

# WELMEC

European cooperation in legal metrology

## Directive 90/384/EEC: Common Application



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WELMEC is a cooperation between the legal metrology authorities of the Member States of the European Union and EFTA. This document is one of a number of Guides published by WELMEC to provide guidance to manufacturers of measuring instruments and to notified bodies responsible for conformity assessment of their products. The Guides are purely advisory and do not themselves impose any restrictions or additional technical requirements beyond those contained in relevant EC Directives. Alternative approaches may be acceptable, but the guidance provided in this document represents the considered view of WELMEC as to the best practice to be followed.

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**DIRECTIVE 90/384/EEC: COMMON APPLICATION  
NON-AUTOMATIC WEIGHING INSTRUMENTS**

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## **FOREWORD**

This revised document is intended to provide guidance to all those concerned with the application of Council Directive 90/384/EEC as amended by Directive 93/68/EEC on Non-automatic Weighing Instruments.

The document provides a record of the continuing work of WELMEC Working Group 2 in the area of the common application of the Directive itself and in addition seeks to provide information which is specific to individual member countries.

This document is one of a number of Guides published by WELMEC to provide guidance to manufacturers of measuring instruments and to notified bodies responsible for conformity assessment of their products. The Guides are purely advisory and do not themselves impose any restrictions or additional technical requirements beyond those contained in relevant EC Directives. Alternative approaches may be acceptable, but the guidance provided in this document represents the considered view of WELMEC as to the best practice to be followed.

## 1 EC type approval certificate (TAC) and certificate number format

A draft document covering the requirements of Annex II.1.4. is shown for the EC certificate of type approval. It is intended that the document contains the Certificate, preferably on a single page, followed by the Descriptive Annex.

The structure presented below is an example of what is considered to be a suitable format; however, other structures may be applied.

### **CERTIFICATE OF EC TYPE APPROVAL NO .....**

(name and designation of the type)

[Note: although this is given further down the page, the repetition was considered an aid to clarity]

Issued by (Name of notified body)  
(address - optional)

in accordance with (Regulation implementing Directive .....

issued to (manufacturer and/or authorised agent holding approval, name and address)

in respect of (name and type of instrument, brief detail of characteristics; for example, for a weighing instrument: accuracy class, Max, Min, e, temperature range (if different from -10 °C to +40 °C))

valid until (date)

The principal characteristics, approval conditions and special conditions, if any, are set out in the Appendix hereto, which forms part of the approval documents and consists of ... pages.

Signature:

Name and address of Notified Body:

## **DESCRIPTIVE ANNEX TO CERTIFICATE OF EC TYPE-APPROVAL N0....**

- 1 Name and type of instrument
- 2 Functional description of the instrument (including photographs, schematic views, exploded views, a list of devices etc.)
- 3 Technical data (including Table of load cells and list of drawings of mechanical construction)
- 4 Peripheral devices and interfaces
- 5 Approval conditions (for example: special inscriptions)
- 6 Special conditions for verification
- 7 Location of seals and verification marks
- 8 Location of CE mark of conformity and inscriptions

## **CONTENT OF DOCUMENTATION TO BE HELD BY THE NOTIFIED BODY**

- 1 Product specification
  - Contents: Description
  - Drawings
  - Block diagrams
  - Flow charts
  - Circuit diagrams
- 2 Examination report  
(including an explanation of how the essential requirements are to be met)
- 3 Test results

## Certificate Number Format

The following table shows the form of the certificate identification numbers.

EEA COUNTRIES	NUMBER FORMAT	REMARKS
AUSTRIA	A XXXXX/YY	
BELGIUM	B-YY-MMMXXX	
DENMARK	DK 0199.XXXX DK 0200.XXXX	0199 & 0200 = Notified Body Number
FINLAND	FI YY.1.X	1 = NAWI Before 1 January 1997 was FI X.1.YY
FRANCE	YY.00.620.XXX.0  F-YY-A-XXX	SDM: 00 = SDM for legal metrology; 620 = NAWI; 0 = European validity  LNE: A = NAWI
GERMANY	D YY-09-XXX	09 = NAWI
GREECE		
ICELAND		
IRELAND	IRLXXX/YY	
ITALY	I YY-XXX	
LUXEMBOURG		
NETHERLANDS	TXXXX	
NORWAY	NXX/YY	
PORTUGAL		
SPAIN	E YY-00-XXX E YY-02-XXX	00 = Centro Español de Metrología (CEM) 02 = Generalitat de Catalunya
SWITZERLAND	CH-M-YYXXX	M = AWI and NAWI
SWEDEN	S-MMMM XX	
UK	UK XXXX	

Note:

YY = last two digits of year; X→ = sequential numeric identifier, MMM = Manufacturer Number.

## **2 Criteria for additions to the EC type approval**

2.1 The requirements relating to modifications to the approved type are set out in 1.7 of Annex II to the Directive. The Directive requires the applicant to keep the Notified Body who issued the type approval certificate informed of any modification to the approved type.

2.2 Not all modifications to the approved type will require an addition to the EC type approval certificate.

2.3 The opinion expressed by the Working Group in general terms is that any replacement of a part, device or sub-assembly etc which has a function in the measurement path must receive additional approval ie load receptor to display and printout.

Where that replacement is of an analogue part this must be tested in addition to receiving approval eg load cells, analogue PCBs (including A to D convertors). Test results previously obtained will be taken into account.

### 3 Decisions of common application

The following is a list of decisions reached of common application under the Essential Requirements. (In most sections, a reference is given to a relevant WELMEC Working Group 2 meeting number and either the Point number in the Minutes or the Decision number.)

#### 3.1 General

##### Summary

- 3.1.1 Indication of unstable equilibrium
- 3.1.2 Calculated weight
- 3.1.3 Class I instruments;  $d < 0.1$  mg
- 3.1.4 Use of slashed zeros
- 3.1.5 Unauthorised translations of EC type approval certificates
- 3.1.6 Load cells
  - 3.1.6.1 Barometric pressure
  - 3.1.6.2 Non-humidity (NH) tested load cells
  - 3.1.6.3 Digital load cells - compatibility forms
  - 3.1.6.4 R60 Certificates of Conformity
  - 3.1.6.5 Minimum output dead load return (multi-interval or multiple range)
  - 3.1.6.6 Q-factor in compatibility forms
- 3.1.7 Instruments having a mode of operation not in conformity with the Essential requirements
- 3.1.8 Verification marks
  - 3.1.8.1 Application of green M sticker and red M symbol
  - 3.1.8.2 "Green M" stickers on POS systems
  - 3.1.8.3 Indicator with "green M"
- 3.1.9 AWI/NAWI; aid to classification
- 3.1.10 Identification of software stored on EPROM
- 3.1.11 Visibility of CE marking
- 3.1.12 Currency symbols
- 3.1.13 Vehicle-mounted non-automatic weighing instruments
- 3.1.14 More than one mode of operation (eg single range, multiple range and multi-interval range)
- 3.1.15 Max, Min, e and d markings, and inscriptions in software
- 3.1.16 Combined and multi-plate weighbridges
- 3.1.17 Type Approval Certificate validity date
- 3.1.18 Weight barcodes
- 3.1.19 Supplementary indications in Imperial units
- 3.1.20 Portable weighbridges
- 3.1.21 Accidental repetition of a weighed item
- 3.1.22 Preliminary Observation of Annex I of Directive 90/384/EEC
- 3.1.23 Marking of Test Certificate number on module or peripheral
- 3.1.24 Declaration of Conformity
  - 3.1.24.1 Declaration of Conformity and 1.2(b) application
  - 3.1.24.2 Declaration of Conformity - manufacturer's responsibility
- 3.1.25 Weighing of liquids used in air-conditioning

## **Decisions**

### **3.1.1 Indication of unstable equilibrium (see Section 4.10)**

The use of a flashing sign as an indication that the equilibrium is unstable, is considered acceptable on instruments not intended for direct selling to the public, preferably only for instruments for laboratory use.

### **3.1.2 Calculated weight (Meeting 10, Decision 10)**

Where the indication represents an actual determination of the weight then the indication must respect the error allowance and be presented in the correct format.

When gross, net and tare are printed together, weight may be calculated from two actual determinations of weight. In the case of a multi-interval instrument it would be allowed to print a calculated value with the least significant digit which need not be rounded to the relevant scale interval.

Any printout of the calculated weight values should be identified as calculated weight values.

### **3.1.3 Class I instruments; $d < 0.1$ mg (Meeting 10, Decision 11)**

For Class I instruments where  $d < 0.1$  mg the instrument need not be marked with differentiated digits where the instruments are used for an Article 1.2(a) application other than indent 1 or indent 6. The limitation should be included in the EC type approval certificate.

### **3.1.4 Use of slashed zeros (Meeting 10, Decision 12)**

The use of slashed zeros is generally acceptable so long as the presentation is unambiguous.

### **3.1.5 Unauthorised translations of EC type approval certificates (Meeting 10, Decision 13)**

It is the responsibility of the manufacturer to make the EC type approval certificate (TAC) available in the language necessary to enable EC verification to take place. The manufacturer may make unauthorised translations however the official version remains the version produced by the Notified Body which granted the EC type approval.

All translations should use the terminology specified in EN45501. Refer also to the language markings in Section 9.

### **3.1.6 Load cells**

#### **3.1.6.1 Barometric pressure tests for load cells (Meeting 8, Decision 6)**

Where a load cell design makes it unnecessary to test for the effect of barometric pressure, the test may be declared not applicable and the test certificate shall state the reason for not testing.

### 3.1.6.2 Non-humidity (NH) tested load cells (Meeting 11, Decision 4)

When using the modular construction route a load cell marked NH may not be authorised for inclusion in a TAC unless humidity testing to EN45501 has been conducted on the load cell, the complete measuring instrument or the measuring element.

### 3.1.6.3 Digital loadcells - compatibility forms (Meeting 17, Point 7)

Digital loadcells from different manufacturers differ in their interfacing arrangements, and cannot necessarily be exchanged. At present, therefore, compatibility forms should be limited to analogue loadcells. Digital loadcells should only be approved in combination with their indicators.

### 3.1.6.4 R60 Certificates of Conformity (Meeting 18, Point 19)

Section 1 of Clause A.5 of WELMEC 2.4 is interpreted to mean that, for the modular approach, only R60 Certificates issued by a Notified Body responsible for type examination under Directive 90/384/EEC are acceptable.

### 3.1.6.5 Minimum output dead load return (multi-interval or multiple range) (Meeting 9, Decision 8)

The requirement of Section 4.12.2 of EN45501 is relaxed for multi-interval and multiple range instruments by applying the following formula for minimum dead load output return:

$$Z = \frac{E_{\max}}{(2 \text{ DR})} \geq \begin{array}{l} \text{either} \\ \text{or} \end{array} \begin{array}{l} \frac{\max_r}{e_1} \\ \frac{0.4 \max_r}{e_1} \end{array} \begin{array}{l} \text{for multi-interval instruments} \\ \text{for multiple range instruments} \end{array}$$

### 3.1.6.6 Q-factor in Compatibility forms (Meeting 19, Point 16)

The following was agreed as a possible approach to calculating the approximate Q-factor.

EN45501/R76 Section 4.12.1 “Maximum capacity of the load cell” states that the correction factor  $Q > 1$  considers the possible effects of eccentric loading, dead load of the load receptor, initial zero-setting range and non-uniform distribution of the load. It is used to calculate whether the load cell capacity is sufficient for the purpose, ensuring that the load cell is not overloaded.

In many conventional weighing instruments, where the manufacturer has allowed 2-3 times overload security for the load cell, the Q-factor is unimportant. However, in some types of instrument, for example fork lift scales where the front end load cells can be subjected to overloading, the Q factor is essential as there is a risk of non-uniform distribution of the load. The following formula includes a component for this non-uniform distribution (NUD):

$$Q = \frac{\text{Max} + \text{deadload} + \text{additive tare} + \text{initial zero setting range} + \text{NUD}}{\text{Max}}$$

Typical values for NUD might be 50% of Max for fork lift scales and weighbridges, and 20% of Max for other conventional instruments.

