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WELMEC Guide 2.10

TECHNICAL IMPLEMENTATION OF THE MODULAR EVALUATION

For Non-Automatic Weighing and Automatic Weighing Instruments

Version 2021

For information:
This Guide is available for the Working Group Measurement Instruments
For future reference on the Europa Website.

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 EU 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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Contents

1. Definitions, abbreviations and symbols

The definitions and abbreviations given below apply to this guide together with the definitions given in WELMEC 8.8 and the EN 45501:2015.

AWI	Automatic Weighing Instrument.
EC	Evaluation Certificate as defined in WELMEC 8.8:2017.
Evaluation report (ER)	As defined in WELMEC 8.8:2017.
General acceptance	The procedure whereby a NB implements a statement in the TEC stating that the instrument may be equipped with “any module of a certain type” provided the module and instrument fulfills certain defined compatibility conditions.
MID	Measuring Instruments directive 2014/32/EU of the European parliament and of the council of 26 February 2014 on the harmonization of the laws of the Member States relating the making available on the market of measuring instruments.
Module	See EN 45501:2015 clause T.2.2
Modular approach	The voluntary modular approach according to WELMEC 8.8:2017.
NB	Notified Body.
NAWI	Non-automatic Weighing Instrument.
NAWID	Directive 2014/31/EU of the European parliament and of the council of 26 February 2014 on the harmonization of the laws of the Member States relating the making available on the market of non-automatic weighing instruments.
Part	As defined in WELMEC 8.8:2017
PC	Parts Certificate as defined in WELMEC 8.8:2017
Protective interface	See EN 45501:2015 clause T.2.3.6.
Purely digital part	An electronic part that does not have analogue inputs and only performs digital functions and provides a digitized output or display.
Technical document	Either an OIML recommendation, normative document, harmonized standard or WELMEC or Annex of this guide.
TEC	EU type examination certificate or design examination certificate.
WELMEC 8.8	WELMEC 8.8, 2017: Guide on the General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments.

2. Scope

This guide covers the technical implementation of the voluntary modular evaluation according to WELMEC 8.8 for NAWs and AWIs that needs to be conformity assessed under the NAWID or the MID. This guide should therefore be applied together with WELMEC 8.8 and the appropriate technical document as listed in section 3.

- It is reminded that the issuing of an EC, PC, PER, ER for a part by another notified body doesn't prejudge full responsibility of the notified body responsible for the conformity assessment of the complete measuring instrument.
- It is also reminded that it is the manufacturer of the complete instrument who is responsible for designing and manufacturing the measuring instrument in conformity with the requirements and to demonstrate the conformity to all applicable requirements of the MID or NAWID, as appropriate, even in case the modular evaluation is used.
- Even if modular evaluation is used, the manufacturer shall apply for a conformity assessment procedure for the complete measuring instrument.

Independent of the parts foreseen by this guide, the conformity assessment procedures for the complete measuring instrument according to NAWID or MID shall be used.

It is up to the NB to decide if an EC or PC for a part, including the technical documentation of that part, can be used for a modular evaluation of the complete instrument.

Even in the case of new technologies, i.e. parts not yet foreseen by this guide, a conformity assessment procedure to evaluate if the complete measuring instrument meets the essential requirements or modular evaluation on the part can still be carried out.

However, if the producer of a part not yet foreseen wants an EC or PC in accordance with WELMEC 8.8, this guide needs to be extended[1], with that part and the evaluation criteria for those new parts shall than be specified through a separate technical annex.

Therefore this guide is a "living" guide, i.e. it is structured so that it can be easily extended with new parts.

[1] A proposed revision of a guide has to follow the WELMEC procedures before it can be accepted and published on the WELMEC website.

3. EC or PC for parts of a NAWI or AWI

An EC or PC according to WELMEC 8.8 is only possible for the parts listed in chapter 3.1 of this guide.

Note: An EC or PC for Software is not possible because software is not considered a part of a measuring instrument, see the definition of a part in WELMEC 8.8.

Typically parts are tested according to the EN45501 with some additional requirements listed in this guide. EN 45501 has clear definitions of parts as well as clear testing procedures for these parts. OIML recommendations for automatic weighing instruments do have the same definitions but usually lack the testing procedures.

This means that even for a part used in an automatic weighing instrument it needs to be tested according to EN45501 but than some conversion of the test results might be necessary, for example for the calculation of Minfill under OIML R61.

In WELMEC 7.5 references to WELMEC 7.2 were made when it was deemed that the harmonized standard En45501 does not, or only partially covers the NAWID software-related Essential Requirements.

For the software related requirements therefore the OIML R60 or the EN45501 or Annex A5 of this guide in combination with WELMEC 7.5 shall be used.

