculated change	Before adding load	After adding load	Indicated change	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:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.4 Electrostatic discharge test (continued)

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

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

a) Direct application

Contact discharges:

Air discharges:

b) Indirect application

1.6.5 Immunity to electromagnetic fields (R xx-2, 7.3.5)
1.6.5.1 Immunity to radiated electromagnetic fields R xx-2, 7.3.5.1)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

Test severity:

Frequency range: 80[9] to 2000 MHz
Field strength: 10 V/m
Modulation: 80 % AM, 1 kHz, sine wave

Rate of sweep:

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

Disturbance				Result			
Test facility	Frequency Range (MHz)	Polarization	Facing EUT	Test duration	Indicated totalization, *I*	Significant fault	
						No	Yes (remarks) (Remarks)
without disturbance							
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				
		Vertical	Front				
			Right				
			Left				
			Rear				
		Horizontal	Front				
			Right				
			Left				
			Rear				

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

[9] For instruments having no mains or other I/O ports available so that the conducted test according to R 50-2, 7.3.5.2 cannot be applied, the lower limit of the radiation test is 26 MHz

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Disturbances				Result						
Antenna	Frequency range (MHz)	Polarization	Facing EUT	Totalization						Significant fault
				Load	Calculated change	Before adding load	After adding load	Indicated change	No	Yes (remarks)
without disturbance										
		Vertical	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Horizontal	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Vertical	Front							
			Right							
			Left							
			Rear							
without disturbance										
		Horizontal	Front							
			Right							
			Left							
			Rear							

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

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.5.1 Immunity to radiated electromagnetic fields (continued)

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

Additional information regarding testing, e.g., by photos or sketches.

1.6.5 Immunity to electromagnetic fields (R xx-2, 7.3.5) (continued)

1.6.5.2 Immunity to conducted electromagnetic fields (R xx-2, 7.3.5.2)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

Test severity:

	Mass flowrate	Time to Σ_{min}	Static load, L, for Σ_{min}
Qm_{max}			

Frequency range: 0.15–80 Mhz
RF amplitude: 10 V_{emf}
Modulation: 80 % AM, 1 kHz, sine wave

Rate of sweep:

Disturbance			Result		
Frequency range (MHz)	Cable/interface	Level (V_{emf})	Indicated totalization, I	Significant fault	
				No	Yes (remarks)
without disturbance					
without disturbance					
without disturbance					
without disturbance					
without disturbance					
without disturbance					

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

Result sheet B - Used where integrations of a constant load is applied and the totalization indicator is used to determine the error

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

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

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.6.5.2 Immunity to conducted electromagnetic fields (continued)

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

Additional information regarding testing, e.g., by photos or sketches

1.6.6 DC mains voltage dips, short interruptions and (short term) variations (R 61-2, 10.3.10)

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

Automatic zero-setting and zero-tracking device is:

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

Marked nominal voltage (U_{nom}) or voltage[10] range[11]: ☐ V

Test load, *L*: ☐

Disturbance				Result		
Amplitude (%U_{nom})	Duration (s)	Number of disturbances	Repetition interval (s)	Indication *I*	Significant fault	
					No	Yes (remarks)
without disturbance						
0 (high imp)	0.01	3	10			
0 (low imp)	0.01	3	10			
40	0.1	3	10			
70	0.1	3	10			
85	10	3	10			
120	10	3	10			

[10] The reference voltage shall be as defined in IEC 1000-4-11 (1994) section 5.

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Amplitude (%U_{nom})	Duration (s)	No. of disturbances	Repetition interval (s)	Totalization						Significant fault
				Load	Calculated change	Before adding load	After adding load	Indicated change	No	Yes (remarks)
without disturbance										
0 (high imp)	0.01	3	10							
0 (low imp)	0.01	3	10							
40	0.1	3	10							
70	0.1	3	10							
85	10	3	10							
120	10	3	10							

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

☐ 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:

1.6.7 **Ripple on DC mains power** (R 51-2, 10.3.7)

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

Load: ☐

Voltage (U_{nom}): = ☐ V U_{min} = ☐ V U_{max} = ☐ V

Result sheet A

Disturbance			Result	
Test Condition		Indication I	Significant fault	
Test	Duration (s)		No	Yes (remarks) [12]
without disturbance				
without disturbance				

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

Result sheet B - Used where integrations of a constant load is applied, and the totalization indicator is used to determine the error

Test	Duration (s)	No. of disturbances	Repetition interval (s)	Totalization						Significant fault
				Load	Calculated change	Before adding load	After adding load	Indicated change	No	Yes (remarks)
without disturbance										
0 (high imp)	0.01	3	10							
0 (low imp)	0.01	3	10							
40	0.1	3	10							
70	0.1	3	10							
85	10	3	10							
120	10	3	10							

☐ 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:

1.7 Metrological characteristics (R xx-1, 3.7.4 & R xx-2, 8)

1.7.1 Repeatability (R xx-1, 3.7.4.1 & R xx-2, 8.1)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

Time to Σ_{min} at L	Static load, L
	20 % Max =
	50 % Max =
	75 % Max =
	Max =

Test load, L	Totalizing time	T*	Indicated total		Difference $I_1 - I_2$
			Run 1, I_1	Run 2, I_2	

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.7.2 Discrimination of the totalization indicating device (R xx-1, 3.7.4.2 & R xx-2, 8.2)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Pre-test information

