

CERTIFICATE  
TRANSFORMATION  
REQUIREMENTS

**Supplement to  
OIML R 61**  
Edition 2004 (E)

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**Automatic gravimetric filling instruments**

CERTIFICATE TRANSFORMATION REQUIREMENTS

Doseuses pondérales à fonctionnement automatique

EXIGENCES SUR LA TRANSFORMATION DES CERTIFICATS

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## **Supplement to OIML R 61 – Automatic gravimetric filling instruments**

Edition 2004 (E)

### **CERTIFICATE TRANSFORMATION REQUIREMENTS**

#### **1 Introduction**

OIML Recommendation R 61 (2004) incorporates a number of changes to the 1996 edition, which is now therefore superseded. However, OIML Certificates issued against R 61 (1996) will remain valid without limitation and will remain applicable in certain countries or regions until national and regional regulations are aligned with R 61 (2004). It should also be noted that R 61 (1996) Certificates may be issued up to the end of 2004. In parallel, R 61 (2004) Certificates may be issued to manufacturers as of March 2004, assuming they have manufactured filling instruments that meet the requirements of the new Recommendation.

Therefore, manufacturers who hold R 61 (1996) Certificates and whose filling instruments also meet the requirements of R 61 (2004) may wish to receive R 61 (2004) Certificates without having to be subjected to all the examinations and tests of R 61 (2004), since a number of the requirements are the same as those in R 61 (1996).

This document identifies those requirements in R 61 (2004) that have changed compared with R 61 (1996), as well as new requirements.

Based on this document, an Issuing Authority that issued an R 61 (1996) Certificate for a given model of filling instrument to a given manufacturer may consider the possibility of issuing an R 61 (2004) Certificate without performing all the tests and examinations which were carried out for the R 61 (1996) Certificate. This is conditional on a manufacturer or representative being able to submit a model and documentation providing evidence that it is the same model as evaluated for the R 61 (1996) Certificate and test report. Changes in, or additions to items such as the markings or indications on the filling instruments to conform with the requirements of R 61 (2004) which do not affect the load cell performance shall be permitted.

In the same way, the Issuing Authority may decide to use the former Test Report with supplements for the new and different examinations and tests.

#### **2 Summary of additional requirements**

##### **2.1 Minimum capacity (Min) and Rated minimum fill (Minfill)**

R 61 (1996) defined the minimum capacity and the rated minimum fill in the terminology. However, it did not specify their values or describe their inter-relationship.

R 61 (2004) requires that the:

- Minimum capacity is to be specified by the manufacturer in accordance with the requirements for minimum capacity given in the Recommendation. For filling instruments that effect the fill by one weighing cycle the minimum capacity is equal to the rated minimum fill; and

- Rated minimum fill is determined from automatic weighing while monitoring the effects of zero-setting, warm-up time, temperature effect on no-load and disturbances and is the value below which the weighing results may be subject to errors specified in the Recommendation. For filling instruments that effect the fill by more than one weighing cycle the rated minimum fill is larger than the minimum capacity. Mathematically, the rated minimum fill is expressed as:

$$\text{Minfill} \geq d/\text{MPD}$$

This formula is used to derive the minimum permissible values of Minfill for class X(x) instruments:

<i>d</i> (g)	Minimum permissible value of Minfill (g)			
	X(0.2)	X(0.5)	X(1)	X(2)
0.5	28	11	6	3
1	111	22	11	6
2	334	44	22	12
5	1665	335	110	30
10	3330	1330	330	110
20	6660	2660	1340	340
50	25000	6650	3350	1650
100	50000	20000	6700	3300
200	100000	40000	20000	6600
≥ 500	500 <i>d</i>	200 <i>d</i>	100 <i>d</i>	50 <i>d</i>

(The values in grams are rounded to the values of *d* that can be indicated)

## 2.2 Zero-setting

### 2.2.1 Range of zero-setting

R 61 (1996) did not cover this principle.