For example, if:

deadload ~ 20% of Max,  
additive tare ~ 10% of Max,  
initial zero range ~ 20% of Max,  
and NUD ~ 50% of Max (fork lift scale)

then: 
$$Q = \frac{\text{Max} + 0.2 \text{ Max} + 0.1 \text{ Max} + 0.2 \text{ Max} + 0.5 \text{ Max}}{\text{Max}} = 2$$

### **3.1.7 Instruments having a mode of operation not in conformity with the Essential requirements (Meeting 11, Point 4)**

The following example provides an acceptable solution:

Class I and II instruments which are not to be used for direct sale to the public may include an indication of weight based on a % value which does not meet the Essential Requirements provided that the restrictive use symbol referred to in Article 12 of the Directive is illuminated whenever the % mode is in operation.

The manufacturer declares in the operator's manual that the % mode of operation is not available for 1.2(a) applications under the Directive.

### **3.1.8 Verification marks**

#### **3.1.8.1 Application of green M sticker and red M symbol (Meeting 11, Decision 3)**

Refer to Sections 3 and 10 of WELMEC 5 document 'Directive 90/384/EEC: Explanation and Interpretation' for further information.

The green M sticker need not physically be a sticker but may be of an alternative form so long as it remains clearly visible, easily legible and indelible.

#### **3.1.8.2 "Green M" stickers on POS systems (Meeting 17, Point 20)**

A weighing POS system may be connected to many devices, for example displays, keyboards, printers cash drawers and barcode scanners. On such a system, when verified, a single "green M" sticker, on the POS itself, is sufficient. If a data storage device is connected, then this should also bear its own "green M" sticker.

#### **3.1.8.3 Indicator with "green M" (Meeting 17, Point 20)**

An indicator should only bear a "green M" if it is part of a verified weighing system. An indicator sold on its own should not therefore bear a "green M" and neither should an indicator being used only for non-trade purposes.

### **3.1.9 AWI/NAWI; aid to classification (Meeting 11, Decision 8)**

The following interpretation of the definition of a non-automatic weighing instrument (NAWI) or an automatic weighing instrument (AWI) is intended to be used only when doubt exists in applying the definitions contained in Directive 90/384/EEC and the OIML recommendations.

‘An instrument capable of performing consecutive weighing cycles without any intervention of an operator is always regarded to be an AWI. If an instrument needs the intervention of an operator, it is regarded to be a NAWI only if the operator is required to determine or verify the weighing result.

Determining the weighing result includes any intelligent action of the operator that affects the result, such as deciding when an indication is stable or adjusting the weight of the weighed product.

Verifying the weighing result means making a decision regarding the acceptance of each weighing result on observing the indication. The weighing process allows the operator to take an action which influences the weighing result in the case where the weighing result is not acceptable.

Note: the necessity to give an instruction to start the weighing process or to release a load is not relevant in deciding the category of instrument’.

### **3.1.10 Identification of software stored on EPROM**

For a complete instrument:

- conformity to type is now covered by the declaration of conformity from the manufacturer,
- there is no danger of access by the user to software on EPROM,
- there is no obligation for software identification on EPROM for a complete instrument.

Concerning modules however, there is no declaration of conformity procedure. Therefore where Test Certificates (TCs) are involved there is a need for the identification of software stored on EPROM. Refer to the “Identification of software on EPROM” section of the WELMEC 2.5 guide.

### **3.1.11 Visibility of CE marking (Meeting 13, Point 1.1)**

CE marking addresses the market surveillance bodies of the member states, and aims at facilitating their surveillance tasks by visibly demonstrating conformity. Visibility means that the CE marking is easily accessible for the market surveillance authorities. In exceptional circumstances due to the installation and manner of use of an instrument, this could mean that the CE marking is located on the instrument in a place accessible to the surveillance authorities and that its position is indicated clearly in the TAC.

### **3.1.12 Currency symbols (Meeting 13, Point 1.1)**

The currency symbols to be used on weighing instruments are of the form normally used for trade, examples being shown in Section 10 of this guide, and are not the currency codes commonly used in currency exchange transactions.

### **3.1.13 Vehicle-mounted non-automatic weighing instruments (Meeting 13, Decision 5)**

Vehicle-mounted non-automatic weighing instruments may be tilted to a higher inclination than 5% when used on site. In this case, the requirement for immunity to tilt as set out in 7.1 of Annex 1 of Directive 90/384/EEC is not adequately met by an instrument which is inside the mpe only up to a tilt of 5% as required by 3.9.1.1 of EN45501. EC Type Approval will therefore be issued only under the following conditions:

The manufacturer defines the upper limit of tilting up to which the error of indication, at any load, is within the mpe.

Tilt testing should be carried out up to 10% unless the instrument display is blanked out, and the printout and data transmission is inhibited at a lesser value by means of an inclination sensor.

Where a sensor is used to compensate the effect of tilting on the weighing result, the sensor is regarded as an essential part of the weighing instrument. It should therefore be submitted to the essential tests such as temperature, humidity and EMC, during the approval procedure.

In any case, the correct functioning of the sensor should be checked within the scope of the approval procedure and at the time of verification of every individual instrument.

Note: This does not apply to retail counter scales which are used for direct sales to the public.

### **3.1.14 More than one mode of operation (eg single range, multiple range and multi-interval range) (Meeting 13, Decision 6)**

Under 3.3 of Annex 1 of Directive 90/384/EEC, an instrument may contain different modes of operation, for example single range, multiple range and multi-interval, provided that there is no interference between the different modes of operation. The following is an example:

0 to 15 kg x 5 g (single range)	0 to 6 kg x 2 g (multi-interval range)
	6 to 15 kg x 5 g

In this example, selection between the modes only takes place at switch-on. The operative range must be clearly identified on the instrument near to, or on, the display.

### **3.1.15 Max, Min, e and d markings (Meeting 14, Point 2), and inscriptions in software (Meeting 13, Decision 7)**

Where the inscriptions Max, Min, e and d are provided near to, or on, the display, it is not necessary for them to be additionally marked on the dataplate.

(Although EN45501, in its Section 7.1.3, appears to require that all the descriptive markings be grouped together, Annex IV of the Directive solely requires the CE marking and the ID number of the Notified Body to be grouped together.)

Where a data plate is not used for certain inscriptions, then these may be contained in software, provided:

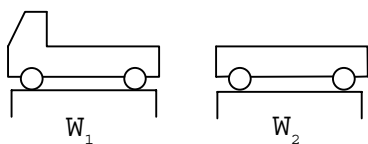
The information is permanently displayed when the instrument is in the weighing mode.  
Software containing the information must be secured from unauthorised access or changes.

Details of the inscriptions contained in software must be declared in the TAC.

### 3.1.16 Combined and multi-plate weighbridges (Meeting 14, Point 4, Meeting 15, Point 2 and Meeting 18, Point 9)

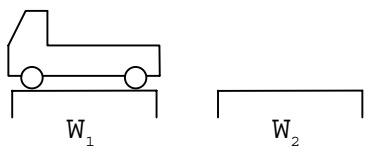
This concerns weight obtained by using adjacent weighbridges. Acceptable solutions, with examples, are shown below:

Two weighbridges, each with its own indicator:

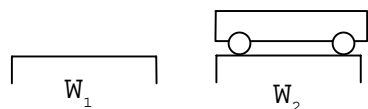


$W_1 = 30 \text{ t} \times 10 \text{ kg}$   
 $W_2 = 30 \text{ t} \times 10 \text{ kg}$   
 (Two indicators; simultaneous indication necessary)  
 Calculated weight  $60 \text{ t} \times 10 \text{ kg}$   
 (mpe does not apply to calculated weight)

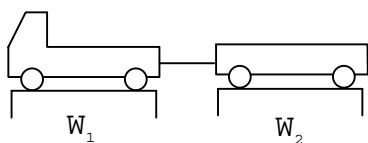
Multi-plate weighbridge with one indicator:



$W_1 = 30 \text{ t} \times 10 \text{ kg}$



$W_2 = 30 \text{ t} \times 10 \text{ kg}$



$W_{1+2} = 60 \text{ t} \times 20 \text{ kg}$

$W_{1+2}$  is a weighing range (Compatibility of modules and mpe must be satisfied for it)

(See also Section 3.1.2)

### 3.1.17 Type Approval Certificate validity date (Meeting 15, Point 8)

In relation to the validity date of an EC Type Approval Certificate (10 years from date of approval), this original date should remain the validity date even when any additions to or revisions of the TAC are issued. A new 10-year validity should only be granted if the Notified Body decides to issue a new TAC.

### **3.1.18 Weight barcodes (Meeting 15, Point 9)**

In relation to NAWIs which produce weight barcodes, this must always be in addition to the normal printout of the weight. Only when a POS forms part of a NAWI and manually entered weights (either hand entered or by barcode entry) are accepted must the customer's receipt clearly distinguish those entries from actual weighed entries.

### **3.1.19 Supplementary indications in Imperial units (Meeting 16, Point 4)**

In Directive 90/384/EEC, the units of mass NAWIs must use are covered in Annex 1, paragraph 1, and are:

- SI units: kg; µg; mg; t;
- Imperial units: pound; ounce (avoirdupois); troy ounce;
- other non-SI units: metric carat, if weighing precious stones

Of the three imperial units:

- The troy ounce, in accordance with Chapter II of the Annex to Directive 80/181/EEC, may continue in use for transactions in precious metals indefinitely in those member states where it was authorised on 21 April 1973. (The troy ounce is not considered further in this section).
- The pound and the ounce (avoir), in accordance with Chapter IV of the Annex, may continue in use for goods sold loose from bulk until 31 December 1999.

Directive 80/181/EEC also makes provision for “supplementary indications”, which are defined in Article 3 as “one or more indications of quantity expressed in units of measurement not contained in Chapter I of the Annex accompanying an indication of quantity expressed in a unit contained in that Chapter”. Chapter I contains the SI or metric units. Article 3.2 provides for the use of supplementary indications only until 31 December 1999. However, it is highly likely that this will be extended until 31 December 2009.

For supplementary indications in Imperial units on NAWIs which are primarily metric instruments, any method is acceptable, subject to type examination, which:

- meets the requirements of predominance in Directive 80/181/EEC Article 3.4, and
- allows both indications to be seen at the same time.

The reason for the second of these is that Article 3.1 states that the supplementary indication *accompanies* the metric indication. The supplementary indication could not accompany the metric indication if it replaced, or was in substitution for, the metric indication, even momentarily.

### **3.1.20 Portable weighbridges (Meeting 16, Decision 1)**

Portable weighbridges shall be identified as such in the Type Approval Certificate.

The manufacturer's declared requirement for the mounting surface for the weighbridge shall be noted in the Type Approval Certificate. If relevant, the user shall be adequately informed.

### **3.1.21 Accidental repetition of a weighed item (Meeting 17, Point 8)**

Some form of interlock is necessary to prevent the accidental repetition of a weighed item. Although the detection of weight disturbance is the ideal form of interlock, any alternative method, such as the necessity of re-entering the Price-Look-Up (PLU) code, may be acceptable but must be stated in the approval certificate.

### **3.1.22 Preliminary Observation of Annex I of Directive 90/384/EEC (Meeting 17, Point 14)**

This English version of the Directive states that:

“Where an instrument includes or is connected to more than one indicating or printing device used for the applications listed in Article 1 2(a), those devices which repeat the results of the weighing operation and which cannot influence the correct functioning of the instrument shall not be subject to the essential requirements if the weighing results are printed or recorded correctly and indelibly by a part of the instrument which meets the essential requirements and the results are accessible to both parties concerned by the measurement. However, in the case of instruments used for direct sales to the public, display and printing devices for the vendor and the customer must fulfil the essential requirements.”