Where WELMEC 7.5 defines requirements which are not met by the specified technical documents (OIML R60, EN45501 or Annex A5 of this guide), these requirements need to be evaluated according to WELMEC 7.2.

For software related requirements for parts used for AWI either WELMEC 7.2 is used or WELMEC 7.5 in combination with the relevant instrument specific annex of WELMEC 7.2.

WELMEC 7.5, in combination with the relevant instrument specific annex of WELMEC 7.2, can be used to convert NAWI software evaluations into AWI evaluations, and vice-versa. The tables in section 2 of WELMEC 7.5 identify what additional requirements must be met to allow the conversion.

The EC or PC shall in any case specify for which types of measuring instruments the part can be used.

3.1 Parts eligible for an EC or PC

The tables in the clauses below gives the name of the parts, defines the parts, declare for which type of measuring instrument a part can be used and a reference to the corresponding technical document containing the requirements that applies to the part.

3.1.1 Load cells and parts that include load cells:

Name of the part	Definition	Measuring instrument types	Technical document[2]
Analog Passive Load Cell	Load cell from which the output provides either measurable data or direct information representing the measurand value. OIML R 60-1:2017 clause 3.1.3.1.	NAWI and AWI	OIML R 60:2017 And Annex A1
Analog Active Load Cell	load cell which is capable of performing the functions as described under “ana-log-passive” load cell (3.1.3.1) and which also utilizes active electronics OIML R 60-1:2017 clause 3.1.3.2.	NAWI and AWI	OIML R60:2017 And Annex A1
Digital Load Cell	Analog-active load cell which includes an analog to digital conversion device providing a representation of the measurand value in some unprocessed digital format. OIML R 60-1:2017 clause 3.1.3.3.	NAWI and AWI	OIML R 60:2017 • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A1
Digital Load Cell equipped with further data processing	Load cells equipped with electronics including amplifier, analog-to-digital converter (ADC), and data processing device (optionally) are called digital load cells. OIML R 60-1:2017 clause 3.1.3.4.	NAWI and AWI	EN 45501:2015 annex E • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A2

[2] For software related requirements for parts used for NAWI WELMEC 7.5 shall be used.

For software related requirements for parts used for AWI either WELMEC 7.2 is used or WELMEC 7.5 in combination with the relevant instrument specific annex of WELMEC 7.2.

Name of the part	Definition	Measuring instrument types	Technical document[2]
Weighing module	Part of the weighing instrument that comprises all mechanical and electronic parts (i.e. load receptor, load-transmitting device, load cell, and analog data processing device or digital data processing device) but not having the means to display the weighing result. It may optionally have parts for further processing (digital) data and operating the instrument. EN 45501:2015 clause T2.2.7.	NAWI and AWI	EN 45501:2015 annex E • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A2

Table 3.1.1 Load cells or parts with a LC eligible for an EC or PC

3.1.2 Parts with analog-to-digital conversion and without a LC

Name of the part	Definition	Measuring instrument types	Technical document[3]
Indicator	Electronic device of an instrument that may perform the analog-to-digital conversion of the output signal of the load cell, and which further processes the data, and displays the weighing result in units of mass. EN 45501:2015 clause T.2.2.2.	NAWI and AWI	EN 45501:2015 annex C • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A3
Analog Data Processing Device	Electronic device of an instrument that performs the analog-to-digital conversion of the output signal of the load cell, further processes the data, and supplies the weighing result in a digital format via a digital interface without displaying it. It may optionally have one or more keys (or mouse, touch-screen, etc.) to operate the instrument. EN 45501:2015 clause T2.2.3.	NAWI and AWI	EN 45501:2015 annex C • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A3

Table 3.1.2 Parts with A/D converter and without a LC eligible for an EC or PC

[3] For software related requirements for parts used for NAWI WELMEC 7.5 shall be used.

For software related requirements for parts used for AWI either WELMEC 7.2 is used or WELMEC 7.5 in combination with the relevant instrument specific annex of WELMEC 7.2.

3.1.3 Purely digital parts

Name of the part	Definition	Measuring instrument types	Technical document[4]
Digital Data Processing Device	Electronic device of an instrument that further processes the data and supplies the weighing result in a digital format via a digital interface without displaying it. It may optionally have one or more keys (or mouse, touch-screen, etc.) to operate the instrument. EN 45501:2015 clause T2.2.4.	NAWI and AWI	EN 45501:2015 annex D • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A4
Terminal	Digital device that has one or more keys (or mouse, touch-screen, etc.) to operate the instrument, and a display to indicate the weighing results transmitted via the digital interface of a weighing module or an analog data processing device. EN 45501:2015 clause T2.2.5.	NAWI and AWI	EN 45501:2015 annex D • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A4
Digital display	A digital display can be realized as a primary display or as a secondary display: a) Primary display: Either incorporated in the indicator housing or in the terminal housing or realized as a display in a separate housing (i.e. terminal without keys), e.g. for use in combination with a weighing module; b) Secondary display: Additional peripheral device (optional) which repeats the weighing result and any other primary indication, or provides further, non-metrological information. EN 45501:2015 clause T2.2.6.	NAWI and AWI	EN 45501:2015 annex D • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 And Annex A4

[4] For software related requirements for parts used for NAWI WELMEC 7.5 shall be used.