Time to Σ_{min} at L	Static load, L
	20 % Max =
	50 % Max =
	75 % Max =
	Max =

First test load, L_1	Totalizing time	Additional load L_2	Totalizing time	Calculated quantity		Indicated quantity		Difference, $I_2 - I_1$
				T_1	T_2	I_1	I_2	
20 % Max =								
50 % Max =								
75 % Max =								
Max =								

☐ Passed ☐ Failed

Where: L_1 = First arched chute load

$$L2 = \begin{Bmatrix} load\ x\ 0.07\ \%\ for\ class\ 0.2 \\ load\ x\ 0.175\ \%\ for\ class\ 0.5 \\ load\ x\ 0.35\ \%\ for\ class\ 1 \\ load\ x\ 0.7\ \%\ \ for\ class\ 2 \end{Bmatrix}$$

"Totalizing time" = the exact duration of the test

$$T = \frac{\text{Totalizing time} \times L}{\text{Totalizing time}}$$

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.7.3 Discrimination of the totalization indicating device used for zero totalization (R xx-1, 3.7.4.3 & R xx-2, 8.3)

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

Test duration = ☐

Test	Initial quantity, T_1	Totalizing time	Final quantity, T_2	Totalizing time	Difference, $T_1 - T_2$
Test load added					
1					
2+					
3					
4+					
5					
6+					
Test load removed					
7+					
8					
9+					
10					
11+					
12					

☐ Passed ☐ Failed

Where: + indicates presence of test load on the force receptor

$$Test\ load = \begin{Bmatrix} 0.02\ \%\ of\ Max\ for\ class\ 0.2 \\ 0.05\ \%\ of\ Max\ for\ class\ 0.5 \\ 0.1\ \%\ of\ Max\ for\ class\ 1 \\ 0.2\ \%\ of\ Max\ for\ class\ 2 \end{Bmatrix}$$

Remarks:
Include information that affect the test condition, as indicated in R xx-2, 7.1

1.7.4 Short- and long-term stability of zero (R xx-1, 3.7.4.4 & R xx-2, 8.4)

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

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

Requirement (R 50 -1, 3.7.4.4.1)	class 0.2: 0.000 5 %	class 0.5: 0.001 25 %	class 1: 0.002 5 %	class 2: 0.005 %
Difference between the highest and lowest indicated values obtained in the set of the six readings from 0 minutes to 15 minutes =				
Difference between the highest and lowest indicated values obtained in the set of the six readings from 195 minutes to 210 minutes =				
Requirement (R xx-1, 3.7.4.4.2)	class 0.2: 0.000 7 %	class 0.5: 0.001 75 %	class 1: 0.003 5 %	class 2: 0.007 %
Difference between the highest and lowest indicated values obtained in the set of the twelve readings from 0 minute to 210 minutes =				

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

1.8 In-situ tests (R xx-1, 3.8 & 7.1 and R xx-2, 8 & 9)

Location details:	
In-situ data:	
Application no.:	
Type designation:	
Observer:	
Date:	

Data	Derivation	Data ref.	Value	Units
Totalization scale interval		d		
Scale interval for zero-setting	From the device used for zero indication			
Maximum capacity	Maximum net load of the force receptor	Max		
Minimum totalizing time		T_{min}		
Maximum mass flowrate	Max × Qm	$Q\text{m}_{max}$		kg/h or t/h
Minimum mass flowrate	Mass flowrate at which weighing results comply with requirements	$Q\text{m}_{\text{min}}$		kg/h or t/h
Weighing segment length		W_{L}		m
2 % of the load at $Q\text{m}_{max}$ for 1 hour	$0.02 \times Q\text{m}_{\text{max}}$ where $Q\text{m}_{\text{max}}$ is expressed in units of mass per hour	(1)		kg or t
Table 3 (R xx-1, 3.4)	$\left\{\begin{array}{l}2000\,d \text{ for class } 0.2\\800\,d \text{ for class } 0.5\\400\,d \text{ for class } 1\\200\,d \text{ for class } 2\end{array}\right\}$	(2)		kg or t
Minimum totalized quantity, Σ_{min}	Largest of (1) and (2)	Σ_{min}		kg or t
*				

* Insert other relevant data as necessary

2 In-situ product tests (R xx-1, 3.8, 6.2.2.1, 7.1 & R xx-2, 9)

2.1 Accuracy of the control instrument

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

Minimum capacity:		Date:		yyyy-mm-dd
Scale interval, *d*		Time:		hh:mm:ss
Resolution during test: (smaller than *d*)				
Observer:				

Control instrument details:		Arched chute weigher details:	
Type:		Σ_{min}:	
Class:			
Max capacity:			
Min capacity:			
Control instrument scale interval, d_c:			
Approval no.:		Transfer vehicle:	
Date of last test:		Capacity:	

REQUIREMENT (R xx-2, 4.2.1):

The control method used for product tests shall enable determination of the mass of the product used for testing with an error not exceeding one-third of the appropriate mpe for automatic weighing in R xx-1, 3.2.1.