In this, it is not clear whether the text “...correctly and indelibly by a part of the instrument which meets the essential requirements...” refers to “printed or recorded” or just to “recorded”.

It shall be understood to refer to “printed or recorded”, so that either the printing or the recording (or both) must be performed by a part (or parts) which meet the essential requirements.

### **3.1.23 Marking of Test Certificate number on module or peripheral (Meeting 14, Point 8)**

The marking of the Test Certificate number on a module or peripheral is optional, and it is for the manufacturer to decide whether or not to provide this information.

### **3.1.24 Declaration of Conformity**

#### **3.1.24.1 Declaration of Conformity and 1.2(b) application (Meeting 14, Point 11)**

A manufacturer who provides a Declaration of Conformity for an instrument which can only be used for a 1.2(b) application is implying that the instrument meets the technical requirements leading to the application of the CE marking. This is misleading and incorrect, and contrary to the provisions of the Directive.

#### **3.1.24.2 Declaration of Conformity - manufacturer’s responsibility (Meeting 17, Point 9)**

Under the New Approach Directives such as 90/384/EEC, it is the manufacturer who draws up the Declaration of Conformity and not the Notified Body. The Declaration of Conformity is for production control and not for verification or approval.

### **3.1.25 Weighing of liquids used in air-conditioning (Meeting 17, Point 6)**

If a country has legislation which controls the recording of amounts of air-conditioning liquid used or discarded, and if this is done by using non-automatic weighing instruments, then these instruments must be controlled.

## **3.2 EURO currency in price-indication during transition period (Meeting 16, Point 11)**

This relates to weighing instruments with price indication and price printing during a transition period up to the introduction of the EURO

In the meeting on 3/4 February 1998, WELMEC WG2 agreed that it is not necessary to amend existing Type Approval Certificates (TACs) to accommodate the EURO in line with the rules given hereafter, unless an additional display not already covered by the TAC is necessary.

It was also agreed that new TACs, or amendments to TACs, may be granted to reflect the use of the EURO.

Basic notes regarding the conversion to EURO may be gathered from the Council regulation (EC) *No. 1103/97* of 17 June 1997 on certain provisions relating to the introduction of the EURO (articles 4 and 5). Additional information may be obtained via the internet address "<http://euro.eu.int>". Details, however, are subject to the national regulations of the individual member states.

Along with other things, the member states may also determine the beginning and end of a transition period during which, most likely, price indications and cash payments will be permitted in both currencies.

As regards weighing instruments with price indication and price printing, the WELMEC member states would accept the following arrangements during the transition period:

(NCU = National Currency Unit)

### **3.2.1 Basic principles**

3.2.1.1 Prices (unit prices, prices-to-pay, totals) may be indicated in either NCU, EURO or in NCU and EURO.

3.2.1.2 Use or indication of the official conversion rate with 6 significant digital places (eg 1 EURO = 1,23456 NCU).

3.2.1.3 The conversion rate stored in the weighing instrument shall be correct. The security requirements of No 8.5 of Annex 1 of Directive 90/384 need not be applied to the conversion rate.

3.2.1.4 Calculation with this conversion rate according to the following rules:

EURO amount = NCU amount divided by the official conversion rate

NCU amount = EURO amount multiplied by the official conversion rate

3.2.1.5 Accurate rounding of the converted EURO amount to 1 Cent (1/100 EURO) according to article 5 of the above-mentioned EC regulation. If the said rounding falls exactly in the middle it shall be rounded up. This applies equally to the rounding of a converted NCU amount.

3.2.1.6 The recommended way of expressing the unit of currency is the symbol “ € ” or “EUR” or “EURO”. NAWIs that are modified to express the unit of currency may use “EURO”, “Euro”, EUR”, “Eur” or “ € ”.

### **3.2.2 Indicating devices**

3.2.2.1 The indicating device may be so designed as to permit the switching between both currencies (NCU and EURO). Alternatively, an additional indicating device for the second currency may be provided.

3.2.2.2 When switching over between NCU and EURO, it shall not be possible to display the unit price and price-to-pay with different currency units. If the unit price is also indicated in the informative currency, the price-to-pay in that currency is calculated from that unit price.

3.2.2.3 If an additional indicating device is provided it will suffice if only the price-to-pay or the price total is additionally indicated in the other currency.

3.2.2.4 For the purchaser, the currency in which the prices are indicated must be clearly recognisable. The following alternative possibilities as regards the indication of the currency symbol would be permitted:

- Indicated directly in the display.
- Marking next to the display and control by a related indicator (eg LED).
- If the NCU/kg and NCU symbol is permanently affixed to the display, a note shall appear in the text indication (or if necessary in the weight display field): “Indication in EURO” or simply “EURO”. In case of 7-segment displays the abbreviation “E” instead of EURO is also allowed to be displayed together with the unit price and the price-to-pay.

### **3.2.3 Printing**

For printouts, there is the choice between NCU and EURO. If only one of the two currencies is printed, it must be the one in which the prices were also indicated by the weighing instrument.

If the prices are printed in both currencies, the following applies:

3.2.3.1 The unit price must be printed out in addition to the price-to-pay in at least one of the two currencies.

3.2.3.2 Next to the unit price and the price-to-pay in the one currency, the price-to-pay and/or the total may be printed in addition in the other currency. If the unit price is printed in both currencies, the prices-to-pay are to be computed on the basis: weight multiplied by the relevant unit price.

3.2.3.3 The currency symbols must be printed out so that they can be ascribed unambiguously to all unit prices and prices-to-pay and price totals shown.

- 3.2.3.4 If only the price total is printed in the second currency, that total is to be calculated on the basis of the total indicated in the first currency.
- 3.2.3.5 If single values and totals of single values are printed out in both currencies, the single values in the second currency are to be calculated from the single values in the first currency. Totals are to be calculated from the related single values in each of the two currencies.
- 3.2.3.6 A printout of the conversion rate is permitted but is not mandatory. If printed out, this must be done in the form of, for example “1 EURO = 1,23456 NCU” (or “EURO 1 = NCU 1,23456”), with all 6 official digital places. Instead of “EURO”, the official abbreviations recommended may also be used, eg “EUR” or “€”.

### 3.3 Gravity zones (Meeting 16, Point 3 and Meeting 17, Point 4)

#### 3.3.1 Preliminary remarks

- 3.3.1.1 The issue of geographical zones (called "gravity zones") for weighing instruments that are sensitive to gravity variations has been discussed several times within WELMEC WG2 since the 10th meeting in May 1995. The major objective was to find a harmonized way of marking/identifying gravity values/zones in all WELMEC member states that is acceptable to both manufacturers and Notified Bodies. As an outcome of the 3 years of discussion the principles described hereafter have been agreed upon by all WELMEC WG2 members.
- 3.3.1.2 The legal basis of the new "gravity concept" is Directive 90/384/EEC, Annex II, No 5.1 and 5.2. It mentions that gravity zones may be established by the member states on their territories. Existing national regulations with regard to gravity marking/identifying are not intended to be repealed by the new concept described in Section 3.3.2. The new harmonised concept should however be regarded as equivalent to existing national regulations.
- 3.3.1.3 The new concept primarily aims at EC verification<sup>1)</sup> performed at a location - e.g. the manufacturer's works- other than the intended place of use of the instrument. The EC verification - and hence the final adjustment of the instrument - may, of course, be carried out at the actual place of use. In either case these regulations must be in conformity with Directive 90/384/EEC, in particular, the error introduced by the estimated value of gravity at the place of use should not lead to a total error that exceeds the maximum permissible error (*mpe*) on EC verification (see Section 3.3.2.3).
- 3.3.1.4 The new gravity concept is intended to provide an *optional system* for identifying/markings gravity values/zones for a weighing instrument. If this option is chosen by a manufacturer, however, it will normally be accepted in all WELMEC member states in view of EC verification.

#### 3.3.2 The new gravity concept

- 3.3.2.1 A weighing instrument that is sensitive to gravity shall indicate within the *mpe* on EC verification at the time of EC verification - whether in one or two stages, carried out either by a Notified Body or the manufacturer himself.
- 3.3.2.2 If the EC verification is carried out at a location other than the intended place of use, the instrument must be finally adjusted to the *g* value of that place of use. Alternatively the instrument may be finally adjusted to the (fictitious) reference value in the centre of a specified gravity zone encompassing the intended place of use.
- 3.3.2.3 A gravity zone is defined by the boundaries for both the geographical latitude  $\varphi$  (boundary values  $\varphi_1$  and  $\varphi_2$ ) and the altitude above sea level, *a* (boundary values

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<sup>1)</sup> EC verification in this document is used as a generic term for all comparable procedures mentioned in Directive 90/384/EEC, Annex II.

$a_1$  and  $a_2$ ). The boundary values shall be chosen as integer multiples of  $1^\circ$  (exceptionally  $0,5^\circ$  is also allowed) and 100 m, respectively.

Gravity zones may be chosen by the manufacturer such that the differences of gravity acceleration,  $\Delta g_\varphi$  and  $\Delta g_a$ , between the value of any place of use within that zone and the reference value of gravity,  $g_R$ , for that zone, will not result in an absolute value of variation of any indication of the instrument greater than  $1/3$  of the *mpe* on EC verification. The manufacturer will adjust the instrument, using the gravity formula in eq. (2) and one of the appropriate conditions, eq. (1a), (1b) or (1c), such that it respects the *mpe* on EC verification at any place of use within the chosen zone:

$$n (\Delta g_\varphi + \Delta g_a) / g_R \leq mpe / (3e)^2 \quad (1a)$$

with:

$\Delta g_\varphi = 1/2  g(\varphi_1, a_m) - g(\varphi_2, a_m) $	max. variation due to a change in $\varphi$ <sup>3)</sup>
$a_m = 1/2 (a_1 + a_2)$	mean value of altitude $a$
$\Delta g_a = 1/2  g(\varphi_m, a_1) - g(\varphi_m, a_2) $	maximum variation due to a change in $a$
$\varphi_m = 1/2 (\varphi_1 + \varphi_2)$	mean value of latitude $\varphi$
$g_R = g(\varphi_m, a_m)$	reference value of gravity in the zone
$n =$	number of verification scale intervals $e$ of the weighing instrument
$mpe =$	maximum permissible error on EC verification at <i>Max</i> , expressed in $e$

Condition (1a) is, strictly speaking, valid only for  $1000 \leq n \leq 2000$  and  $n \geq 3000$  (class III instruments), where  $n = Max / e$ . In the other cases, condition (1a) has to be modified:

$$500 (\Delta g_\varphi + \Delta g_a) / g_R \leq 0,5e / (3e)$$

$$\Leftrightarrow (\Delta g_\varphi + \Delta g_a) / g_R \leq 1 / 3000 \quad \text{if } 500 \leq n < 1000 \quad (1b)$$

and

$$2000 (\Delta g_\varphi + \Delta g_a) / g_R \leq 1,0e / (3e)$$

$$\Leftrightarrow (\Delta g_\varphi + \Delta g_a) / g_R \leq 1 / 6000 \quad \text{if } 2000 < n < 3000 \quad (1c)$$

The same applies by analogy to the other accuracy classes.

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<sup>2)</sup> Relative deviations of real gravity values from the gravity values calculated with eq. (2) are not taken into account, because they do normally not exceed  $5 \times 10^{-5}$  and can be neglected.

<sup>3)</sup> In order to be correct even for unusual applications, it is mentioned that if the gravity zone includes the equator ( $\varphi = 0^\circ$ ) the maximum variation due to  $\varphi$  must be calculated from  $\Delta g_\varphi = 1/2 [g(\varphi_{max}, a_m) - g(\varphi=0, a_m)]$ , with  $\varphi_{max}$  equal to  $\varphi_1$  or  $\varphi_2$  whichever is the greater value.