For software related requirements for parts used for AWI either WELMEC 7.2 is used or WELMEC 7.5 in combination with the relevant instrument specific annex of WELMEC 7.2.

Name of the part	Definition	Measuring instrument types	Technical document[4]
Price Totalizer	A price totalizer is a purely digital device that receives the final weight value and price to pay from the NAWI[5] and indicates all these values together with the unit price and totalises different transactions.	NAWI and Weight price labeller (AWI)	Annex A5 for PriceTotalizers and Price Computing Devices • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2
Price Computing Device	A price computing device is a purely digital device that receives the final weight value from the NAWI[6] and calculates the price to pay and indicates the final weight value and price to pay together with the unit price and may totalise different transactions.	NAWI and Weight price labeller (AWI)	Annex A5 for Price Totalizers and Price Computing Devices • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2
Data Storage Device	Device used for keeping measurement data ready after completion of the measurement for later legally relevant purposes (e.g. conclusion of a trading transaction later, when the customer is not present for the determination of the amount, or for special applications identified and legislated by the state). EN 45501:2015 clause T2.8.5.	NAWI and AWI	EN 45501:2015 annex D and clause G.3 • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2[7] Annex A4
Printer	A device for printing legally relevant data, not being a simple recipient printer.	NAWI and AWI	EN 45501:2015 annex D • WELMEC 7.5 + instrument specific requirements WELMEC 7.2 or • WELMEC 7.2 Annex A4

5 The NAWI fulfils all the essential requirements of the NAWI directive for direct sales to the public and therefore has its own display, visible for both customer and vendor, and sends the final weight value to the price totalizer or price computing device.

6 The NAWI fulfils all the essential requirements of the NAWI directive for direct sales to the public and therefore has its own display, visible for both customer and vendor, and sends the final weight value to the price totalizer or price computing device.

Name of the part	Definition	Measuring instrument types	Technical document[4]
Simple Recipient Printer[7]	A device that: - is not capable of transmitting any data or instructions into the NAWI other than to release a printout or to check for correct data transmission, and - can only print or indicate measurement data as received from the NAWI without any possibility to modify or further process the measurement data.	NAWI and AWI	Annex B2.

Table 3.1.3 Purely digital parts eligible for an EC or PC

3.2 Parts eligible for general acceptance

It is the prerogative of the Notified Body to decide whether or not general acceptance for a part is possible.

Within WELMEC WG2 agreement has been reached that general acceptance for weighing modules, analog data processing units and indicators is not possible.

For some parts with general acceptance guidance exist. See the table below:

Part involved	See guidance in
Analog load cell	Annex B1
Simple Recipient Printer	Annex B2

Table 3.2.1 Parts with guidance on how to implement general acceptance

[7] A simple recipient printer is eligible for an EC or PC but also for general acceptance without an EC or PC, see Annex B2 of this guide.

4. Markings of the part

The part may bear the CE marking according to European directives other than the NAWID or MID, but in the case of a NAWI or AWI it shall not bear the supplementary metrology marking and Notified Body number relating to the NAWID or MID.

The part shall either be inscribed with the following markings or these markings shall be visible on the display on demand where applicable or a combination of both:

- EC or PC number of the part
- Producers name, registered trade name or registered trademark
- Type designation
- Serial number
- Parts specific markings as specified in the applicable technical document.

5. Technical documentation

The technical documentation of the parts shall comply with the requirements specified in WELMEC 8.8, MID article 18, and the applicable OIML recommendation, normative document or harmonized standard and the applicable annex of this guide.

The technical documentation shall include a written declaration containing at least the following:

- Which harmonized standard or normative document has been adopted for the part;
- That the part cannot be disturbed or fraudulently manipulated through the interfaces;

The manufacturer shall submit the necessary information to establish the compatibility of the part in combination with other parts.

For detailed information that needs to be included in the technical documentation, see the applicable annex for the part.

6. Rules concerning the EC or PC

If the EC or PC makes reference to WELMEC 8.8 than the EC or PC shall comply with the requirements in WELMEC 8.8.