R 61 (2004) includes a test for the range of zero-setting and requires that the maximum range of adjustment of zero-setting must be less than or equal to:

- 4 % of maximum capacity of the instrument; and
- 20 % of the maximum capacity of the instrument for the initial zero-setting device.

The initial zero-setting is the sum of positive and the negative parts of the zero-setting range.

### 2.2.2 Automatic programmable zero-setting device

Not covered in R 61 (1996).

R 61 (2004) includes a test for determining the frequency of automatic zero-setting and requires that the maximum programmable time interval must be set by the manufacturer in accordance with the results of the test for frequency of automatic zero-setting.

Additionally, R 61 (2004) allows for the influence of existing operational conditions on the setting of the maximum programmable time interval during in-service operations.

### **2.2.3 Zero-tracking device**

Not covered in R 61 (1996).

R 61 (2004) describes a zero-tracking device as operating only when the indication is at zero, or at a negative net value equivalent to gross zero. Zero-tracking may operate continuously during automatic weighing and must be subjected to a maximum rate of correction of 0.5 MPD in-service per second to prevent interaction with the normal weighing process.

### **2.2.4 Preset tare device**

Not covered in R61 (1996).

R 61 (2004) specifies a preset tare device that:

- Has a scale interval equal to or automatically rounded to the scale interval of the instrument;
- May be operated together with other tare devices provided it cannot be modified or cancelled if any tare device operated after the preset tare operation is still in use; and
- Operates automatically if the preset tare value is clearly identified with the load being weighed.

## **2.3 Descriptive markings**

R 61 (1996) did not require the filling instrument to be marked with its date of manufacture. R 61 (2004) requires the date of manufacture to be marked on the instrument.

## **2.4 Electromagnetic susceptibility disturbance tests**

R 61 (1996) specifies electromagnetic susceptibility tests in the range of 26 MHz to 1000 MHz at fields of 3 V/m RMS in accordance with IEC 61000-4-3 (1995).

R 61 (2004) specifies the updated electromagnetic susceptibility tests in accordance with changes in the IEC Publications as follows:

- Radiated range: 80 MHz to 2 GHz at field of 6 V/m RMS on one face, or 3 V/m RMS on all faces if fail, in accordance with IEC 61000-4-3 (2002); and
- Conducted range: 150 kHz to 80 MHz at field of 3 V RMS in accordance with IEC 61000-4-6 (2001).

## **2.5 Power supply (DC)**

R 61 (1996) did not specify any tests for DC power supply.

The general provision in R 61 (2004) is that a complete measurement or part of a measurement subjected to under and over voltages must be within the maximum permissible errors while the instrument is still operating.

R 61 (2004) also specifies the following tests for DC powered instruments:

Influence factor tests:

- Static temperature;
- Temperature effect on no-load indication;
- Damp heat, steady state; and
- Tilting.

Disturbance tests:

- Electrostatic discharge; and
- Electromagnetic susceptibility.

### 3 Comparison of new or revised requirements in R 61 (2004)

Tables of the new or revised requirements in R 61 (2004) are given on the following pages. For each item, the requirements in R 61 (2004) are detailed alongside those of R 61 (1996).

The far right column under the heading “Does R 61 (1996) Certificate comply with R 61 (2004) on this item?” contains one of three statements:

- Yes:** Yes, models of filling instruments for which there is an existing R 61 (1996) OIML Certificate will comply with R 61 (2004) on this item.
- Re-evaluate:** Models of filling instruments for which there is an existing R 61 (1996) OIML Certificate may or may not comply with R 61 (2004) on this item. The model and/or documentation will need to be re-evaluated to determine compliance.
- New in R 61 (2004):** These items did not exist in R 61 (1996), and must therefore be considered. This may require a review of the documentation on a case by case basis, a visual examination, or tests of the type submitted.