3.3.2.4 For the calculation of the reference value,  $g_R$ , and the maximum variations,  $\Delta g_\varphi$  and  $\Delta g_a$ , and for the final adjustment of the weighing instrument, depending on the actual  $g$  value at the place of EC verification, the "standardized" gravity formula according to /1/ in combination with the theoretical vertical gradient of gravitational acceleration in free air /2/ is used:

$$g = 9,780\,318 (1 + 0,005\,3024 \sin^2 \varphi - 0,000\,0058 \sin^2 2\varphi) - 0,000\,003085 a \quad \text{m s}^{-2} \quad (2)$$

In this formula, the latitude  $\varphi$  must be entered in degrees ( $^\circ$ ) and the altitude  $a$  in meters (m).

3.3.2.5 With an instrument adjusted to a gravity zone, a suitable identification of that zone shall be provided. The identification may be either

- (i) the reference value,  $g_R$ , of the gravity zone, together with the lower and upper limits of gravity values for the zone, or
- (ii) a code designation in the form  $\varphi_1\text{-}\varphi_2\equiv a_1\text{-}a_2$  (alternatively  $\varphi_1\text{-}\varphi_2:a_1\text{-}a_2$ ) that is used uniformly for all WELMEC member states,

e.g. 49-52 $\equiv$ 0-200 (alternatively 49-52:0-200),

which would indicate that the weighing instrument had been adjusted for a mean  $g$  value in the zone between latitudes  $49^\circ$  and  $52^\circ$  and altitudes 0 m to 200 m, the fictitious reference "point" being at the latitude  $\varphi_m = 50,5^\circ$  and the altitude  $a_m = 100$  m.

Note 1:  $a_1$  may exceptionally be a negative number. In that particular case a code designation of eg. 49-52 $\equiv$ -100-200 would indicate that the weighing instrument had been adjusted for a mean  $g$  value in the zone between latitudes  $49^\circ$  and  $52^\circ$  and altitudes -100 m to +200 m.

Note 2: In addition to the code designation in the form  $\varphi_1\text{-}\varphi_2\equiv a_1\text{-}a_2$  a manufacturer is allowed to present additional qualifying information concerning the place (region) of use (eg. a defined city or the administrative territory like a department, province, region, etc) provided that the latter is completely located in the gravity zone specified by the latitude and altitude values  $\varphi_1$ ,  $\varphi_2$  and  $a_1$ ,  $a_2$ , respectively.

The identification may be presented by an inscription or any document accompanying the weighing instrument, or be available on the display by a procedure described in the operating manual.

3.3.2.6 Existing requirements for securing of adjustment devices apply equally to gravity compensating or correcting devices, including the indication of the gravity information on the display. Details are to be mentioned in the type approval certificate of the weighing instrument.

### 3.3.3 Practical Procedure, Example

- Given the following weighing instrument to be EC verified:  
Retail scale, Class III,  $Max = 15$  kg,  $e = d = 5$  g,  $n = 3000$ ,  $mpe (Max) = 1,5 e$
- The EC verification shall be carried out in one stage at the manufacturer's works that are assumed to be located in Braunschweig,  $\varphi = 52,3^\circ$ ,  $a = 80$  m, the  $g$  value for Braunschweig being

$$g (\text{Braunschweig}) = 9,812\,484 \text{ m s}^{-2}$$

calculated with Eq. (2).

The designated place of use shall be Uppsala in Sweden with  $\varphi = 59,9^\circ$   
and  $a = 150$  m (estimated values using a map).

The manufacturer chooses the following gravity zone according to the rules mentioned in Section 3.3.2.3 which comprises the designated place of use:

$$59-61 \equiv 0-500$$

Therefore, the boundary values are  $\varphi_1 = 59^\circ$ ,  $\varphi_2 = 61^\circ$ ,  $a_1 = 0$  m,  $a_2 = 500$  m.

- With the mean values of geographical latitude and altitude,

$$\begin{aligned}\varphi_m &= 1/2 (\varphi_1 + \varphi_2) \\ &= 60^\circ\end{aligned}$$

$$\begin{aligned}a_m &= 1/2 (a_1 + a_2) \\ &= 250 \text{ m}\end{aligned}$$

and the maximum variations

$$\begin{aligned}\Delta g_\varphi &= 1/2 |g(\varphi_1, a_m) - g(\varphi_2, a_m)| \\ &= 0,000\,785 \text{ m s}^{-2}\end{aligned}$$

$$\begin{aligned}\Delta g_a &= 1/2 |g(\varphi_m, a_1) - g(\varphi_m, a_2)| \\ &= 0,000\,771 \text{ m s}^{-2}\end{aligned}$$

and the reference value

$$\begin{aligned}g_R &= g(\varphi_m, a_m) \\ &= 9,818\,399 \text{ m s}^{-2}\end{aligned}$$

it is confirmed that condition (1a) is met:

$$n (\Delta g_{\phi} + \Delta g_a) / g_R \leq mpe / 3e$$

$$3000 (0,000\ 785 + 0,000\ 771) / 9,818\ 399 \leq 1,5e / 3e$$

$$0,48 \leq 0,5$$

- Finally, in the last phase of the EC verification in Braunschweig, the retail scale is adjusted to the calculated reference value  $g_R$ .

### 3.3.4 References

/1/ Bulletin OIML No 94, 1984, 23-25; supplemented by:  
Bulletin OIML No 127, 1992, 45

/2/ Kohlrausch, F.: Praktische Physik, Band 1, 24. Aufl., Stuttgart: Teubner 1996

### 3.4 Software securing (sealing) (Meeting 17, Point 10)

The term "software securing" (sometimes also called "software sealing") is often used in different connections. In order to avoid misunderstandings it is stated that in the following it is exclusively used in the sense of Directive 90/384/EEC, Annex I, No 8.5, and EN 45501, No 4.1.2.4, respectively, thus meaning provisions for securing components and pre-set controls to which access or adjustment is prohibited.

In order to harmonize EC type approvals with regard to software securing methods which, completely or partially, replace conventional "hardware" securing measures (eg wire and lead, or control marks), the following principles and guidelines are proposed:

#### 3.4.1 By analogy with conventional sealing methods, the legal status of the instrument must be recognizable to the user or any other person responsible at the instrument itself.

*Examples of acceptable technical solutions:*

- a. An event counter, ie. a non-resettable<sup>1)</sup> counter, that increments each time a protected operational mode of the instrument is entered and one or more changes are made to device-specific parameters (see also WELMEC 2.3 guide). The reference number of the counter at the time of (initial or subsequent) verification is fixed and secured by appropriate hardware means at the instrument itself.

<sup>1)</sup> The term "non-resettable" implies that if the counter has reached its maximum number it will not continue to zero without the intervention of an authorized person.

or

- b. An event logger, ie. a file containing a series of records where each record contains at least the number from the event counter and the date corresponding to the change of a device-specific parameter (see also WELMEC 2.3). Optionally, further information may be recorded, eg. the identification of the parameter that was changed and the new value of the parameter. The reference number of the counter or the date at the time of (initial or subsequent) verification is fixed and secured by appropriate hardware means at the instrument itself.

*Note:*

The indication that an unauthorized change of protected device-specific parameters has happened need not necessarily be shown on or near the instrument's display. The latter method may, however, be chosen as an additional option. It is sufficient if the weighing instrument can, by a simple procedure, present the relevant actual data for comparison with the reference data recorded at the last verification in order to inform the user or any other person responsible about the legal status of the instrument. **Details have to be described in the operating manual, and in either the Type Approval Certificate of the instrument or the Test Certificate of its module (indicator).**

**3.4.2 Software securing methods must guarantee a sufficient protection and long-term storage of the data registered.**

The following protection measures are considered to be adequate for event counters and event loggers:

- All entries (the counter number in case of an event counter or the data registered by an event logger) must be protected against intentional and unintentional changes in the sense of WELMEC 2.3. It is guaranteed by appropriate means that the event counter (event logger) *automatically* increments (registers) each time a protected operational mode of the instrument is entered and a device-specific parameter is changed, and there is no possibility to fraudulently change the counter (registered data) in either mode, and
- the hardware medium used for storing these data must be protected against unauthorized replacement, or an unauthorized replacement is obvious or can be made evident by appropriate means.

*Example of an acceptable technical solution:*

The chip for storing the event counter (event logger) data is soldered onto the circuit board inside the instrument and the board itself is protected against unauthorized exchange.

*Note:*

As a rule, the hard disk of a PC is not considered to provide sufficient protection of event counter or event logger data.

**3.4.3 An instrument making use of a software securing method shall have adequate facilities for affixing of the reference data on or near the main plate by an authorized person or body.**

*Examples of acceptable technical solutions:*

- a. Inscription of the reference number (data) on or near the main plate in accordance with Directive 90/384/EEC, Annex IV, 1.2.
- b. Adjustable (hardware) counter that is firmly mounted to the instrument and that can be secured after it has been adjusted to the actual counter number at the time of (initial or subsequent) verification.

*Note:*

As a rule, it is not sufficient that the reference number (data) are shown or can be called up simply on the weighing instrument's display because this method does normally not provide sufficient evidence for the authorization of the person or body who has entered new reference data.

## 4 BCR intercomparison on Non-automatic Weighing Instruments (NAWI)

The following summarises the agreements reached by the BCR 172 working group. The reference of the BCR Report for the project is EUR 15303 EN. The EN references refer to EN 45501 'Metrological aspects of non-automatic weighing instruments'. These changes have been included in OIML R76-1 by Amendment 1 however EN45501 has not yet been amended.

### 4.1 Warm-up time test

- it was confirmed that the disconnection of the mains power supply must be at least 8 hr prior to the test (cf EN, A 5.2)
- every individual measurement, taken 0, 5, 15, 30 minutes after switch-on, shall be corrected for the zero error at that time, not for the zero error taken immediately after switch-on.

### 4.2 Span stability test

- it was clarified that not all performance tests have to be performed within 28 days, only temperature test, damp heat test, and two times switch-off
- the minimum number of eight measurements shall be distributed fairly even over the 28 days, and not accumulated into one or two days.
- no significant difference appeared in the results between TLs that took only one reading, as compared to others which noted the average of 5 readings.

### 4.3 Stability of equilibrium - printing, and zero and tare setting

- this test shall be conducted by loading the instrument, disturbing the equilibrium one single time, and releasing the printout or other function as soon as possible thereafter. A check of the documentation is not considered sufficient.

### 4.4 Accuracy of zero and tare setting

- these tests shall be performed by loading the instrument to an indication as close as possible to a switch-over point, then initiating the zero setting or tare balancing function, and checking for accurate zero (within 0,25 e)

### 4.5 Eccentricity test

- the indication at each measurement shall be corrected for the zero error determined immediately prior to the measurement

### 4.6 Disturbance tests (EN - B.3.1 to B.3.4)

- all tests shall be conducted with only one test load, instead of two different test loads
- prior to any test, the internal error of indication shall be set as close as possible to zero: the allowed variation of up to 1 e will then actually correspond to an analogue error of 1.5 e

- if there are interfaces on the instrument, an appropriate peripheral device shall be connected during the tests
- 4.7 Level indicator - limiting value
- the "Note" to EN 3.9.1.1 shall be interpreted such that on a bubble level, the "limiting value of tilting" shall always be a displacement of 2 mm of the bubble, irrespective of the radius of a ring which might indicate the centre of the level.
- 4.8 Immunity of interfaces (EN - 5.3.6.1 only, not EMC)
- to verify compliance with this requirement, no physical test procedure is available, therefore a specific declaration of the manufacturer is considered sufficient
- 4.9 Checking facilities
- as these are purely optional, the documentation should contain information about the format of the reaction to the detection of a fault, in the display; confusion with other error messages, display blanking etc should be avoided.
  - No tests to trigger these reactions are intended.
- 4.10 Indication of unstable equilibrium
- the use of a blinking unit sign as indication that the equilibrium is not stable, is considered acceptable on instruments not intended for direct selling to the public, preferably only for laboratory use.
- 4.11 Securing of access to service functions via menu
- service functions which may be used to modify metrological parameters or the adjustment of the instrument must be secure, eg by a dip-switch which is secured, and may not be accessible by password unless it automatically becomes evident that a change has taken place eg automatically displaying a new code number on switch on after each change has taken place which can be compared with a durably marked code number on the data plate representing the last set-up.
- 4.12 Marking of range of tare device
- Where the operating range of a tare balancing device is not equal to Max but is equal to the actual range of indication - which may be up to  $Max + 9 e$  - the range of the tare balancing device need not be mentioned on the descriptive plate.
- 4.13 Testing of peripheral devices (see section 3.2 above)

## **5 Guides and decisions on modular assessment**

A WELMEC document dealing with the Modular Approach, and with the testing of PCs and other digital peripheral devices, is published under WELMEC Guide 2.5.