Example: Number of weighings on control instrument

$$= \frac{2\,\Sigma_{min}}{\text{Vehicle capacity}}$$

(One gross, one tare for each load)

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

$$\text{Possible control instrument error} = \left\{ \begin{array}{c} \pm 0.5\, d_c \text{ for } 0 \leq m \leq 500 \\ \pm 1.0\, d_c \text{ for } 500 < m \leq 2000 \\ \pm 1.5\, d_c \text{ for } 2000 < m \end{array} \right\} = E_c \text{ (Class III) per weighing}$$

Requirement:

$$\frac{\text{mpe}}{100} \times \Sigma_{min} \times 1/3 \geq \sqrt{N} \times Ec$$

where $\sqrt{N}$ is an adjustment for the probable error of *N* partial weighings.

The metrological authority may want to take into consideration other factors such as weather, product loss, etc.

2.2 Repeatability (R xx-1, 3.8.1 & R xx-2, 9.3.2)

Application no.: .....

Type designation: .....

Observer: .....

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

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

Test pair	Controlled load, *T*	Indication, *I*	Feed mass flowrate	Error, *I* – *T*	Error (%)	Error difference (%)
1						
2						
3						
4						
5						

☐ Passed ☐ Failed

Note: To be used to determine the following:
mpe for type evaluation (R xx-2,4 and 9);
mpe for initial verification and in-service inspection (R xx-1, 6.2.2.1).

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

2.2 Repeatability (continued) - continuation test sheet

Infeed mass flowrate = ...

Test pair	Controlled load, *T*	Indication, *I*	Feed mass flowrate	Error, *I* – *T*	Error (%)	Error difference (%)
1						
2						
3						
4						
5						

Infeed mass flowrate = ...

Test pair	Controlled load, *T*	Indication, *I*	Feed mass flowrate	Error, *I* – *T*	Error (%)	Error difference (%)
1						
2						
3						
4						
5						

☐ Passed ☐ Failed

Remarks:

Include information that affect the test condition, as indicated in R xx-2, 7.1

3 Checklist

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

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
3		METROLOGICAL REQUIREMENTS				
3.2		**Maximum permissible errors**				
3.2.1	9.3.2	a) Maximum permissible errors for automatic weighing: do not exceed values in R xx-1 Table 1 rounded to nearest *d*				
3.2.2	7	b) Maximum permissible errors for influence factor tests shall not exceed the values in R xx-1 Table 2 rounded to nearest *d*				
3.3	Observe	**Agreement between multiple indicating devices**				
		No difference between results				
3.4	Observe	**Minimum value of minimum totalized quantity, Σ_{min} ≥ largest of the following:**				
		a) 2 % of load totalized in 1 hour at max mass flowrate;				
		b) The quantity corresponding to the appropriate number of totalization scale intervals in R xx-1 Table 3.				
3.5	Observe	**Minimum mass flowrate (Q_{min}):**				
		The weighing results shall comply with the requirements of this Recommendation at or above the minimum mass flowrate				
		Units of measurement:				
3.6	Observe	a) The units of mass used on arched chute weighers are: gram (g), kilogram (kg) and tonne (t)				
		b) The mass flowrate units to be used are: gram per hour (g/h), kilogram per hour (kg/h) and tonne per hour (t/h)				
		Verify compliance using simulation:				
3.7.1	5.4	Variation of infeed mass flowrate: errors do not exceed mpes for influence factor tests in R xx-1, 3.2.2, Table 2				

* Use continuation sheet if necessary.