Item	R 61 (1996)		R 61 (2004)		Does R 61 (1996) Certificate comply with R 61 (2004) on this item?																																																											
	Requirements	Ref.	Requirements	Ref.																																																												
Minimum capacity (Min)	Value and relationship with rated minimum fill are not defined.	T.3.7	A value specified by the manufacturer and meeting requirements of R 61. Value must be equal to the rated minimum fill for one weighing cycle of the instrument.	T.3.7 2.6	Re-evaluate																																																											
Rated minimum fill (Minfill)	Value and relationship to the minimum capacity are not defined.	T.3.11	<p>A value derived from automatic weighing while monitoring the effects of zero-setting, warm-up time, temperature on no-load and disturbance, below which the weighing results may be subject to errors specified in R 61.</p> <p>Mathematically, the rated minimum fill is expressed as:</p> $\text{Minfill} \geq d/\text{MPD}$ <p>This formula is used to derive the minimum permissible values of Minfill for class X(x) instruments:</p> <table border="1"> <thead> <tr> <th rowspan="2">d (g)</th> <th colspan="4">Minimum permissible value of Minfill (g)</th> </tr> <tr> <th>X(0.2)</th> <th>X(0.5)</th> <th>X(1)</th> <th>X(2)</th> </tr> </thead> <tbody> <tr> <td>0.5</td> <td>28</td> <td>11</td> <td>6</td> <td>3</td> </tr> <tr> <td>1</td> <td>111</td> <td>22</td> <td>11</td> <td>6</td> </tr> <tr> <td>2</td> <td>334</td> <td>44</td> <td>22</td> <td>12</td> </tr> <tr> <td>5</td> <td>1665</td> <td>335</td> <td>110</td> <td>30</td> </tr> <tr> <td>10</td> <td>3330</td> <td>1330</td> <td>330</td> <td>110</td> </tr> <tr> <td>20</td> <td>6660</td> <td>2660</td> <td>1340</td> <td>340</td> </tr> <tr> <td>50</td> <td>25000</td> <td>6650</td> <td>3350</td> <td>1650</td> </tr> <tr> <td>100</td> <td>50000</td> <td>20000</td> <td>6700</td> <td>3300</td> </tr> <tr> <td>200</td> <td>100000</td> <td>40000</td> <td>20000</td> <td>6600</td> </tr> <tr> <td>≥ 500</td> <td>500 d</td> <td>200 d</td> <td>100 d</td> <td>50 d</td> </tr> </tbody> </table>	d (g)	Minimum permissible value of Minfill (g)				X(0.2)	X(0.5)	X(1)	X(2)	0.5	28	11	6	3	1	111	22	11	6	2	334	44	22	12	5	1665	335	110	30	10	3330	1330	330	110	20	6660	2660	1340	340	50	25000	6650	3350	1650	100	50000	20000	6700	3300	200	100000	40000	20000	6600	≥ 500	500 d	200 d	100 d	50 d	T.3.9 2.7	Re-evaluate
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Item	R 61 (1996)		R 61 (2004)		Does R 61 (1996) Certificate comply with R 61 (2004) on this item?
	Requirements	Ref.	Requirements	Ref.	
In-service and initial verification maximum permissible deviation multiplication factor	Not specified. However a factor of 0.7 is used to derive the in-service verification maximum permissible deviation error.	2.2.2 Table 1	Multiplication factor of 0.8 is used.	2.2.2 Table 1	Re-evaluate
Particle mass correction	Applicable to fills on any filling instrument during Initial and In-service verification.	2.3	Applicable to fills on any filling instrument during Initial, In-service and Subsequent verification except for: <ul style="list-style-type: none"> <li>• Fills less than or equal to 25 kg, which needs to comply with OIML R 87; and</li> <li>• Fills with particle mass using selective combination weighers only.</li> </ul>	2.3	Re-evaluate
Units of measurement	Milligram (mg); Gram (g); Kilogram (kg); or Tonne (t).	2.6	Metric carat (ct); Milligram (mg); Gram (g); Kilogram (kg); or Tonne (t).	2.9	Yes
Final feed cut-off device	Does not include devices with adjustable compensation beam for material in flight.	3.4	Requirements to cover devices which may include adjustable compensation beam for material in flight.	3.5	Yes