### Testing Indicators

A WELMEC document dealing with the testing of an indicators as a module is published under WELMEC Guide 2.1.

The publication deals with the scope, purpose of the tests, specifications to be considered, the test set-up, the metrological and technical requirements met and the certification of the test results.

### Testing Point of Sale (POS) Devices

A WELMEC document dealing with the testing of a POS device as a module is published under WELMEC Guide 2.2.

The publication deals with the scope, test set-up, documentation, technical requirements, tests, securing, certification of test results and tests for verification.

### Examining Software

A WELMEC document dealing with the examination of software for free-programmable, PC-based modules or peripheral devices which are linked to, or form part of a NAWI is published under WELMEC Guide 2.3.

The publication deals with the scope, terminology, software requirements, report on software examination and required specifications in Certificates.

In addition, test certificates can be issued provided that the software examination is carried out in accordance with WELMEC guide 2.3.

### Testing loadcells

A WELMEC document dealing with loadcells as modules is published under WELMEC Guide 2.4.

## **6 Classification**

Member States are not restricted to a common application in relation to the classification of instruments therefore the class of instrument required or permitted in one Member State may be different from that in another Member State.

For permitted uses the classification may take one of the following forms:

- Any class
- Any class other than Class I
- Any class other than Class III
- Only Class I and II

Other methods of restricting the use of instruments may be imposed by Member States eg limiting the maximum verification scale interval.

## **7 Language markings**

The following is provided as a guide to markings and legends that are commonly used in member countries. The list is neither exhaustive nor exclusive. Other alternatives may be required to be used.

The use of 'pictograms' is permitted in most member countries. For many of the markings and legends listed 'pictograms' have been developed by CECIP (European Committee for Constructors of Weighing Instruments) in their publication 'Pictograms for Scales'.

<b>English</b>	<b>Danish</b>	<b>Dutch</b>	<b>Finnish</b>
Not to be used for direct sale to the public	Ikke tilladt til direkte salg til publikum	Niet voor rechtstreekse verkoop aan het publiek	Ei saa käyttää myytäessä suoraan kuluttajalle
For postal use only	Må kun anvendes til postekspedition	Uitsluitend gebruik voor de Post	Ainoastaan postimaksujen määräämiseen
Weight	Vægt	Gewicht	Paino
Unit price	Enhedspris	Eenheidsprijs	Yksikköhinta
Price to pay	Pris	Te betalen	Maksu
Total, sub-total	Ialt, delresultat	Totaal, sub-totaal	Summa, välisumma
Gross, net	Brutto, netto	Bruto, netto	Brutto, netto
Tare, preset tare	Tara, indkodet tara	Tarra, voorinstel-tarra	Taara, esiaseteltava taara
Zero	Nul	Nul	Nolla
Print	Print	Afdruk	Tulostus
Set point	Sætpunkt	Instelpunt	Asetusarvo
Date, time	Dato, tidspunkt	Datum, tijd	Päivämäärä, kellonaika
Unstable weight	Ustabilt vejeresultat	Instabiele aanwijzing	Epävaka kuorma
Weight below Min	Vejning under Min	Gewicht beneden Min	Paino alle Min
No weight change	Ingen ændring af vejeresultat	Geen verandering van gewicht	Muuttumaton paino
Error	Fejl	Fout	Virhe
Cash, cheque, credit, change	Kontant, check, kredit, byttepenge	Contant, cheque, creditcard, wisselgeld	Käteinen, shekki, luotto, vaihtoraha/takaisin
Transactions	Transaktioner	aantal transacties	Kauppatapahtuma
Customer	Kunde	Klant	Asiakas
Vendor, operator	Sælger, Operatør	Verkoper	Käyttäjä
Non-weighed article		Niet gewogen artikel	Punnitsematon tuote
Weighed article		Gewogen artikel	Punnittu tuote
Clear		Uitwissen	Korjaus
Weighing range		Weegbereik	Punnitusalue

English	French	German	Greek
Not to be used for direct sale to the public	Interdit pour la vente directe au public	Nicht zulässig in *offenen Verkaufsstellen *In Austria: öffentlichen	ΑΠΑΓΟΡΕΥΕΤΑΙ Η ΧΡΗΣΗ ΓΙΑ ΤΗΝ ΑΜΕΣΗ ΠΩΛΗΣΗ ΠΡΟΣ ΤΟ ΚΟΙΝΟ
For postal use only	Réservé à l'usage postal	Nur für Postzwecke	ΜΟΝΟ ΓΙΑ ΤΑΧΥΔΡΟΜΙΚΗ ΧΡΗΣΗ
Weight	Poids	Gewicht	ΒΑΡΟΣ
Unit price	Prix unitaire	Grundpreis	ΤΙΜΗ ΜΟΝΑΔΑΣ
Price to pay	Prix à payer	Verkaufspreis	ΠΛΗΡΩΤΕΟ ΠΟΣΟ
Total, sub-total	Total, sous-total	Summe, Teilsumme	ΣΥΝΟΛΟ, ΜΕΡΙΚΟ ΣΥΝΟΛΟ
Gross, net	Brut, net	Brutto, Netto	ΜΕΙΚΤΟ ΒΑΡΟΣ, ΚΑΘΑΡΟ ΒΑΡΟΣ
Tare, preset tare	Tare, tare prédéterminée	Tara, Taraeingabewert	ΑΠΟΒΑΡΟ, ΠΡΟΚΑΘΟΡΙΣΜΕΝΟ ΑΠΟΒΑΡΟ
Zero	Zéro	Null	ΜΗΔΕΝ
Print	Impression	Abdruck, Druck	ΕΚΤΥΠΩΣΗ
Set point	Point de consigne	Schaltpunkt	ΣΗΜΕΙΟ ΡΥΘΜΙΣΗΣ ΒΑΡΟΥΣ
Date, time	Date, heure	Datum, Zeit	ΗΜΕΡΟΜΗΝΙΑ, ΩΡΑ
Unstable weight	Poids instable	Kein Gleichgewicht	ΑΣΤΑΘΗΣ ΕΝΔΕΙΞΗ ΒΑΡΟΥΣ
Weight below Min	Poids inférieur à Min	Gewicht kleiner als Min	ΒΑΡΟΣ ΜΙΚΡΟΤΕΡΟ ΑΠΟ ΤΗΝ ΕΛΑΧΙΣΤΗ ΔΥΝΑΜΙΚΟ ΤΗΤΑ Min
No weight change	Poids inchangé	Kein Gewichtswechsel, Ohne Gewichtswechsel	ΚΑΜΙΑ ΑΛΛΑΓΗ ΒΑΡΟΥΣ
Error	Erreur	Meßabweichung, Fehler	ΣΦΑΛΜΑ
Cash, cheque, credit, change	Comptant chèque, carte (ou crédit), rendu	Bargeld, Scheck, Kredit, Wechselgeld	ΜΕΤΡΗΤΑ, ΕΠΙΤΑΓΗ, ΠΙΣΤΩΣΗ, ΡΕΣΤΑ
Transactions	Transactions	Vorgang	ΣΥΝΑΛΛΑΓΕΣ
Customer	Client	Kunde	ΠΕΛΑΤΗΣ
Vendor, operator	Vendeur, opérateur	Verkäufer, Bediener	ΧΡΗΣΤΗΣ
Non-weighed article	Article non pesé	Nicht gewogene Artikel	ΜΗ ΖΥΓΙΖΟΜΕΝΟ ΕΙΔΟΣ
Weighed article	Article pesé	Gewogener Artikel	ΖΥΓΙΖΟΜΕΝΟ ΕΙΔΟΣ
Clear	Correction	Löschen	ΔΙΟΡΘΩΣΗ
Weighing range	Etendue de pesage	Wägebereich	ΠΕΡΙΟΧΗ ΖΥΓΙΣΗΣ

English	Icelandic	Italian	Norwegian
Not to be used for direct sale to the public	Ekki til nota við beina sölu til almennings	Vietato per la vendita diretta al pubblico	Ulovlig ved salg direkte til publikum
For postal use only	Aðeins til vigtunar á pósti	Esclusivamente per uso postale	Kun lovlíg ved postveiging
Weight	Þyngd	Peso	Lodd
Unit price	Einingarverð	Prezzo unitario	Enhetspris
Price to pay	Verð	Importo	Pris ä betale
Total, sub-total	Samtals, alls	Totale, sub totale	Sum, del sum
Gross, net	Brúttó, nettó	Lordo, netto	Brutto, netto
Tare, preset tare	Tara, forstillt tara	Tara, tara predeterminata	Tara, Forhåndsinnstilt tara
Zero	Núll	Zero	Null
Print	Prenta	Stampa	Utskrift
Set point	Stilligildi	Punto di regolazione	Set pimlt
Date, time	Dags., tími	Data, ora	Data, tid
Unstable weight	Óstöðug þyngd	Peso instabile	Usabil vekt
Weight below Min	Undir lágmarksþyngd	Peso inferiore a Min	Last under Min
No weight change	Óbreytt þyngd	Peso stabile	Ingen endring ov veieresultatet
Error	Villa	Errore	Feil
Cash, cheque, credit, change	Staðgreitt, tékki, greiðslukort, til baka	Contante, assegno, credito resto	Kontant, sjckk, kredit, vcksel
Transactions	Færslur	Transazione	Transaksjon
Customer	Viðskiptavinur	Cliente	Kunde
Vendor, operator	Sölumaður, starfsmaður	Venditore, operatore	Selger, operatør
Non-weighed article	Ekki vegin vara	Articolo non pesato	Ikke veid vare
Weighed article	Selt eftir vigt	Articolo pesato	Veid vare
Clear	Eyða	Correzione	Slett
Weighing range	Vigtarsvið	Campo di pesatura	Vcieområde

<b>English</b>	<b>Portuguese</b>	<b>Spanish</b>	<b>Swedish</b>
Not to be used for direct sale to the public	Interdito para a venda directa ao público	Prohibido para la venta directa al público	Får inte användas vid försäljning direkt till enskild konsument
For postal use only	Só para uso postal	Uso postal exclusivo	Endast för postalt bruk
Weight	Peso	Peso	Vikt
Unit price	Preço unitario	Precio unitario	Enhetspris
Price to pay	Preço a pagar	Importe	Betalpris
Total, sub-total	Total, sub-total	Total-subtotal	Total sub-total
Gross, net	Bruto, liquido	Bruto, neto	Brutto, netto
Tare, preset tare	Tara, tara pré determinada	Tara, tara predeterminada	Tara, förinställd tara
Zero	Zero	Cero	Noll
Print	Impressao	Impresión	Utskrift
Set point	Ponto do ajuste	Punto de ajuste	Inställningsvärde
Date, time	Data, hora	Fecha, hora	Datum, tid
Unstable weight	Peso instavel	Peso inestable	Ostabil viktvärde
Weight below Min	Peso abaixo de Min	Peso por debajo de Min	Vikt under Min
No weight change	Peso estavel	Peso estable	Ingen viktändring
Error	Erro	Error	Fel
Cash, cheque, credit, change	Dinheiro, cheque, crédito	En efectivo, cheque (talón), crédito (tarjeta), cambio	Kontant, check kredit växel
Transactions	Transacções	Transacciones	Transaktioner
Customer	Cliente	Cliente	Kund
Vendor, operator	Vendedor, operador	Vendedor, operario	Försäljare, operatör
Non-weighed article	Artigo nao pesado	Artículo no pesado	Icke-vägd vara
Weighed article		Artículo pesado	Vägd vara
Clear	Corrigir	Corrección (borrado)	Korrigering
Weighing range	Gama de pesagem	Rango de pesaje	Vägningsområde

## 8 Currency markings

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### EURO CURRENCY

For the indication and printing of the EURO currency, both during and after the transition period, refer to Section 3.2 of this guide.