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
3.7.2	5.5	**Eccentric infeed mass flowrate:** Eccentric product flowrate shall not lead to a totalization error exceeding the maximum permissible error Eccentric product flowrate may result from: a) non-uniform or eccentric distribution of product mass flowing from the product infeed; b) misaligned product flow, that is, misalignment between the product infeed and the arched chute.				
3.7.3	7.2	**Influence quantities**				
3.7.3.1	7.2.1	a) Static temperatures				
3.7.3.2	7.2.2	b) Temperature effect at zero mass flowrate				
5.5.3	7.2.3.1	c) Damp heat, steady state (non-condensing)				
5.5.3	7.2.3.2	d) Damp heat, steady state (condensing)				
3.7.3.3	7.2.4	e) Mains voltage (AC)				
3.7.3.4	7.2.5	f) Mains voltage (DC)				
3.7.3.4	7.2.6	g) Battery voltage (not main connected)				
3.7.4		h) Metrological characteristics				
		Repeatability:				
3.7.4.1	8.1	Difference between two results obtained for the same load ≤ absolute value of mpe for influence factor tests in R xx-1, 3.2.2				
		Discrimination of the totalization indicating device:				
3.7.4.2	8.2	Difference between the indications with and without the additional load shall be at least equal to one half of the calculated value related to the additional load.				
		Discrimination of the totalization indicating device used for zero totalization:				
3.7.4.3	8.3	Visible differences between indications obtained at no force and the situation where a force is applied, equal to the following percentages of the maximum capacity:				
		a) 0.02 % for class 0.2				
		b) 0.05 % for class 0.5				
		c) 0.1 % for class 1				
		d) 0.2 % for class 2				
3.7.4.4	8.4	**Stability of zero:**				
		Short stability of zero:				
3.7.4.4.1		Difference between zero-indications in 1 hour at Qm_{max} shall not exceed the following percentages over a period of: 3.5 hours of simulated operation:				
		a) 0.00 05 % for class 0.2				
		b) 0.001 25 % for class 0.5				
		c) 0.002 5 % for class 1				
		d) 0.005 % for class 2				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
3.7.4.4.2		**Long stability of zero:**				
		Difference between the highest and lowest indicated values obtained in the set of the six readings from 195 minutes to 210 minutes at Qm_{max} shall not exceed the following percentages:				
		a) 0.000 05 % for class 0.2				
		b) 0.001 25 % for class 0.5				
		c) 0.002 5 % for class 1				
		d) 0.005 % for class 2				
3.8		**In-situ method during type evaluation and verification**				
		Repeatability:				
3.8.1	9.3.2	Difference between errors shall not exceed the absolute value of the appropriate mpe for automatic weighing in R xx-1, 3.2.1				
		Durability:				
3.8.2	5	The durability error due to wear and tear, or the decay of the properties of electronic components shall not be greater than the absolute value of the maximum permissible error for automatic weighing R xx-1, 3.2.2				
4		**Technical requirements**				
4.1	Observe	**Suitability for use:**				
		a) Instrument suits method of operation				
		b) Instrument suits products				
		c) Instrument suits accuracy class				
5.1.1	Observe	**Performance under rated operating conditions:**				
		Instrument does not exceed the mpe				
4.2	Observe	**Security of operation:**				
4.2.1	6.2	**Accidental maladjustment:**				
		a) Effect is obvious				
		b) Adjustable components that can disturb the metrological performance of arched chute weighers are held securely and the position of the component is accurately and permanently defined,				
4.2.2		**Operational adjustment:**				
		a) It is not possible for general totalization indicating device to be reset to zero				
		b) It is not possible to make operating adjustments or to reset other trade indicating devices during an automatic weighing operation				
4.2.3	Observe	**Fraudulent use**:				
		No characteristics likely to facilitate fraudulent use				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
4.2.4	Observe	**Operating devices:**				
		Cannot normally come to rest in a position other than those intended unless all indication and printing disabled				
4.2.5	Observe	**Conveyor interlock: If arched chute weigher is switched off/ceases to function:**				
		Product flow stops, or				
		Visible or audible signal is given				
4.2.6	Observe	**Out of range warning or alarm:**				
		a) Produces a continuous, clearly audible and/or visible warning or alarm, or				
		b) Generates a record of the warning or alarm with the date, time, duration and totalized value on the applicable totalized printout, or on any supplementary recording devices; if:				
		c) The instantaneous load is above the maximum capacity of the weighing unit				
		d) The mass flowrate is above the maximum or below the minimum value				
		e) A breakdown, maladjustment or fault has been detected (R xx-1, 4.3.1)				
		f) A whole conveyor totalization device, if applicable, provides a totalization over less than a whole number of mass flowrates;				
4.2.7	Observe 6.3	**Securing and sealing of components and pre-set controls:**				
		a) Components, interfaces and pre-set controls subject to legal requirements that are not intended to be adjusted or removed by the user are fitted with a securing means or enclosed. When enclosed, it is not possible to seal the enclosure. The seals are easily accessible				
		b) Adequate securing is provided on all parts of the measuring system which cannot be protected in any other way against operations liable to affect the measurement accuracy				
4.2.7.1	Observe	**Securing and sealing measures:**				
		a) Access to functions liable to affect metrological properties are restricted by means such as, a switch protected by a physical seal, a password with audit trail, hard key or identification tag				
		b) Software functions are secured against intentional, unintentional and accidental changes in accordance with the requirements of R xx-1, 5.8				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		c) Transmission of metrological data via interfaces are secured against intentional, unintentional and accidental changes in accordance with the requirements of R xx-1, 5.6.1				
		d) Measurement data held on storage devices are secured against intentional, unintentional and accidental changes in accordance with the requirements of R xx-1, 5.7				
4.2.7.2	Observe	**Means for securing components and pre-set controls to which access or adjustment is prohibited is provided:**				
		a) Physical seals, if available, must be broken to access the components or functions, and/or an audit trail system				
		b) Physical seals which automatically memorize access to components or functions and it shall be possible to access and display this information, the records shall include the date and a means of identifying the authorized person making the intervention				