Item	R 61 (1996)		R 61 (2004)		Does R 61 (1996) Certificate comply with R 61 (2004) on this item?
	Requirements	Ref.	Requirements	Ref.	
Range of zero-setting and Initial zero-setting	Not specified.	–	<p>Range of adjustment of zero-setting must be less than or equal to:</p> <ul style="list-style-type: none"> <li>• 4 % of the initial zero-setting; and</li> <li>• 20 % of the maximum capacity of the instrument.</li> </ul> <p>Initial zero-setting is the sum of the positive and the negative parts of the zero-setting range.</p>	T.2.4.4 3.8.1 A.5.3.2	New in R 61 (2004)
Automatic programmable zero-setting device	Not included.	–	<p>The maximum programmable time interval will be set by the manufacturer in accordance with the requirements for determining the frequency of automatic zero-setting.</p> <p>Existing operating conditions may influence the maximum programmable time interval.</p>	3.8.3.2 A.5.3.5	New in R 61 (2004)
Zero-tracking device	Not included.	–	<p>A zero-tracking device operates continuously during the automatic weighing cycle and is subjected to a maximum rate of correction of 0.5 MPD for in-service verification.</p>	T.2.4.53 .8.4	New in R 61 (2004)

Item	R 61 (1996)		R 61 (2004)		Does R 61 (1996) Certificate comply with R 61 (2004) on this item?
	Requirements	Ref.	Requirements	Ref.	
Preset tare device	Not included.	–	<p>A preset tare device:</p> <ul style="list-style-type: none"> <li>• Has a scale interval equal or is automatically rounded to the scale interval of the instrument;</li> <li>• May be operated together with other tare devices provided it cannot be modified or cancelled during this combined operation;</li> <li>• Operates automatically if the preset tare value is clearly identified with the load being weighed.</li> </ul>	3.8.6	New in R 61 (2004)
Date of manufacture in descriptive markings	Not required.	3.10.1	Date of manufacture to be included in descriptive markings on the filling instrument.	3.10.1	New in R 61 (2004)
Disturbance tests – electromagnetic susceptibility	Electromagnetic susceptibility field test in the range of 26 MHz to 1000 MHz at fields of 3 V/m RMS in accordance with IEC 61000-4-3 (1995).	4.1.3 A.6.3.4	<p>Electromagnetic susceptibility test:</p> <ul style="list-style-type: none"> <li>• Radiated range: 80 MHz to 2 GHz at a field of 6 V/m RMS on one face, or 3 V/m RMS on all four faces if fail, in accordance with IEC 61000-4-3 (2002);</li> <li>• Conducted range: 150 kHz to 80 MHz at a field of 3 V RMS in accordance with IEC 61000-4-6 (2001).</li> </ul>	4.1.2 A.5.3.2 A.6.3.4	Re-evaluate

