

## 1.3 INTERFACES, PRINTERS AND PERIPHERAL DEVICES

### Background

Weighing Instruments, be they non-automatic or automatic, when used for a legally controlled purpose are required to comply with all of the applicable relevant legislation. In legal metrology, the weighing instrument comprises of the weighing element (load cell, load receptor, indicator and all the necessary software and electronics necessary for the weighing operation to be performed) and any other associated equipment connected to it. So for example, an in-store Point of Sale system, comprising of a load receptor, weight display, scanner, printer, cash draw, keyboard, data display and card reader is regarded for legal metrology purposes as a weighing instrument. The Type Approval Certificate for the instrument will detail not only the weighing elements, but also the connected elements and all must satisfy the legal requirements.

If the examination for Type Approval had to cover all of the possible elements of a weighing system, many of which would be common to many different weighing systems, the Type Approval process would be both time consuming and expensive, and the result would be that many elements would be tested over and over again.

### Non-automatic Weighing Instruments

Under the NAWI Directive, there has been developed what is known as the “modular” system. The Directive recognised that many elements of a weighing system are common, many can be tested in their own right and different elements can be combined to produce a weighing system.

WELMEC Working Group 2 (WG2) took on board the development of the modular system to enable manufacturers and the Type Approval organisations to understand how the various elements could be tested and to set out some guidance that would illustrate how the modular system could operate. That Guidance is contained in WELMEC Guide 2.5 “Guide for modular approach and testing PCs and other digital peripheral devices”. The Guide, currently at Issue 2 dated September 2000, can be downloaded free of charge from the WELMEC web-site at [www.welmec.org](http://www.welmec.org).

### Definitions

In developing the Guide, WELMEC WG2 soon recognised that there needed to be very clear definitions of what elements of the weighing system can be regarded as modules and what elements are not modules but “peripherals”.

They came up with the following definitions:

#### Module

*A module is a part of a NAWI that is necessary for obtaining the weighing result and any primary indication related to it. A module is capable of being tested separately and of having partial error limits  $p$ , assigned to it.*

*A device connected to a NAWI via a non-protective interface is regarded as a module. The connection needs to be secured and if nothing is connected to it, the interface itself needs to be secured.*

*Examples of modules of a NAWI: load cell, indicator, display, price-computing POS device, software, weighing module (here they mean a “digitally working instrument including mechanical structures but without a display” which is therefore not a NAWI).*

### **Peripheral**

*A peripheral is an additional device to the NAWI, connected externally or built in, which repeats or further processes the weighing result and/or any primary indication without changing the original characteristics as specified in the Type Approval Certificate of the NAWI.*

*A peripheral shall be connected to the instrument via a protective interface.*

*Examples of peripherals of a NAWI: printers, supplementary displays, alibi printer, alibi data storage device, personal computer (PC), non-price-computing POS device which receives all primary indications from the NAWI and only prints them on a ticket.*

### **Protective Interface**

*The following two definitions gave rise to the concept of the “protective” interface, and whilst there is no specific definition of a protective interface the Guide does give advice which is helpful. It describes two types of protective interface:*

- the interface prevents the introduction into the instrument of unauthorised data, parameters or instructions.*
- the interface provides protection which covers the manner in which data related to primary indications are transmitted to a peripheral device under legal control.*

### **Modules and Test Certificates**

To facilitate the use of modules, WELMEC WG2 developed the concept of Test Certificates (TC). Any module can be submitted for examination and testing to the applicable requirements of the Directive and the European Standard. If the module passes the tests, the Notified Body issues a TC which describes the module and its essential characteristics. Manufacturers can then, with the agreement of the owner of the TC, use that module in their instrument if the Type Approval Certificate (TAC) for the instrument allows the use of modules.

The most common use of TCs in Type Approvals is for load cells. Many load cell manufacturers obtain a TC for their load cells, the weighing instrument manufacturer then applies for the Type Approval for his instrument and asks for a clause to be incorporated into the TAC, allowing the use of any load cell having a TC (or OIML R60 Certificate) issued by a Notified Body.

When using a TC for a load cell, the manufacturer will be required to complete a “Compatibility of Modules” form, which requires him to do some technical checks to ensure that the technical characteristics of the load cell and indicator are such that they will perform together to the accuracy levels required by the TAC. Details of the Compatibility of Modules form can be found in WELMEC Guide 2, “Directive 90/384/EEC, Common Application non-automatic weighing instruments.” The Guide also lists websites where spreadsheets can be found which will simplify the completion of the form. (See also section 3.1 on compatibility of modules).

### **Peripherals**

Certain peripheral devices are allowed to be connected to the NAWI without any specific controls. The most common example of this is simple recipient (non-intelligent) printers, i.e. the printer receives data from the weighing instrument and merely prints it onto a label, ticket or receipt without any further processing. In such cases, the only requirement is that the printer bears the CE conformity mark indicating that it meets all of the other applicable EC legislation such as the EMC Directive and the Low Voltage Directive.

At other times peripherals may need a Test Certificate. The simplest example is what is known as an “alibi printer” i.e. a printer that is connected to a weighing instrument to provide a long term record of weighments in systems where the weight data is sent straight to a computer for invoicing purposes or similar. In this case, a simple recipient printer can be used to provide a tally roll record but because this record is a requirement of the Directive, the printer needs to undergo some testing to ensure it meets the essential requirements of the Directive.

### **Automatic Weighing Instruments**

When the Measuring Instrument Directive was being drafted and adopted, it was assumed by everyone that the modular approach, which was by then well established for non-automatic weighing instruments, would also be applicable for automatic weighing instruments. Unfortunately, no one realised that the Directive itself was drafted in such a way that the modular approach was not allowed. This has been recognised as an error but one that cannot be corrected until the Directive is reviewed which will probably not be for a number of years.

The modular approach has, however, been accepted and for the purposes of the MID and the rules outlining this can be found in the WELMEC Guide 8.8 (<http://www.welmecc.org/latest/guides/88.html>).

The OIML are also looking at adopting a Recommendation on the Modular Approach, and once this is done, then the hope is that it can be adopted by the EC as a “Normalised Document” under the MID thus allowing full use of the modular approach for all measuring instruments covered by the MID .

### **Detailed requirements**

The whole question of modules, peripherals and interfaces is one which arises frequently in WELMEC and perhaps the only real answer is to say that in any case of doubt guidance should be sought from the Notified Body who are/will be responsible for issuing the Type Approval Certificate. Readers who are considering using the modular approach for NAWI manufacture should consult WELMEC Guide 2.5; and for AWI the WELMEC Guide 8.8 for the specific details of the tests that will be applied and the requirements that apply.