Only for parts listed in section 3.1 of this guide an EC or PC can be issued under WELMEC 8.8.

An EC or PC can only be issued for a part that meets the requirements of the technical document(s) listed in section 3.1.

6.1 Essential information in the EC or PC

The EC or PC shall specify, where applicable:

- for which types of measuring instruments the part can be used.
- Information necessary to establish the compatibility for the combination of parts.
- Functions, facilities and devices of the part;
- Information on the nature and location for the securing measures or refer to drawings to check the securing measures (mechanical sealing, event logger, event counter, etc.).
- Information on the software, including the relevant Software environment, see WELMEC 7.2, 2019, chapter 11.1 for additional guidance.
- A reference to the Evaluation Report with the appertaining test data;

For detailed information that needs to be included in the EC or PC see also the applicable annex for the part.

6.2 Revision of an EC or PC

A revision of an EC or PC is possible if the conformity to type of measuring instruments that are already installed remains unchanged by the revision. This means that the latest revision should contain all of the information from the previous versions of the EC or PC, and that a reduction of the metrological characteristics of already certified parts is not possible.

If there is a change in legally relevant characteristics, which would mean that the compatibility requirements with other devices or parts are no longer satisfied, a new EC or PC is required.

6.3 Referencing within an EC or PC to another PC or EC

Referencing within an EC or PC to another EC or PC is not allowed.

Annex A1 Load cells

A1.1 Scope

The load cells mentioned in this annex fall under the scope of OIML R60: 2017.

A1.2 Essential information in the EC or PC

- Specification of what has been evaluated, analog or digital LC;
- A description of the legally relevant characteristics of the LC to enable compatibility checks with other devices or parts:
    - Accuracy class;
    - Temperature limits
    - Maximum capacity E_{max}
    - Minimum Deadload E_{min}
    - Maximum Number of Loadcell Intervals n_L
    - Minimum Dead load output return (DR) or relative minimum dead load output return (Z)
    - Minimum Loadcell Verification Interval v_{min} or relative minimum load cell verification interval (Y)
    - Input Resistance R_{LC} in the case of analog passive load cells
    - Load Cell cable length in the case of analog passive load cells
    - 4- / 6-Wire-Load Cells in the case of analog passive load cells
    - apportioning factor, p_{LC}
    - Rated output
- **If applicable limitations on force introduction**
- If applicable, software identification and a description of how the software identification can be obtained;
- Information regarding the markings.

Annex A2 Weighing module

A2.1 Scope

See the definition in table 3.1.1.

A2.2 Essential information in the EC or PC

- General information concerning the type of module, description of mechanical structures, load cell, analog data processing device, interfaces.
- A description of the legally relevant characteristics of the weighing module, accuracy class, Max, Min, n, n_i; tare and temperature ranges, etc.
- Characteristics of the power supply (AC or DC, voltage, frequency, through USB port, battery of a vehicle)
-
- Information regarding the markings.

Annex A3 Indicators and Analogue Data Processing devices

A3.1 Scope

This annex specifies the evaluation procedure for parts mentioned in table 3.1.2.

A3.2 Evaluation and tests

The European Standard on non-automatic weighing instruments EN 45501:2015 Annex C shall be used for the testing and evaluation procedures of indicators and analog data processing devices. This annex provides additional explanations of the requirements in Annex C.

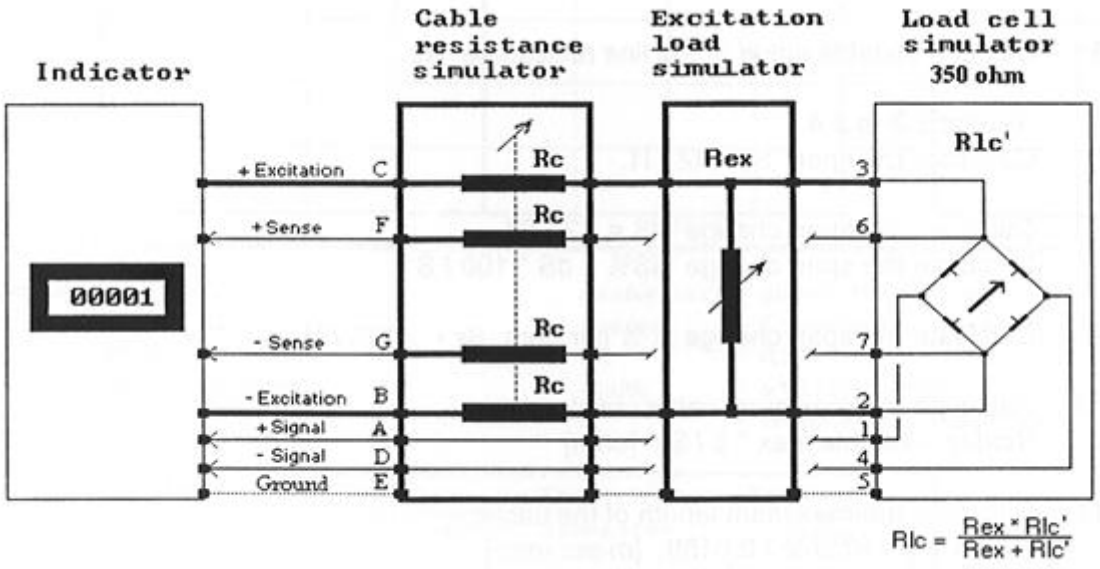
For a personal computer used as an indicator for a non-automatic weighing instrument refer to categories 1 and 2 of EN 45501:2015 clause 5.5.2.1 Table 14.