Item	R 61 (1996)		R 61 (2004)		Does R 61 (1996) Certificate comply with R 61 (2004) on this item?																								
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Power supply (DC)	No tests specified for DC powered instruments.	4.2.5	Tests for DC powered instruments: 1 General provision: Under and over voltages applied over the complete measurement or part of a measurement shall be within the maximum permissible errors when the instrument is still operating; 2 Influence factor tests: <ul style="list-style-type: none"> <li>• Static temperature;</li> <li>• Temperature effect on no-load indication;</li> <li>• Damp heat, steady state;</li> <li>• Tilting;</li> </ul> 3. Disturbance tests: <ul style="list-style-type: none"> <li>• Electrostatic discharge;</li> <li>• Electromagnetic susceptibility.</li> </ul>	2.8.3 4.2.6 A.6.4	New in R 61 (2004)																								
Metrological controls	Consists of: <ul style="list-style-type: none"> <li>• Pattern approval;</li> <li>• Initial verification;</li> <li>• In-service verification.</li> </ul>	5.1	Consists of: <ul style="list-style-type: none"> <li>• Pattern approval;</li> <li>• Initial verification;</li> <li>• Subsequent verification;</li> <li>• In-service verification.</li> </ul>	5.1 5.4	Yes. In accordance with national requirements																								
Number of fills	<table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">m</td> <td style="text-align: center;">≤ 10 kg</td> <td style="text-align: right;">60 fills</td> </tr> <tr> <td style="text-align: right;">10 kg &lt; m</td> <td style="text-align: center;">≤ 25 kg</td> <td style="text-align: right;">32 fills</td> </tr> <tr> <td style="text-align: right;">25 kg &lt; m</td> <td style="text-align: center;">≤ 100 kg</td> <td style="text-align: right;">20 fills</td> </tr> <tr> <td style="text-align: right;">100 kg &lt; m</td> <td></td> <td style="text-align: right;">10 fills</td> </tr> </table>	m	≤ 10 kg	60 fills	10 kg < m	≤ 25 kg	32 fills	25 kg < m	≤ 100 kg	20 fills	100 kg < m		10 fills	6.3	<table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">FP</td> <td style="text-align: center;">≤ 1 kg</td> <td style="text-align: right;">60 fills</td> </tr> <tr> <td style="text-align: right;">1 kg &lt; FP</td> <td style="text-align: center;">≤ 10 kg</td> <td style="text-align: right;">30 fills</td> </tr> <tr> <td style="text-align: right;">10 kg &lt; FP</td> <td style="text-align: center;">≤ 25 kg</td> <td style="text-align: right;">20 fills</td> </tr> <tr> <td style="text-align: right;">25 kg &lt; FP</td> <td></td> <td style="text-align: right;">10 fills</td> </tr> </table>	FP	≤ 1 kg	60 fills	1 kg < FP	≤ 10 kg	30 fills	10 kg < FP	≤ 25 kg	20 fills	25 kg < FP		10 fills	6.3	Yes
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Item	R 61 (1996)		R 61 (2004)		Does R 61 (1996) Certificate comply with R 61 (2004) on this item?
	Requirements	Ref.	Requirements	Ref.	
Accuracy of standards	<p>Accuracy of the control instrument to an error not greater than either:</p> <p>a) One third of the maximum permissible deviation and maximum permissible preset value error (as appropriate) for automatic weighing (2.2 and 2.3 respectively) if the control instrument or the device used for control purposes is verified immediately prior to the material test; or</p> <p>b) One fifth of the maximum permissible deviation and maximum permissible preset value error (as appropriate) for automatic weighing (2.2 and 2.3 respectively) in all other cases.</p>	6.4 A.3.4.1	Accuracy of the control instrument is to an error not greater than one third of the MPD and MPSE (as appropriate and as specified in 2.2 and 2.4) for automatic weighing.	6.4 A.3.6.1	Yes

Item	R 61 (1996)		R 61 (2004)		Does R 61 (1996) Certificate comply with R 61 (2004) on this item?
	Requirements	Ref.	Requirements	Ref.	
Interruption of automatic cycle	Interruption of automatic operation twice during each filling cycle.	6.5.2.1	Interruption of automatic operation twice during each filling cycle in the following conditions: A) On a filling instrument where the fill is weighed in the load receptor: <ul style="list-style-type: none"> <li>• after filling the load receptor (a);</li> <li>• after discharge of the load receptor (b).</li> </ul> B) On a filling instrument where the load is weighed in a container on the load receptor: <ul style="list-style-type: none"> <li>• after tare balancing the empty container (b);</li> <li>• after filling the container (a).</li> </ul> C) On a subtractive weigher: <ul style="list-style-type: none"> <li>• after tare balancing the filled load receptor (a);</li> <li>• after discharge of the fill from the load receptor (b).</li> </ul>	6.5.2.1	Yes