		c) The audit trail should contain sufficient information to identify which password or identification tag was used to make the intervention				
4.2.7.2	Observe	Means for securing components and pre-set controls to which access or adjustment is prohibited is provided:				
		a) The traceability of the interventions shall be assured for at least a period of time specified by national legislation. Records of interventions shall be retained				
		b) Records may not be overwritten, with the exception that if the storage capacity for records is exhausted, new records may replace the oldest record provided that the owner of the data has given permission to overwrite the records				
		c) The sealing measures provided shall be easily accessible.				
4.3	Observe	**Totalization indicating and printing devices:**				
4.3.1		**Quality of indication:**				
		a) Allow reliable, simple, and non-ambiguous reading of the primary indications				
		b) The standard uncertainty in the reading of an analogue indicating device shall not exceed 0.2 *d*				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		c) The figures forming the primary indications shall be of a size, shape and clarity for reading to be easy, and the height of the figures at least 9.5 mm				
		d) The scales, numbering and printing shall permit the figures which form the results to be read by simple juxtaposition.				
4.3.2	Observe	**Form of the indication:**				
4.3.2.1		a) Unit of mass: contain the names or symbols of the units of mass in which they are expressed				
		b) For any one indication of mass, only one unit of mass may be used				
		c) Units of mass are indicated in small letters (lower case) as shown in R xx-1, 3.6.				
4.3.2.2	Observe	**Digital indication:**				
		a) Shows at least one figure beginning at the extreme right;				
		b) Zero may be indicated by one zero to the extreme right, without a decimal sign				
		c) Indicated values have not more than one non-significant zero to the right, and for values with decimal sign, the non-significant zero is allowed only in the third position after the decimal sign				
		d) Decimal fraction is separated from its integer by a decimal sign, with the indication showing at least one figure to the left of the sign and all figures to the right				
		e) Decimal sign is on one line with the bottom of the figures (example: 0.305 kg)				
4.3.3		**Scale interval:**				
4.3.3.1	Observe	a) In the form 1×10^k, 2×10^k, or 5×10^k, "k" being a positive or negative whole number or zero				
4.3.3.2	Observe	b) Scale interval, d, of a partial totalization indicating device is equal to scale interval of the general totalization indicating device				
4.3.3.3	Observe	c) Scale interval of supplementary totalization indicating devices is at least equal to 10 times totalization scale interval				
4.3.4	Observe	**Range of indication:**				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		a) At least one totalization indicating device indicates a value equal to quantity of mass of the product weighed in 10 hours of operation at Qm_{max};				
		b) A larger range of indication may be required for installations where larger deliveries are anticipated.				
4.3.5	6.4	**Totalization indicating devices:**				
		a) In automatic operation: it is not possible to reset the general totalization indicating device; or				
		b) It is not possible to reset the partial totalization indicating device to zero unless the last total indicated before resetting to zero is printed; or				
		c) For a multi-function display an automatic indication of the total is generated if the automatic operation is interrupted or during automatic operation at the latest 20 seconds after indication of another information;				
4.3.6	Observe	**Engagement of totalization indicating and printing devices:**				
		a) Permanently engaged and clearly indicates when they are not engaged;				
		b) There is a device which disengages the totalization indicating devices where it is definitely ensured that there is no movement of the chute or product feed cannot occur.				
4.3.7	Observe	**Printing device:**				
		a) Printing is clear and permanent for the intended use;				
		b) Printed figures are at least 2 mm high;				
		c) If printing takes place, the name or the symbol of the unit of measurement is either to the right of the value; or				
		d) Above a column of values				
4.4	5.6 Observe	**Zero-setting device:**				
		a) The effective mass of the arched chute weigher shall be balanced by a zero-setting device of a type appropriate to the principle of operation of the arched chute weigher				
		b) Does not exceed 4 % of max capacity				
4.4.1		**Semi-automatic and automatic zero-setting devices:**				
		a) The setting to zero takes place after a whole number of revolutions of the conveyor, and				
		b) The end of the zero-setting operation is indicated; and				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		c) For testing purposes, it shall be possible to disengage automatic zero-setting devices during testing as appropriate;				
		d) If an automatic zero-setting device is included must have interlock to prevent zero-setting				
4.5	Observe	**Arched chute:**				
4.5.1	Observe	**Arched chute properties:**				
4.5.1.1		**Weighing segment length** The arched chute shall be installed in such a way that the weigh length of the weighing segment and geometrical alignment remains unchanged while in service.				
		Arched chute shape (dimensions)				
4.5.1.2		a) The curve of the arched chute shall fit the segment of a circle having a radius that is appropriate to the chute length.				
		b) The arched chute shall normally be installed in a fixed position.				
		c) If the slope angle of the force receptor, perpendicular to the mass flow can change, either: 1) the arched chute weigher shall be fitted with a device to compensate the effect of the change, or 2) the arched chute weigher shall not operate, delivery shall not be possible, and totalization shall be disabled during the period of time that the slope of the conveyor is in transition or when the limits to the slope angle set by the manufacturer are exceeded.				
		Arched chute surface				
		The arched chute surface shall suite the correct weighing of the applicable bulk product. Different bulk products may require different arched chute surfaces. For that specific documentation shall accompany each arched chute providing information on the ranges of bulk products for which the arched chute is designed.				
4.5.2.1	Observe	**Draught (air flow) prevention**				