Monetary divisions commonly in use:

0,01 €/kg for the unit price

0,01 € for the price to pay

The € symbol may be placed before or after the amount ( eg € 1.23 or 1.23 € )

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### AUSTRIA

Austrian currency: Schilling (S) } for price  
1 Schilling = 100 Groschen (Gr) } to pay

For unit price: S/kg or Schilling pro Kilogramm

For digital indication permitted price to pay scale intervals are: 1 Gr; 2 Gr; 5 Gr; 10 Gr (= 0,01 S; 0,02 S; 0,05 S; 0,10 S)

The inscriptions must be clearly correlated to the indications, but it may be at the left or right or above or below; in case of printing, rows are permitted.

---

### BELGIUM

F/kg for the unit price

F for the price to pay

The symbols are placed above or to the right of the numerical value

The "," is used between the non-decimal and the decimal part of the value (a "." may be used).

The number of decimals: for  $d_u = 1F/kg$  (or less)  
for  $d_p = 0,2 F$  (or less) if  $e = 1g$   
0,5 F (or less) if  $e = 2g$   
1 F (or less) if  $e = 5g$

---

## DENMARK

Currency is the Kroner; monetary symbols Kr or KR and øre (no abbreviation exists). 1 krone is divided in 100 øre (1 øre = 0,01Kr). The smallest value is 25 øre.

Unit price: XXX,XX Kr/kg or XXX,XX Kr/100 g. Price to pay: XXX,XX Kr. Rounding to the lowest coin is permitted. Symbols may be placed above, below or to the right of the figures.

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## FINLAND

For the price to pay: markka (mk); 1 markka = 100 penniä (p)

For the unit price: mk/kg or mk/100g

The lowest unit price and price to pay interval is 1 p (0,01 mk).

The symbols in relation to the numeric data must be placed after, below or above the figures.

---

## FRANCE

F/kg or F/100 g for the unit price

F for the price to pay

Generally the symbols are placed just after the value or just above or just below the value.

Monetary divisions commonly in use:

0,01 or 0,05 F/kg for the unit price

0,05F for the price to pay

---

## GERMANY

Symbols and monetary units to be used on electronic counter scales

Unit Price (U):

no formal requirement,  
but general habit:

XXX, XX DM/kg

3 digits 2 digits  
for DM for Pfennig

$d_u = 1 \text{ Pfg} = 0,01 \text{ DM}$

Presentation of U per XXX, XX DM/100 g  
is not known, but would be acceptable

Price to pay (P):

XXXX, XX DM

3 or 4 digits 2 digits  
for DM for Pfennig

$d_p = 1 \text{ Pfg} = 0,01 \text{ DM}$

For the weight (W):

XXX,XXX kg

$e = 1 \text{ g}$  or greater,  
no requirement!

All unit signs/symbols must be presented in a non-confusing manner, either after, above, or below the figures, they may be indicated by a display, or presented permanently on the frame around the display.

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## GREECE

The currency is the Drachma (Δραχμή).

There are no formal requirements however for electronic weighing instruments the indications are as follows:

Weight (ΒΑΡΟΣ): X,XXX kg, XX,XXX kg or XXX,XXX kg

Unit price (ΤΙΜΗ ΜΟΝΑΔΑΣ): XXXX Δρχ/kg or XXXXX Δρχ/kg

Price to pay (ΣΥΝΟΛΙΚΗ ΤΙΜΗ) XXXXX Δρχ or XXXXXX Δρχ

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## ICELAND

Currency is the “Krónur” and monetary symbols are Kr or KR and “aurar”.

1 Kr is divided into 100 “aurar” (100 aurar = 1 Kr).

There is no monetary symbol or abbreviation for aurar.

The smallest coin is 1 Kr.

The minimum interval of “Unit price” is 0,01 Kr/”mass unit”.

The interval for the “Price to pay” is rounded to the nearest Kr.

---

## IRELAND

The currency in Ireland is the Irish pound, which is divided into 100 pence or pennies.

The monetary symbols are - £(pound); p(pence or penny)

£/kg or £/100 g for the unit price

£ for the price to pay

Minimum unit price and price to pay interval - £0.01; 1p

Price to Pay

The symbol IR£ may also be used in place of £ according to choice.

The symbols in relation to numeric data may be above, below or alongside the value.

Where the symbol is alongside then it should be in the following form:

£X.XX; Xp

---

## ITALY

Italian currency: LIRA (L.)

L./kg or L/100 g for the unit price

L. for the price to pay

Generally the symbols are placed just above, just below or after the value.

Monetary divisions commonly in use:

5 of 10L. for the unit price

10L. for the price to pay

---

## LUXEMBOURG

The currency in Luxembourg is the “franc luxembourgeois (LUF)”, which is divided into 100 “centimes”.

The monetary symbols are:

F/kg or F/100g      for the unit price, and  
F                      for the price to pay.

The price to pay may be rounded to the nearest 1 LUF.

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## NETHERLANDS

The currency in the Netherlands is 'gulden' (guilder), divided into 100 cent (Both words single or plural, normally written without the 's' at the end).

The symbol used may be:

*f*, fl or Hfl (in order of preference) and c for cent.

The amount to be paid is presented in the following form: *f*23,18

Rounding to 5 cent is only allowed if the presented amount is actually paid by the customer. For a customer visiting a shop rounding to 5 cent may be performed only once ie at the cash desk.

The indication of unit price may be either:

*f*/kg 3,13 or *f*3,13/kg or *f*3,13 per kg

---

## NORWAY

The Norwegian price units are "krone" and "øre". 1 krone is divided in 100 øre. The smallest value is 50 øre.

For an instrument used for direct sales to the public with price indication Norway has the following regulations:

The interval of unit price is a minimum 1 øre (0,01 kr) and for the sum of goods in a transaction the interval is 50 øre.

The abbreviation for krone is "kr".

There is no abbreviation for øre.

The price symbols on the display of a weighing instrument could be placed immediately before, after or above the figures.

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## **PORTUGAL**

Currency, Escudo.

Unit price	Esc/kg
Price to pay	Esc

The symbols are placed to the right, above or under the numerical values.

The interval for unit price is 1 Esc/kg and for the price to pay is 1 Esc.

---

## **SPAIN**

Currency, Peseta; Unit price PTA/kg; Price to pay, PTA.

The symbols on the display of the weighing instrument must be placed immediately to the right or just above or below the figures.

The interval for unit price should be 1 PTA/kg and for price to pay 1 PTA.

---

## **SWEDEN**

The Swedish price units are "krona" and "öre". 1 krona is divided in 100 öre. The smallest value is 50 öre.

For an instrument used for direct sales to the public with price indication Sweden has the following regulations:

The interval of unit price and price to pay shall be at minimum 1 öre (0,01 kr). The price interval of the total sum of one or more transactions shall be at minimum 50 öre (0,50 kr).

Allowed abbreviations:

Krona "kr" or "KR" (if only capital letters are possible)

Öre Shall not be abbreviated (if it is used)

The price symbols on the display of a weighing instrument could be placed immediately before, after or above the figures.

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## **SWITZERLAND**

1 Fr = 100 Rp	1 fr = 100 c	1 fr = 100 ct
Franken, Rappen	franc, centime	franco, centesimo

Unit price: No formal requirements.

Price to pay: xxx,xx Fr (fr) (Separator is comma or point)

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## UNITED KINGDOM

Monetary Symbols £ (pound); p (pence)

Unit Price	£/kg;	£/100 g;	£/item
	p/kg;	p/100 g;	p/item

Alternative presentation: £ per kg; p per kg

The symbols in relation to numeric data may be above, below or alongside the value. Where the symbol is alongside it should be in the following form:

£X.XX/kg; Xp/kg

Where fractional pricing is used then it is acceptable to present the data on the display in the following form:

£ per		p per	
X.XX		X	
•	•	•	•
kg	100 g	kg	100 g

Minimum unit price interval	£0.01;	1p
Maximum value	∞ ;	999p

Price to Pay

The symbols in relation to numeric data may be above, below or alongside the value. Where the symbol is alongside it should be in the following form:

£X.XX; Xp

The price to pay must be presented as a single interval not multi-interval.

Price to pay interval	£0.01;	1p
Maximum value	∞ ;	999p

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## 9 Imperial requirements

9.1 The permitted units of Imperial measurement have the following symbols:

- (i) pound (lb)
- (ii) ounce (oz)
- (iii) Troy ounce (oz tr)

[Note:- All symbols are singular and in lower case letters]

Where the Imperial value for a metric scale interval falls between two ranges in the Table 1 or Table 2 of Annex I to Directive 90/384/EEC then the value should be taken as belonging to the lower range

eg In Table 1 for a Class III instrument where  $e = \frac{1}{8}$  oz then the minimum value for 'n' is 100.

9.2 The units of measurement must be identified either in full or by the permitted symbol. Where a letter of a symbol can be confused with the numeric data there should be a clear space between the data and the symbol (eg 0.01 lb).

9.3 Vulgar fractions shall be clear, unambiguous and compatible with the size of the relevant integer digit. The numerator and denominator of the fraction must be smaller in size than the integer digit and shall be presented in a normal fractional form ie  $\frac{1}{8}$  or  $\frac{1}{2}$ . The numerator shall not be on the same line as the denominator.

If clarity is maintained the line separating the numerator from the denominator may be omitted.

9.4 Where the pound (lb) and ounce (oz) are used together the pound (lb) must have a unit integer digit whereas the ounce (oz) may additionally have vulgar fractions eg 5 lb  $3\frac{1}{8}$  oz not decimal fractions.

9.5 The scale interval shall have one of the following forms:-

- (i)  $1 \times 10^n$ ,  $2 \times 10^n$  or  $5 \times 10^n$ , the index n being a positive or a negative whole number or zero, or
- (ii) 8 oz, 4 oz, 2 oz, 1 oz,  $\frac{1}{2}$  oz,  $\frac{1}{4}$  oz etc, or  $\frac{1}{2}$  lb,  $\frac{1}{4}$  lb etc.

9.6 The numeric data for the indication of ounces (oz) shall be suitable and clearly separated from the digits for the indication of pounds, eg by a blank space equivalent to one digit or a colon.

[Note:- this occurs where the units of measurement are above or below the numeric data.]

9.7 The overall figure for the printing of a vulgar fraction must not be less than 2 mm high, however the numerator and denominator themselves may be less provided that clarity of printout is maintained. The fraction must be of a compatible size to the integer digits.

- 9.8 Instruments with Imperial to Metric switching must have an adequate internal resolution to correctly convert from one unit of measurement to the other eg decimal pound to metric. Switching back to the Imperial mode should be carried out such that no further rounding of the result takes place.

[Note:- if subsequent rounding takes place cumulative errors may occur and result in a change of indication].

- 9.9 A multi-range instrument may have ranges in any one of the permitted units of measurement

eg 15 kg x 5 g  
30 lb x  $\frac{1}{8}$  oz  
30 lb x 0.01 lb

- 9.10 Imperial units may only be used as supplementary indications until 31 December 2009.