A3.2.1 Indicators and analog data processing devices with several A/D input channels

When indicators and analog data processing devices have several A/D input channels only one A/D channel shall be tested according to this annex and the functioning of totalization device shall be checked. When performing tests for disturbances (EN 45501:2015 clause B.3) on such devices each A/D channel shall be connected to a load cell.

A3.2.2 Setup for testing the sense function and maximum cable length (EN 45501:2015 clause C.3.3)

The test setup for testing of the sense function for six wire load cell connection is given below. The method may also be applicable for indicators with AC excitation voltage.



A3.3 Essential information in the EC or PC

The EC or PC of the indicator or analog data processing device shall contain the following:

- Specification of what has been evaluated: an indicator or an analog data processing device;
- A description of the legally relevant characteristics of the indicator or analog data processing device to enable compatibility checks with other devices or parts:
    - Accuracy class
    - Fraction of the maximum permissible error, p_i
    - Temperature limits
    - Maximum number of verification intervals, n
    - Electrical data with regards to the weighing instrument
        - U_{exc} (V) - Load cell excitation voltage
        - U_{min} (mV) - General minimum input voltage for indicator
        - ΔU_{min} (µV) - Minimum input voltage per verification scale interval
        - U_{MRmin} (mV) - Measuring range minimum voltage
        - U_{MRmax} (mV) - Measuring range maximum voltage
        - R_{Lmin} (Ω) - Minimum load cell impedance
        - R_{Lmax} (Ω) - Maximum load cell impedance
    - Connection cable type (4-wire / 6-Wire)
    - Connection cable length
- Characteristics of the power supply (AC or DC, voltage, frequency, through USB port, battery of a vehicle)
- Information regarding the markings.

Annex A4 Purely digital parts

A4.1 Scope

A purely digital parts is a part as defined under 3.1.3 of this guide with the exception of Price totalizers and Price computing devices.

A4.2 Essential information in the EC or PC

The EC or PC of the digital parts shall contain:

- A reference to the Evaluation Report with the appertaining test data.
- Characteristics of the power supply (AC or DC, voltage, frequency, through USB port, battery of a vehicle).
- Minimum hardware requirements.

Annex A5 Price Totalizers and Price Computing Devices

A5.1 Scope

This guide specifies the evaluation procedure for a price totalizer or a price computing device that can be tested on its own, and which communicates with the software of the NAWI through a digital protective interface.

The price totalizer or price computing software can be installed on a separate device or can share the hardware of the NAWI[8]. If the price totalizer or price computing device share hardware with the NAWI it cannot be tested separately with the exception of the display under the condition that the NAWI controls the display or allocate a dedicated part of the display to the price totalizer or price computing device.

The calculation of the price of a non-weighed article can either be performed by the NAWI, the price totalizer or the price computing device.

Tare and zero setting operations may be initiated by the price totalizer or price computing device but the tare or zero operation is performed by the NAWI.

The price totalizer and price computing device may send the unit price and/or a preset tare value to the NAWI through the protective interface.

However, the preset tare operation is carried out by the NAWI, i.e. the NAWI calculates the Net value and displays both the final weight value and the preset tare value.

Price totalizers or price computing devices that run the software on a web server are for the moment not within the scope of this annex. This implies that the hardware and software of the price totalizer or price computing device is physically present near or within the NAWI.

Devices that are used to determine a postal tariff are not within the scope of this annex.