		Adequate measures shall be taken to prevent any disturbance of the flow of the bulk product caused by draught and potentially of influence on the measuring result.				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
4.5.3		**Internal clock**				
	Observe	a) Keeps track of the time keeps time and is used for the calculation of the measurement result.				
		b) Time correction shall be secured in accordance with 4.2.7.				
		c) In the event of an interruption of the power, the internal clock shall continue to function correctly, in accordance with 5.5.5 and 5.5.6.				
4.6		**Identification markings:**				
		a) Identification mark of the manufacturer;				
		b) Serial number and type designation of the arched chute weigher;				
		c) Identification mark on each part of an instrument consisting of separate but associated parts				
		d) Type approval sign;				
4.6.2		**Marking of specifications**				
		a) mains power voltage V				
		b) mains power frequency ..... Hz (if applicable)				
		c) designation of type(s) of product to be weighed				
		d) density the of product in kg/L or t/m^3				
		e) particle size of the product in mm or in µm diameter				
		f) maximum capacity, Max ..... N				
		g) temperature range ..... °C / ..... °C, (if applicable, see 3.7.3.1)				
		h) accuracy class = 0.2, 0.5, 1 or 2				
		i) totalization scale interval, d = ... g, kg or t				
		j) maximum mass flowrate, Qm_{max} = ... g/h, kg/h or t/h				
		k) minimum mass flowrate, Qm_{min} = ... g/h, kg/h or t/h				
		l) pneumatic/hydraulic pressure, (if applicable),				
		m) minimum totalized quantity, Σ_{min} = ... g, kg or t				
		n) designation of the acceptable moisture and temperature range for each product to be weighed				
		o) minimum totalizing time, T_{min} =…../				
4.6.3	Observe	Supplementary markings: as required by metrological authority	Note in Remarks			
4.6.4	Observe	**Presentation of descriptive markings:**				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		a) Indelible and of a size, shape and clarity to enable legibility under typical weighing conditions;				
		b) Either in the national language or a language which is allowed to be applied in the particular country or in form of adequate, internationally agreed and published pictograms or signs;	Confirm			
		c) Grouped together in a clearly visible place either on a descriptive plate near the general totalization indicating device or on the indicating device itself;				
		d) In the case of a plate or sticker which is not destroyed when removed, a means of securing shall be provided; or				
		e) It shall be possible to seal the plate bearing the markings				
	Observe	**The markings mentioned above may also be shown on a software controlled programmable display provided that:**				
		a) at least Max, $Q\mathrm{m}_{max}$, $Q\mathrm{m}_{min}$, Σ_{min} and d shall be displayed when the arched chute weigher is in switched on mode;				
		b) other markings will be displayed on manual command				
		c) the user manual provides information on the manner in which the specifications can be observed, and				
		d) the markings are considered as device-specific parameters (see 2.2.9.4) and shall comply with the appropriate requirements for securing in R xx-1, 4.2.7 and 5.8				
	Observe	Software controlled display markings need not be repeated on the hardware plate, if they are shown on or displayed near the display of the weighing result, with the exception of the following markings which shall be shown on the data plate:				
		a) Max, $Q\mathrm{m}_{max}$, $Q\mathrm{m}_{min}$, and d are shown near the display;				
		b) Type approval mark in accordance with national requirements;				
		c) Name or identification mark of the manufacturer;				
		d) Voltage supply;				
		e) Voltage supply frequency, (if applicable);				
		f) Pneumatic/hydraulic pressure, (if applicable);				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
4.7	Observe	**Verification marks:**				
4.7.1		**Position of verification marks:**				
		a) Part on which it is located cannot be removed from the arched chute weigher without damaging the marks;				
		b) Allows easy application of mark without changing the metrological qualities of the arched chute weigher;				
		c) Is visible without the arched chute weigher or its protective covers having to be moved when it is in service				
4.7.2		**Mounting: arched chute weighers required to have verification marks shall have:**				
		a) Verification mark support, at the place location as described in R xx-1, 4.7.1 to ensure conservation of the marks;				
		b) When the mark is made by a stamp, the support is a strip of lead or other product with similar qualities inserted into a plate fixed to the arched chute weigher; or into a cavity in the arched chute weigher;				
		c) Space provided for adhesive printed label (if applicable);				
5		**Additional requirements for electronic arched chute weighers:**				
5.1		**General requirements on sensitivity to external influence quantities**				
5.1.2	7.3	**Disturbances:**				
		When exposed to disturbances, either				
		a) significant faults do not occur, or				
		a) significant faults are detected and acted upon under:				
	7.3.1	i) AC mains voltage dips, short interruptions and reductions				
	7.3.2	ii) Bursts (fast transient tests) on mains power lines and on signal, data and control lines				
	7.3.3	iii) Surges on AC and DC mains power lines and on signal, data and control lines				
	7.3.4	iv) Electrostatic discharge test				
	7.3.5.1	v) Immunity to radiated electromagnetic fields				
	7.3.5.2	vi) Immunity to conducted electromagnetic fields				
5.2	Observe	**The disturbances application may be applied separately to each:**				
		a) individual cause of significant fault; and/or	Note in remarks			
		b) part of the electronic instrument	Note in remarks			
		Choice of (a) or (b) above is made by the manufacturer	Note in remarks			
5.1.3	Observe	**Durability:**				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		Requirements in R xx-1, 3, 4 and 5.1.3 shall be met durably				
5.1.4	Observe	**Evaluation for compliance:**				
		Instrument has passed examination and tests specified in R xx-2:				
5.3	Observe	**Acting upon a significant fault:**				
		a) Visual indication; or				
		b) Audible indication is provided and continues until user takes action or the fault disappears				
		Totalized quantity information is retained when a significant fault occurs				
5.4	Observe	**Display failure detection**:				
		All relevant signs of indicating devices are activated				
5.5		**Functional requirements:**				
5.5.1	7.2.3	**Influence factors:**				
		Instruments shall maintain their metrological and technical characteristics under influences.				
5.5.3	7.2.3	**Humidity:**				