## **10 Contents and structure of the documentation (EC type examination)**

This section describes the contents and the structure of the documentation to be submitted for EC type examination of a non-automatic weighing instrument.

The structure follows Annex III of Directive 90/384/EEC. Numbers in slashes /../ refer to EN45501. These references are however not exhaustive.

- 10.1 General description of type, explanations necessary to understand the functioning of the instrument
  - 10.1.1 Intended purpose of use, kind of instrument (e.g. platform plus-minus-scale, price labeller)
  - 10.1.2 General characteristics (manufacturer; Class, Max, Min, e, n; single-/multi-interval, multiple range; range of temperature, voltage ...) /7.1/
- 10.2 List of descriptions and characteristic data of all devices incorporated in the instrument
  - 10.2.1 Means for securing components, controls etc. /4.1.2/  
Place for application of CE and related marks /7.2/
  - 10.2.2 Adjustment devices /4.1.2.5/
  - 10.2.3 Auxiliary, or extended indicating device /3.4, 4.4.3, 4.14.7/
  - 10.2.4 Multiple use of indicating devices /4.4.4/
  - 10.2.5 Printing devices /4.4.5/, printing of weighing results /4.6.11, 4.7.3/ and other values /4.15.4, 4.17/
  - 10.2.6 Memory storage device /4.4.6/
  - 10.2.7 Zero-setting, zero-tracking devices /4.5, 4.6.9, 4.14.2/
  - 10.2.8 Tare devices /4.6, 4.10, 4.14.3/
  - 10.2.9 Preset tare devices /4.7, 4.14.4/
  - 10.2.10 Locking devices /4.8, 4.14.5/
  - 10.2.11 Levelling device and level indicator, maximum value of tilt /3.9.1/
  - 10.2.12 Auxiliary verification device /4.9/
  - 10.2.13 Selection of weighing ranges (on multiple range instruments) /4.10/
  - 10.2.14 Devices to connect different load receptors to different load measuring devices /4.11/

- 10.2.15 Functions of price-calculating instruments (e.g. for direct sales to the public) /4.15/
- special applications /4.15.4/
  - self-service application /4.15.5/
  - price labelling /4.17/
- 10.2.16 Interfaces
- Type(s), intended use, immunity to external influences instructions /5.3.6/
  - peripheral devices presented to be connected for the disturbance tests /5.4.2/
- 10.2.17 Peripheral devices, e.g. printers, remote displays, that are to be included in the type approval certificate
- 10.2.18 Other devices or functions, e.g. for purposes other than determination of mass (not subject to conformity assessment)
- 10.3 Information concerning special cases
- 10.3.1 Subdivision of the instrument in modules - e.g. load cells, mechanical system, indicator, display - indicating the functions of each module and the fractions  $p_i$  of the maximum permissible errors.
- For modules that have already been approved, reference to test certificates or type approval certificates /3.5.4/
- For load cells, reference to evaluation under R60 /4.12/
- See also point 8 -
- 10.3.2 Special operating conditions /3.9.5/
- 10.3.3 Reaction of the instrument to significant faults /5.1.1, 5.2, 4.14.9/
- 10.3.4 Functioning of the display after switch-on /5.3.1/
- 10.3.5 Any other special information
- 10.4 Conceptual designs, drawings and plans of components, sub-assemblies, electric circuits etc. in particular of:
- load receptor
  - lever systems and material of the levers, if not designed according to /6.3.2 - 6.3.4/
  - devices to apply the force to the load cells
  - electrical connection elements, e.g. for connecting load cells to the indicator
  - load cells, if not presented as modules under 3.1
  - indicator: block diagram
    - schematic circuit
    - keyboard with function assigned to any key
  - drawing of the main plate /7.1/

- samples of all intended printouts, see also point 2.5
  - presentation of the instrument (drawing or photo) showing where verification and securing marks are to be applied
  - cf. points 2.1, 2.14. Size not larger than 210 x 297 mm (DIN A 4)
- 10.5 Declarations whether EN 45501 has been fully applied. For deviations, reference should be made to the corresponding points in Annex I of the Directive, and in the EN, and also to the corresponding points in sections 2 and 3 of the documentation.
- 10.6 Results of tests performed by the manufacturer, on protocols from R 76-2, including proof of competence.
- 10.7 Test reports from other laboratories, as per point 6.
- 10.8 Certificates of other EC-type approvals or separate tests, relating to modules or other parts mentioned in the documentation, together with test protocols where possible  
- see also point 3.1.

## **11 Compatibility of modules**

According to EC-Directive 90/384/EEC Annex II No 3 as amended by EC-Directive 93/68/EEC, the manufacturer who is intending to submit an instrument for EC verification must ensure and declare that the instrument is in conformity with the type as described in the EC type approval certificate and satisfies the requirements of the Directive which apply to it.

Where the EC type approval certificate covers a variety of modules and/or allows the construction of a series of weighing instruments with different maximum capacities and/or measuring ranges it is necessary for the manufacturer to demonstrate before initial verification that the incorporated modules are compatible to each other and to the weighing instrument.

The relevant quantities and characteristics identified which together establish the compatibility have been included on the following forms. These forms cover the complete instruments, the electronic indicator and the load cell(s), plus 4 conditions referred to in EN 45501 and another 6 conditions which are for technical reasons as a result of the section itself. The tables, where the data shall be entered allow for an easy decision to be taken as to whether or not they are satisfied.

The manufacturer of the weighing instrument can check and prove this compatibility by filling in the forms given in the following pages.

It is intended that the forms should be attached to the formal Declaration of Conformity or by other means held ready to be presented to a Notified Body responsible for initial verification or subsequent metrological control. They should also accompany an application for EC type examination or EC unit verification, as part of the supporting documentation.

**Compatibility of Modules**  
**Data sheet**  
Non-automatic weighing instrument

(All data to be taken from test certificate, type approval certificate or instrument in question)

Manufacturer:

Type:

Serial number:

Number of EC-type approval certificate:

issued by:

dated:

Metrological and technical Data :

Weighing instrument	- accuracy class	<i>class</i>		
	- maximum capacity (multi-interval / multiple range)	<i>Max</i> ( <i>Max</i> <sub>1</sub> ) ( <i>Max</i> <sub>2</sub> ) ( <i>Max</i> <sub>3</sub> )		g, kg, t
	- verification scale interval (multi-interval / multiple range)	<i>e</i> ( <i>e</i> <sub>1</sub> ) ( <i>e</i> <sub>2</sub> ) ( <i>e</i> <sub>3</sub> )		g, kg, t
	- number of verification scale intervals $n = \text{Max} / e$ (multi-interval / multiple range $n_i = \text{Max}_i / e_i$ )	<i>n</i> ( <i>n</i> <sub>1</sub> ) ( <i>n</i> <sub>2</sub> ) ( <i>n</i> <sub>3</sub> )		-
	- reduction ratio	<i>R</i>		-
	- number of load cells	<i>N</i>		-
	- correction factor	<i>Q</i>		-
	- dead load of load receptor	<i>DL</i>		g, kg, t
	- lower limit of temperature range	<i>T</i> <sub>min</sub>		°C
	- upper limit of temperature range	<i>T</i> <sub>max</sub>		°C
	- connecting system	<i>WS</i>		-
	-- 4-wire- or 6-wire-system			
	-- length of connecting cable	<i>L</i>		m
	-- cross section of wire	<i>A</i>		mm <sup>2</sup>

<b>Electronic indicator</b> Type : .....	- suitable for accuracy class of the weighing instrument	<i>class</i>		-
Manufacturer : ..... ..... ..... Test Certificate N <sup>o</sup> or Type-approval N <sup>o</sup> : ..... issued by : ..... dated : .....	- maximum number of verification scale intervals	<i>n<sub>ind</sub></i>		-
	- load cell excitation voltage	<i>U<sub>exc</sub></i>		V
	- minimum input voltage per verification scale interval	$\Delta u_{\min}$		$\mu\text{V}, \text{mV}$
	- minimum load cell resistance	<i>R<sub>Lmin</sub></i>		$\Omega$
	- maximum load cell resistance	<i>R<sub>Lmax</sub></i>		$\Omega$
	- lower limit of temperature range	<i>T<sub>min</sub></i>		$^{\circ}\text{C}$
	- upper limit of temperature range	<i>T<sub>max</sub></i>		$^{\circ}\text{C}$
	- fraction of the maximum permissible error	<i>p<sub>ind</sub></i>		-
	4-wire-system : - maximum value of cable length per wire cross section	$(L/A)_{4\max}$		$\text{m}/\text{mm}^2$
	6-wire-system : - maximum value of cable length per wire cross section	$(L/A)_{6\max}$		$\text{m}/\text{mm}^2$

<b>Load cell</b>	- maximum capacity	<i>E<sub>max</sub></i>		g, kg, t
Type :	- minimum dead load	<i>E<sub>min</sub></i>		g, kg, t
	- accuracy class			
Manufacturer : ..... .....	- rated output	<i>C</i>		$\text{mV}/\text{V}$
	- maximum number of verification scale intervals	<i>n<sub>LC</sub></i>		-
Test Certificate N <sup>o</sup> or Type approval N <sup>o</sup> : .....	- minimum verification scale interval or the ratio $Y = E_{\max}/v_{\min}$	<i>v<sub>min</sub></i> <i>Y</i>		g, kg,t -
	- minimum dead load output return or the ratio $Z = E_{\max}/(2 \cdot DR)$	<i>DR</i> <i>Z</i>		g, kg, t -
issued by : .....	- input resistance of single load cell	<i>R<sub>LC</sub></i>		$\Omega$
	- lower limit of temperature range	<i>T<sub>min</sub></i>		$^{\circ}\text{C}$
dated : .....	- upper limit of temperature range	<i>T<sub>max</sub></i>		$^{\circ}\text{C}$
	- fraction of the maximum permissible error	<i>p<sub>LC</sub></i>		

<b>Connecting elements</b>	- fraction of the maximum permissible error	<i>p<sub>con</sub></i>		-
----------------------------	---	------------------------	--	---

Condition (1)	<b>Accuracy classes</b>						
	Load cell(s)		Indicator	equal or better than	<b>Weighing instrument</b>	<b>passed</b>	<b>failed</b>
		&					

Condition (2)	Temperature limit	Load cell		Indicator		<b>Weighing instrument</b>	<b>passed</b>	<b>failed</b>
	$T_{min}$		&		$\leq$			
	$T_{max}$		&		$\geq$			

Condition (3)	$(p_{LC})^2$	$+ (p_{con})^2$	$+ (p_{ind})^2$	=	$\Sigma p_i^2$	$\leq 1$	<b>passed</b>	<b>failed</b>
				=				

Condition (4) **Single scale interval instrument :**

$n_{ind}$	$\geq$	$n = Max / e$	<b>passed</b>	<b>failed</b>

**Multi-interval or multiple range instrument ( i = number of range ):**

i	$n_{ind}$	$\geq$	$n_i = Max_i / e_i$	<b>passed</b>	<b>failed</b>

Condition (5)	<b>Q·Max·R/N</b>			$\leq$	$E_{max}$	<b>passed</b>	<b>failed</b>
		=					

Condition (6a) **Single scale interval instrument :**

$n_{LC}$	$\geq$	$n = Max / e$	<b>passed</b>	<b>failed</b>

**Multi-interval or multiple range instrument ( i = number of range ):**

i	$n_{LC}$	$\geq$	$n_i = Max_i / e_i$	<b>passed</b>	<b>failed</b>

**Condition (6b) Multi-interval instrument**

$DR$	$Z = E_{max} / (2 \cdot DR)$	$\geq$	$Max_r / e_1$	passed	failed

( $Z = n_{LC}$  if neither  $DR$  nor  $Z$  are given in the load cell test report)