[8] If the price totalizer or price computing device replaces parts of the NAWI, for example the power supply of the price totalizer or price computing device is used for the NAWI, than separate testing is not possible with exception of the display. In that case the NAWI and price totalizer or price computing device should be tested together and a revision or extension of the EU-type examination certificate of the NAWI is necessary

A5.2 Documentation

The technical documentation of the parts shall comply with the requirements specified in section 5 of this guide and in addition contain the following:

- The type designation of the price totalizer or price computing device;
- Power supply (voltage, frequency, etc.);
- The means for securing components including interfaces and controls;
- Type of interfaces, intended us, i.e. the data transferred to and from the NAWI to the price totalizer or price computing device;
- The devices incorporated in the price totalizer or price computing device, i.e printing devices, memory storage devices, etc.;
- The functions, e.g. for direct sales to the public, price labelling, special applications, i.e. multiple use of indicating devices, self-service application;
- Other devices or functions for purposes other than the determination of price.

A5.3 Evaluation and tests

Under the scope of this Annex, the price totalizer and the price computing device are purely digital devices. Therefore tests need not be performed on the hardware except those needed to fulfil the checks in the checklist.

For the evaluation of the software, the price totalizer or price computing device shall be connected through an appropriate interface:

- to a printer, and
- either a complete NAWI or a test set-up simulating a complete NAWI.

It shall be ensured that in the test set-up all legally relevant functionalities supported by the price totalizer and price computing device are present, and in operation.

The evaluation body needs to evaluate if the price totalizer or price computing device meets the requirements specified in Table 5.3.1. In the case that certain evaluations are not performed because the requirements are not applicable, the evaluation body should specify in the table “Not Applicable”.

Table 5.3.1			
Reference	Requirement	Interpretation	Passed / Failed / Not applicable
Article 18 of the MID and WELMEC 8.8, clause 4.1 and 5.5.1 or 5.5.2.2. d) of EN45501 and A5.2 of this guide	The technical documentation should be in accordance with • MID article 18 and • EN45501: 2015 clause 5.5.1 or clause 5.5.2.2 d) of whichever is applicable • A5.2 of this guide	The technical documentation should include which communication protocol(s) can be implemented in the price totalizer or price computing device.	
See EN45501:2015 for the complete text of the requirement to be evaluated			
3.6.3	Multiple indicating devices		
4.1.2.1	Fraudulent use	The same weighing data should not be used twice	
4.1.2.3	Controls		
4.2.1	Quality of reading		
4.2.2	Form of indication		
4.4.4	Multiple use of indicating devices		
4.4.5	Printing devices	The printouts from the price-totalizer and price-computing device are part of the evaluation, not the printer itself	
4.6.11	Printing of weighing results	The printouts from the price-totalizer and price-computing device are part of the evaluation, not the printer itself. When manually entered weights (either hand entered or by barcode entry) are accepted the customer's receipt must clearly distinguish those entries from actual weighed entries.	
4.13.1	Primary indications		
4.13.4	Preset tare devices	The price totalizer and price computing device may send the preset tare value to the NAWI through the interface. However, the preset tare operation should be carried out by the NAWI, i.e. the NAWI calculates the Net value. The NAWI should display the final weight value and the preset tare value. It is not necessary that the price totalizer or price computing device displays the preset tare value.	

Table 5.3.1			
Reference	Requirement	Interpretation	Passed / Failed / Not applicable
4.13.6	Visibility	The height of the numerical figures does not need to be the same for the customer's and vendor's display, provided that the essential requirements are fulfilled and all primary indications are displayed clearly and simultaneously to both the vendor and the customer. The height of the numerical figure of the vendor's display need not be ≥ 9,5 mm if the data is clearly readable by the vendor in their normal operating position.	
4.13.9	Significant fault		
4.13.11	Self-service instruments		
4.14.1	Primary indication		
4.14.3	Price-computing device or price totalizer	Notwithstanding the 4th paragraph of 4.14.3 of EN45501: 2015, the unit price (UP) and price to pay (PP) may remain visible until the next operation is performed. Both UP and PP shall be displayed in the appropriate currency unit.	
4.14.4	Special applications of price computing		
4.14.4.1	Non-weighed articles		
4.14.4.2	Totalization		
4.14.4.3	Multi-vendor operation		
4.14.4.4	Cancellation		
4.14.4.5	Additional information		
4.16	Price-labelling instruments[9]		
4.20	Modes of operation		
5.1.1	Significant fault		
5.2	Acting on significant fault		
5.3.1	requirements on switch-on	Point 5.3.1 is not applicable to dedicated non-segmental displays and displays which repeat each of the primary indications displayed by the NAWI.	
5.3.6 WELMEC 7.5	Interfaces		

[9] Only applicable if the combination of NAWI and price totaliser or price computing device can also function as a price-labelling instrument or put in price-labelling mode. In that case printing below Min is not allowed.