		Instruments shall maintain their metrological and technical characteristics at relative humidity of either 85% (non-condensing) or 93% (condensing) at the upper limit of the temperature range of the instrument.				
5.5.4	5.2	**Warm-up time:**				
		a) No indication/transmission of results and automatic operation is inhibited;				
		b) Contains sufficient information on arched chute weigher interfaces as specified in R xx-1, 5.6.				
5.5.5	7.2.4 7.2.5	**Mains electrical power supply failure:**				
		a) Retain the metrological information contained in the arched chute weigher at the time of failure for at least 24 hours; and				
		b) is capable of indicating that information for at least 5 minutes following energization during the 24-hour period;				
		c) Switch-over to emergency power supply shall not cause a significant fault.				
5.5.6	7.2.6	**Battery power supply:**				
		a) Either continues to function correctly or is automatically put out of service whenever the voltage drops below the specified minimum value;				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		b) Retains metrological information contained in the instrument at the time of failure for at least 24 hours;				
		c) Capable of indicating that information for at least 5 minutes following energization during the 24-hour period				
5.6	Observe	**Interface:**				
5.6.1		Does not affect metrological functions and instrument functions correctly				
		Interface security:				
		a) Does not allow the legally relevant software and functions of the arched chute weigher and its measurement data to be inadmissibly influenced by:				
		b) Other interconnected instruments; or				
		c) Disturbances acting on the interface				
	Observe	An interface through which the functions mentioned above cannot be performed or initiated, need not be protected. Other interfaces shall be secured as follows:				
		a) Data is protected e.g., with a protective interface (R xx-1, 2.2.12.2), against accidental or intentional interference;				
		b) Hardware and software functions shall comply with the appropriate requirements for securing in R xx-1, 4.2.7 and 5.8;				
		c) It shall be easily possible to verify the authenticity and integrity of data transmitted to and from the arched chute weigher;				
		d) Other devices required by national regulations to be connected to the interfaces of arched chute weighers shall be secured to inhibit automatically the operation of the arched chute weigher for reasons of the non-presence or improper functioning of the required device.				
5.7	Annex A.3	**Data storage device:**				
		a) Stored in internal memory or on external storage for subsequent use;				
		b) The stored data is adequately protected against intentional and unintentional changes during the data transmission and/or storage process;				
		c) Contains all relevant information necessary to reconstruct an earlier measurement.				
5.7.1	Observe	**Securing measures:**				
		a) Meets the appropriate requirements of R xx-1, 4.2.7 for securing;				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		b) External storage devices identification and security attributes shall be automatically verified to ensure integrity and authenticity;				
		c) Exchangeable storage media for storing measurement data need not be sealed provided that the stored data is secured by a specific checksum or key code;				
		d) When storage capacity is exhausted, new data may replace the oldest data provided that overwriting the old data has been archived and/or authorized.				
5.8	Annex A	**Software:**				
	Annex A.1	Legally relevant software of the arched chute weigher is identified by the manufacturer;				
	Annex A.2.1	Sufficient information on software controlled instruments is available				
5.8.2	Annex A.2.2	**Security of legally relevant software:**				
		a) Legally relevant software is adequately protected against accidental or intentional changes;				
	Annex A.2.4	b) Software is assigned with appropriate software identification which is adapted in the case of every software change that may affect the functions and accuracy of the arched chute weigher;				
	Annex A.2.3	c) Functions performed or initiated via connected interfaces, i.e., transmission of legally relevant software, shall comply with the securing requirements for interfaces in R xx-1, 5.6.				
6	Annex C	**Metrological controls:**				
		Measures to ensure durability shall be taken subject to national regulations, and shall include assessments under items (a) to (d) below in compliance with R xx-1, 3.9.	Note in remarks			
		a) Type approval				
		b) Initial verification				
		c) Subsequent verification				
		d) In-service verification				
6.1		**Type evaluation:**				
6.1.1	Observe	**Documentation:**				
		Metrological characteristics:				
		a) Standard set of specifications for the arched chute weigher;				
		b) Functional description of components and devices;				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		c) Drawings, diagrams and general software information;				
		d) Description and application of securing components, interlocks, adjustment devices, controls, etc. (R xx-1, 4.2, 5.8);				
		e) Details of fractions p_i (modules tested separately) R xx-2, 6.1.6.7;				
		f) Totalization indicating and printing devices (R xx-1, 4.3);				
		g) Data storage device (R xx-1, 5.7);				
		h) Zero-setting devices (R xx-1, 4.5);				
		i) Interfaces (types, intended use, immunity to external influences instructions, etc., (R xx-1, 5.6);				
		j) Detailed software information for software controlled instruments (R xx-1, 5.8);				
		k) Drawing or photo of the instrument showing the principle and the location of control marks, securing marks, descriptive and verification marks (R xx-2, 4.7, 4.10);				
		l) Operating instructions, manual;				
		m) Information on the applications and ranges of bulk products for which the arched chute is designed (4.5);				
		n) Any document or other evidence demonstrating that the design and construction of the instrument complies with the requirements of this Recommendation;				
		o) Designation of the acceptable moisture and temperature range for each product to be weighed;				
		p) Description of positioning requirements for product flow presentation and suitable cautions about the effect of improper product infeed on the accuracy of the instrument;				
		q) Instructions on positioning, installation and loading requirements for a force simulation platform that can be loaded with weights for use in simulation testing (R xx-2, 4.3) ;				
		r) Instructions on adjusting infeed flow and suitable cautions about limits and securing adjustments during the test the infeed mechanism (Rxx-2, 9.3.3).				