**Condition (6c) Multiple range instrument**

$DR$	$Z = E_{max} / (2 \cdot DR)$	$\geq$	$0,4 \cdot Max_r / e_1$	passed	failed

( $Z = n_{LC}$  if neither  $DR$  nor  $Z$  are given in the load cell test report)

**Condition (6d)**

$DL \cdot R / N$	$\geq$	$E_{min}$	passed	failed

**Condition (7)**

$e \cdot R / \sqrt{N}$	$\geq$	$v_{min} = E_{max} / Y$	passed	failed
=				

( $Y = n_{LC}$  if neither  $v_{min}$  nor  $Y$  are given in the load cell test report)

( $e = e_1$  for a multi-interval instrument or for a multiple range instrument)

**Condition (8)**

$\Delta u$	$\geq$	$\Delta u_{min}$	passed	failed

$\Delta u$  calculated from following formula :

$$\Delta u = \frac{C}{E_{max}} \cdot U_{exc} \cdot \frac{R}{N} \cdot e$$

**Condition (9)**

$R_{Lmin}$	$\leq$	$R_{LC} / N$	$\leq$	$R_{Lmax}$	passed	failed

**Condition (10) 4-wire-system**

$L$	$I$	$A$	$=$	$(L/A)_4$	$\leq$	$(L/A)_{4max}$	passed	failed
	$I$		$=$					

**6-wire-system**

$L$	$I$	$A$	$=$	$(L/A)_6$	$\leq$	$(L/A)_{6max}$	passed	failed
	$I$		$=$					

**Proof of the compatibility of the metrological and technical data of weighing instrument, load cell(s) and electronic indicator.**

- Condition (1):** Accuracy class of weighing instrument, compatible to class of indicator and load cell(s)
- Condition (2):** Temperature limits of the weighing instrument compared with the temperature limits of the load cell(s) and the electronic indicator
- Condition (3):** Sum of the squares of the fractions  $p_i$  of the maximum permissible errors of load cell(s), connecting elements and indicator ( EN 45501, No. 3.5.4) must not exceed 1
- Condition (4):** Number of verification scale intervals of the weighing instrument must not exceed maximum number of verification scale intervals of the electronic indicator
- Condition (5):** Maximum capacity of load cell(s) must be compatible to Max of the weighing instrument (EN 45501, N<sup>o</sup> 4.12.1)
- Condition (6 a):** Compatibility of the maximum number of verification scale intervals of load cell(s) to the number of verification scale intervals of the weighing instrument (EN 45501, N<sup>o</sup> 4.12.2)
- Condition (6 b):** Compatibility of minimum dead load output return of the load cell to the verification scale interval of a **multi interval instrument**  
(Condition corresponding to EN 45501, N<sup>o</sup>4.12.2, as agreed by WELMEC WG2 Decision 8 dated 23 November 1994)
- Condition (6 c):** Compatibility of minimum dead load output return of the load cell to the verification scale interval of a **multiple range instrument**  
(Condition corresponding to EN 45501, N<sup>o</sup>4.12.2, as agreed by WELMEC WG2 Decision 8 dated 23 November 1994)
- Condition (6 d):** Compatibility of minimum dead load of the load cells to the actual dead load of the load receptor.
- Condition (7):** Minimum load cell scale interval (EN 45501 N<sup>o</sup> 4.12.3) must be compatible to verification scale interval of the weighing instrument
- Condition (8):** Actual input voltage per verification scale interval must not be less than the minimum input voltage per verification scale interval for the electronic indicator
- Condition (9):** Actual load cell impedance must be within the allowed range of load cell impedance for the electronic indicator
- Condition (10):** Cable length per wire cross section of the connection cable between the junction box for the load cell(s) and the indicator must not exceed the value specified for the indicator

## 12 Conformity documents

This section sets out examples of conformity documents required to be presented with a instrument at various stages in the verification procedure. These may be combined into one document.

**A** Declaration of Conformity - For completion by the manufacturer or his authorised representative prior to verification.

The form which may be included in the operators manual of the instrument is required to be available at the site of installation.

This declaration should include a statement indicating that it is only valid with a certificate of conformity issued by a notified body. The statement does not appear if the manufacturer operates a quality system and declares conformity in accordance with Annex II.2 of Directive 90/384/EEC.

In case of verification in two stages the validity of the declaration of conformity may depend on evidence (or proof) of the carrying out of the second stage of verification.

**B** Certificate of Conformity - For completion by the Notified Body at the time of verification (EC unit verification and EC verification) and presented to the manufacturer or his authorised representative.

The manufacturer or his authorised representative is required to make the certificate available on request.

A certificate of conformity may be used for many instruments of same type by including all serial numbers.


**C** Certificate on tests of the 1st stage - For completion by the Notified Body at the time of 1st stage verification (EC unit verification and EC verification) and presented to the manufacturer or his authorised representative. This certificate must be presented with the instrument at the time of 2nd stage verification.

**D** Certificate on tests of the 1st stage - For completion by the manufacturer or his authorised representative at the time of 1st stage verification (EC declaration of type conformity). This certificate must be presented with the instrument at the time of 2nd stage verification.

Name und Anschrift des Herstellers oder seines autorisierten Vertreters  
 Name and address of manufacturer or his authorised representative  
 Nom et adresse du fabricant ou de son représentant autorisé

Muster  
 Specimen  
 Specimen

**A**

	<p>KONFORMITÄTSERKLÄRUNG  <i>Declaration of conformity</i>          Déclaration de conformité</p>
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Die nichtselbsttätigen Waage  
*The non-automatic weighing instrument*  
 L'instrument de pesage à fonctionnement non automatique



Hersteller: <i>Manufacturer:</i> Fabricant	
Typ/Modell: <i>Type/Model:</i> Type/modèle:	
Nr. der EG-Bauartzulassung (gegebenen falls): <i>No of the EC type-approval certificate (where applicable):</i> N° du certificat d'approbation CE de type (le cas échéant):	

entspricht dem in der Bescheinigung über die Bauartzulassung beschriebenen Baumuster, sowie den Anforderungen der EG-Richtlinie 90/384/EWG in der jeweils geltenden Fassung und den Anforderungen folgender EG-Richtlinien:  
*corresponds to the production model described in the EC type-approval certificate and to the requirements of the Council Directive 90/384/EEC as amended and to the requirements of the following EC directives:*  
 correspond au modèle décrit dans le certificat d'approbation CE de type, aux exigences de la directive 90/384/CEE modifiée et aux exigences des directives CE suivantes:

Unterschrift  
*Signature*  
 Signature

Datum  
*Date*  
 Date

Name, Anschrift und Kennnummer der benannten Stelle  
Name, address and identification number of the notified body  
Nom, adresse et numéro d'identification de l'organisme notifié

**Muster**  
Specimen  
Specimen

**B**

Konformitätsbescheinigung  
*Certificate of conformity*  
Attestation de conformité

Die Übereinstimmung der nichtselbsttätigen Waage  
*The conformity of the non-automatic weighing instrument*  
La conformité de l'instrument de pesage à fonctionnement non automatique



Hersteller: <i>Manufacturer:</i> Fabricant:	
Typ/Modell: <i>Type/Model:</i> Type/modèle:	
Herstellungsnummer: <i>Serial number:</i> Numéro de série:	

mit den Anforderungen der EG-Richtlinie 90/384/EWG in der jeweils geltenden Fassung wurde durch eine Prüfung nach EN 45 501 Nr.8.2 festgestellt.  
*with the requirements of the Council Directive 90/384/EEC as amended was established by tests referred to in EN 45 501 - 8.2.*  
avec les exigences de la directive 90/384/CEE modifiée a été constatée par une vérification en conformité avec la norme européenne EN 45 501 - 8.2.

Die EG-Eichung wurde für folgende(n) Aufstellungsort / Gebrauchsort / Gebrauchszone durchgeführt:  
*The EC-verification is valid for the following place of installation / location / area of use:*  
La vérification CE est valide pour l'emplacement / l'endroit d'utilisation / sphère d'utilisation suivant:

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Unterschrift  
*Signature*  
Signature

Datum  
*Date*  
Date

Stempel  
*Stamp*  
Tampon

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Name, Anschrift und Kennnummer der benannten Stelle  
Name, address and identification number of the notified body  
Nom, adresse et numéro d'identification de l'organisme notifié

Muster  
Specimen  
Specimen



Bescheinigung über Prüfungen in der 1. Stufe  
*Certificate on tests of the 1st stage*  
Attestation des essais de la 1ère étape

Die Übereinstimmung der nichtselbsttätigen Waage  
*The conformity of the non-automatic weighing instrument*  
La conformité de l'instrument de pesage à fonctionnement non automatique



Hersteller: <i>Manufacturer:</i> Fabricant:	
Typ/Modell: <i>Type/Model:</i> Type/modèle:	
Herstellungsnummer: <i>Serial number:</i> Numéro de série:	

mit den Anforderungen der EG-Richtlinie 90/384/EWG in der jeweils geltenden Fassung wurde durch Prüfungen und Versuche nach EN 45 501 Nr.8.2 mit Ausnahme folgender Prüfungen festgestellt:  
*with the requirements of the Council Directive 90/384/EEC as amended was established by examinations and tests referred to in EN 45 501 - 8.2, with the exception of the following tests:*  
avec les exigences de la directive 90/384/CEE modifiée a été constatée par les examens et essais en conformité avec la norme européenne EN 45 501-8.2, à l'exception des essais suivants:

Die noch erforderlichen Prüfungen zur Feststellung der Konformität sind bei der 2. Stufe vorzunehmen.  
*Pending tests to ensure the conformity will be performed at the second stage.*  
Les essais encore nécessaires pour la constatation de la conformité seront faits lors de la deuxième étape.

Unterschrift  
*Signature*  
Signature

Datum  
*Date*  
Date

Stempel  
*Stamp*  
Tampon

Name und Anschrift des Herstellers oder seines autorisierten Vertreters  
Name and address of manufacturer or his authorised representative  
Nom et adresse du fabricant ou de son représentant autorisé

Muster  
Specimen  
Specimen **D**

Kennnummer der benannten Stelle, die die EG-Überwachung nach der EG-Richtlinie 90/384/EWG durchgeführt hat  
Identification number of the notified body that has carried out the EC surveillance referred to the Council Directive 90/384/EEC  
Numéro d'identification de l'organisme notifié, qui a effectué la surveillance CE en conformité avec la directive 90/384/CEE.



Bescheinigung über Prüfungen in der 1. Stufe  
Certificate on tests of the 1st stage  
Attestation des essais de la 1ère étape

Die Übereinstimmung der nichtselbsttätigen Waage  
The conformity of the non-automatic weighing instrument  
La conformité de l'instrument de pesage à fonctionnement non automatique



Hersteller: Manufacturer: Fabricant:	
Typ/Modell: Type/Model: Type/modèle:	
Herstellungsnummer: Serial number: Numéro de série:	

mit den Anforderungen der EG-Richtlinie 90/384/EWG in der jeweils geltenden Fassung wurde durch Prüfungen und Versuche nach EN 45 501 Nr.8.2 mit Ausnahme folgender Prüfungen festgestellt:  
with the requirements of the Council Directive 90/384/EEC as amended was established by examinations and tests referred to in EN 45 501 - 8.2, with the exception of the following tests:  
avec les exigences de la directive 90/384/CEE modifiée a été constatée par les examens et essais en conformité avec la norme européenne EN 45 501-8.2, à l'exception des essais suivants:

Die noch erforderlichen Prüfungen zur Feststellung der Konformität sind bei der 2. Stufe vorzunehmen.  
Pending tests to ensure the conformity will be performed at the second stage.  
Les essais encore nécessaires pour la constatation de la conformité seront faits lors de la deuxième étape.

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Unterschrift Signature Signature	Datum Date Date	Stempel Stamp Tampon
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