Table 5.3.1			
Reference	Requirement	Interpretation	Passed / Failed / Not applicable
5.3.6.1 WELMEC 7.5	Secured interfaces		
5.3.6.2 WELMEC 7.5	Securing interfaces		
5.5.1 G.1 WELMEC 7.5	Devices with embedded software[10]	The audit trail may be part of the software and does not be on a separate piece of hardware However, under the Module B conformity assessment procedure additional securing provisions might be required. It might be necessary to implement an audit trail. It might also be necessary to implement this on a separate piece of hardware that can be secured. (It is up to the producer to decide which securing measures he implements and it is up to the evaluation body to test if these securing provisions meet the requirements) The EC or PC should describe the implemented securing measures, see chapter A5.4.	
5.5.2 G.2 WELMEC 7.5	Programmable or loadable legally relevant software[11]		
5.5.2.2 G.2 WELMEC 7.5	Software requirements		
5.5.2.2 G.2 WELMEC 7.5	Transmission of measuring data		
5.5.2.2 G.2 WELMEC 7.5	Software separation		
5.5.2.2 WELMEC 7.5	Software download		

[10] Acceptable solutions to comply with these requirements can be found in Annex G of EN45501, 2015 or in the WELMEC 7.2.

[11] Acceptable solutions to comply with these requirements can be found in Annex G of EN45501, 2015 or in the WELMEC 7.2.

Table 5.3.1			
Reference	Requirement	Interpretation	Passed / Failed / Not applicable
7.1	Descriptive markings	The following information shall either be marked on the equipment or indicated permanently on the display: • PC or EC number of the price-totalizer or price-computing device. • producers mark or name • type designation • identification of the software The markings should be secured, either by hardware or software means depending on the presentation of the markings: marked or indicated.	

A5.4 Essential information in the EC or PC

The EC or PC of the price totalizer or price computing device shall contain:

- Specification what is evaluated: a price totalizer or a price computing device.
- Information on whether the price computing device can perform other functions than per-article weighing and price computation[12].
- Information on whether the price totalizer or price computing device can be used for price labelling.
- Characteristics of the power supply (AC or DC, voltage, frequency, through USB port, battery of a vehicle)
- Minimum hardware requirements.

[12] A price-computing instrument may perform functions other than per-article weighing and price computation only if all indications related to all transactions are printed clearly and unambiguously and are conveniently arranged on a ticket or label for the customer.

The TEC of the NAWI shall therefore specify that a printing device is mandatory.
In the case of a price totalizer the TEC of the NAWI shall also specify that a printing device is mandatory.

Annex B1 Analog load cell and Indicator

Any information in this annex is additional to the information in the technical document specified in the tables under section 3.1.

B1.1 Scope

This annex details the prerequisites and rules for the combination of analog load cell(s) connected to an indicator or analog data processing device directly or via a junction box.

A single bending beam load cell cannot be used for the described procedure according to this annex.

A load cell marked NH cannot be used for the described procedure according to this annex.

B1.2 Technical requirements

B1.2.1 Conditions for the connection of parts

Overview of possible load cell connections:

Six wire load cells:

- directly connected to the indicator/analog data processing device;
- load cell cable can be shortened or extended with 6-wire cable;
- multiple load cells by use of a junction box using a 6-wire cable connection to the indicator/analog data processing device.

Four wire load cells:

- directly connected to the indicator/analog data processing device;
- load cell cable cannot be shortened;
- load cell cable extended with 6-wire cable with the sense connected to the excitation wires of the load cell cable;
- multiple load cells by use of a junction box using a 6-wire cable connection to the indicator/analog data processing device.

The connection of an analog load cell to a main part by other means than a wired connection is not allowed.

For 4-wire systems the cable length of analog load cell(s) and analog data processing device or indicator must fulfil the conditions as stated in the ECs / PCs.

For 4-wire-load cells the load cell cable length has be defined either in the technical documentation that accompanies the load cell, or on the load cell themselves.

In the case that more than one LC is incorporated in the load receptor (LR), identical analog load cells shall be used. Identical LCs are LCs produced by the same manufacturer, with same dimensions and same technical data except for their accuracy class.

In the case of different accuracy classes in the calculation of compatibility the accuracy class of the analog load cell with the lowest accuracy class shall be taken.

B1.2.2 Securing

The securing provisions should be such that replacing these parts, including junction boxes, gives an evidence of intervention.

B1.3 Compatibility checks and test procedure

In addition to the standard tests the following supplementary compatibility checks can be performed.

- The compatibility conditions as stated in the EN 45501:2015 Annex F.1 to F.3 shall be fulfilled. The compatibility check of the indicator or the analog data processing unit and analog load cell(s) shall be determined by the manufacturer using the compatibility of modules procedure as specified in EN 45501:2015 clause F.4 and assessed by a notified body.
- The cable length (e.g. for 4-wire load cell(s)) should be checked against the conditions given in the ECs / PCs or TEC.
- Check should be carried out to evaluate if the load cells are identical (see A1.2.1)
- In case of general acceptance (see A1.4) the construction should be checked against the conditions listed.