		s) Any document or other evidence that the arched chute weigher complies with the requirements				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
6.1.2	Observe	**General requirements:**				
		a) At least one and not normally >3 units that represent the definitive type, one in a form suitable for simulation testing in a laboratory				
		b) At least one unit installed at a typical site				
6.1.3	Observe	**Examinations and tests**				
		a) Complies with R xx-1, 3, particularly with reference to maximum permissible errors, when the instrument is operated in accordance with the manufacturer's specifications for range and product(s);				
		b) Complies with R xx-1, 4				
		c) Complies with R xx-1, 5				
		d) Submitted documents examined and tests carried out to verify that the instruments comply with the above requirements				
		e) Tests conducted without unnecessary commitment of resources				
		f) Metrological authority permits the results of these tests to be assessed for initial verification				
6.1.3.1	8.2	**In-situ product tests shall be done in accordance with Rxx-2, 4.1.**				
6.1.3.2	Observe	**Provision for means of testing:**				
		For the purposes of testing, the applicant may be required to furnish the metrological authority with the quantity of product, handling equipment, qualified personnel, and a control instrument	Confirm			
6.1.3.3	Observe	**Place of testing:**				
		a) The premises of the metrological authority to which the application has been submitted;				
		b) Any other suitable place mutually agreed upon between the metrological authority and the applicant				
6.1.4	Observe	Type approval certificate: states the appropriate accuracy classes 0.2, 0.5, 1 or 2, as specified at type approval stage and determined by compliance with the metrological requirements at initial verification of the instrument.				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
6.1.5	Observe	Influence factor tests are applied to the complete instrument or simulator as specified in R xx-2, 7.2 in a manner that will reveal a corruption of the weighing result of any weighing process to which the arched chute weigher could normally be applied, in accordance with R xx-1, 3.7 and 5.				
6.1.6	Annex B	**Testing of a family of instruments or modules:**				
		a) As agreed between the metrological authority and the manufacturer				
		b) Where testing the instrument as a whole is difficult or impossible				
		c) Where modules are manufactured and/or placed on the market as separate units to be incorporated in a complete instrument;				
		d) Where the applicant wants to have a variety of modules included in the approved type;				
		e) When a module is intended to be used for various kinds of arched chute weighers (in particular load sensors, indicators, data storage).				
6.1.6.1	Annex B	**Selection of EUTs:**				
		a) Number of EUTs selected is minimized but nevertheless sufficiently representative				
		b) When a choice exists, the EUT with the highest metrological characteristics is selected for test				
6.1.6.2	Observe	**Accuracy class:**				
		If an EUT of a family has been tested completely for one accuracy class, it is sufficient for an EUT of a lower class if only partial tests are carried out that are not yet covered				
6.1.6.3	Observe	**Other metrological features to be considered:**				
		All metrologically relevant features and functions are tested at least once in an EUT as far as applicable and as many as possible in the same EUT				
6.1.6.4	Observe	**Summary of relevant metrological characteristics: The EUTs cover:**				
		a) Lowest input signal (see R xx-1, 6.1.6.5);				
		b) All accuracy classes;				
		c) All temperature ranges;				
		d) Dimensions of force receptor;				
		e) Dimensions and geometrical position (angles) of the arched chute;				
		f) Metrological relevant features (see R xx-2, 5.1.6.3);				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		g) Different types of force receptors, if connectable to the indicator; and				
		h) All possible instrument functions;				
		i) Different types of force receptors;				
		j) All possible indications;				
		k) All possible implemented digital devices;				
		l) All possible interfaces.				
6.1.6.5	Observe	**Minimum input voltage of electronics for maximum capacity:**				
		An analogue data processing device or indicator intended for analogue force transducer(s) is tested at a minimum input voltage signal, specified by the manufacturer, for a load equal to maximum capacity.				
		A complete instrument shall not be configured in such a way that its input voltage signal for a load equal to maximum capacity is below the value used at type testing.				
6.1.6.6		**Requirement for the force transducer(s).**				
		a) The accuracy class of the load cells must be better or equal the accuracy class of the weighing instrument, b)				
		c) The total capacity of load cells must be greater than the capacity of the weighing instrument, including the dead load,				
		d) A safety margin of at least 20 % should be applied when determining the measuring range of load cells: due to eccentric loading or uneven load receptor, the force is never perfectly distributed.				
6.1.6.7	7.1	**Apportioning of errors**				
		The error limits applicable to a module which is examined separately are equal to a fraction *pi* of the maximum permissible errors (R xx-1, 3.2.2 Table 2) or the allowed variations of the indication of the complete instrument. The fractions for any module have to be taken for the same accuracy class as for the complete instrument incorporating the module.				
		The fraction p_i shall be chosen by the manufacturer of the module and shall be verified by an appropriate test, taking into account the following conditions:				
		a) For purely digital devices p_i may be equal to 0.				
		b) For weighing modules pi may be equal to 1.				

Reference R xx-1	Test procedure R xx-2	arched chute weighers checklist	Passed	Failed	N/A	Remarks*
		c) For all other modules (including digital load sensors) the fraction shall not exceed 0.8 and shall not be less than 0.3, when more than one module contributes to the effect in question.				
		d) For mechanical structures evidently designed and manufactured according to sound engineering practice, an overall fraction, $p_i = 0.5$, may be applied without any test, e.g. when levers are made of the same material and when the chain of levers has two planes of symmetry (longitudinal and transversal).				
		e) For instruments incorporating the typical modules (see R xx-1 2.2.8) the fractions p_i may have the values given in Table 4, which takes into account the fact that the modules are affected in a different manner depending on the different performance criteria.				

Use this page to detail remarks from the checklist