B1.4 Conditions for general acceptance

The general acceptance of analog load cell shall be restricted to parts with a PC which complies with the requirements of this guide and of R 60 (2000) or R 60:2017, or to analog load cells that have an OIML Certificate according to R 60 (2000) or R 60:2017 provided that the cable length is specified in the OIML certificate.

The general acceptance of analog load cell(s) shall only be used for well-identified and “non-critical“ types of weighing instruments, such as weighbridges, platform scales, hopper scales, crane scales and overhead track scales, with or without lever systems, see WELMEC 2.4.

B1.5 Compatibility form

A filled-in form for the compatibility check as specified in EN 45501:2015 clause F.4, together with the data that is used to fill in the form, shall be made available by the manufacturer at a conformity assessment procedure according to module B, module D or module F.

B1.6 Essential information within the TEC

B1.6.1 Conditions for the combinations of parts

In addition to the requirements specified in the NAWID or MID, WELMEC 8.8 and chapter 6 of this Guide, the TEC of the NAWI or AWI must contain the following general statement in the case of general acceptance of analog load cells:

" Any analog passive load cell(s) may be used for instruments under this TEC, provided the following conditions are met:

- There is a respective parts certificate or an OIML certificate (with the load cell cable length specified) issued for the load cell by a Notified Body responsible for type examination under directive 2014/31/EU or directive 2014/32/EU.
- The certificate contains the load cell types and the necessary load cell data required for the manufacturer's declaration of compatibility of modules.
- The compatibility of load cells and indicator is established by the manufacturer by means of the compatibility of modules form, see EN 45501:2015 annex F.4 at the time of the conformity assessment procedure according to module D or module F.
- The load cell, load transmission and load receptor must conform to one of the examples shown in WELMEC 2.4.

Remarks on this statement:

- When the general acceptance of load cells is used for automatic weighing instruments, additional requirements may apply.
  For example, for automatic catchweighers (OIML R 51) the general acceptance may be limited to certain load cell constructions. And for automatic gravimetric filling machines (OIML R 61) and totalizers (OIML R 50 and OIML R 107) the verification scale interval as used in the compatibility check is not applicable and may be replaced with a different condition.
- The wording of the statement may be adopted to match the wording in the TEC, as every NB uses their own style.
  For example, the use of "module D" and "module F" may need to be combined with proper references to the applicable directive in the TEC.
- The tables in WELMEC 2.4 need not to be included in a TEC because the general statement in the TEC refers to the examples given in this guide.
- If general acceptance is not used, all the different types and combinations of parts of the complete NAWI has to be defined in the TEC and the constructions drawings have to be supplied to the Notified Body.

B1.6.2 Conditions for securing

The TEC should specify the kind of securing foreseen and how to check the securing provisions, see also B1.2.2.

B1.7 Further information

Although under this guide it is not acceptable for a TEC to include the general acceptance for analog data processing devices or indicators, it is acceptable for several different analog data processing devices or indicators (not necessarily related or even from the same manufacturer to be included in one EU-type examination certificate as long as the EU-type examination certificate names the analog data processing devices or indicators with their Evaluation Certificate or Parts Certificate numbers.

Annex B2 Simple Recipient printer

B2.1 Scope

This annex details the prerequisites and rules for the combination of a weighing instrument with a simple recipient printer.

Chapter 3.1.3 may suggest that simple recipient printer are eligible for having an EC or PC but this is not necessary. In most cases the CE marking showing compliance with all applicable directives is sufficient.

B2.2 Technical requirements

Simple recipient printers have to comply with the requirements from EN 45501:2015 clauses 4.2, 4.4.5, 4.6.11 and 4.6.12.

It has to be decided by the Notified Body, based on the use of the simple recipient printer, whether sealing to the weighing instrument is necessary. Means of securing shall be specified in the TEC.

B2.3 Compatibility checks and test procedure

The compliance with the technical requirements shall be checked during module D, module F, reverification or during an inspection, by initiating a print-out with:

- Gross weighing;
- Weighing with a tare device active (if applicable);
- Weighing with a preset tare device active (if applicable).

B2.4 Conditions for general acceptance

Any simple recipient printer may be connected to a weighing instrument provided that the printer bears the CE marking, showing compliance with all applicable directives.

B2.5 Technical documentation

None.

B2.6 Essential information within the TEC

TEC of the NAWI or AWI shall contain a statement in the case of general acceptance of simple recipient printers similar to:

> “The weighing instrument may be connected to simple recipient printers, provided this printer bears the CE marking.”

B2.7 Further information

None.