



Weights and Measures Bulletin No. 1003 Version 4 (March 2020)

### **Actions to be taken when weighing and measuring instruments are repaired, adjusted, altered or added to**

#### **INTRODUCTION**

This document is a revision of the previous Version 2.0 which was published in July 2010.

Manufacturers, repairers, users, self-verifiers and inspectors have expressed concern about the consistency of approach when instruments are repaired, adjusted, altered or added to. The fundamental question being asked by each party is “Does the instrument need to be re-qualified before it is put back into service?” This guide outlines the legal framework that provides the answer to the question and details some frequently occurring examples that will assist in reaching a conclusion.

Much modern weighing and measuring equipment is composed of a number of components, each component having a different function within the complete instrument. Examples include weighing instruments with electronic point of sale systems (EPOS), weighbridges with linked displays and liquid fuel measuring systems with point of sale terminals (POS). The manufacturer of the instrument connects different components, e.g. load cells, meters, indicators and software to produce a complete instrument. Under the EU directives (The Non-automatic Weighing Instruments Directive and The Measuring Instruments Directive) the manufacturer of the complete instrument is responsible for the conformity assessment of the instrument when it is first placed on the market or put into use. For UK national legislation, the user is responsible for the status of the instruments they use. In practice this responsibility is also taken by the manufacturer, installer or distributor.

After the instrument has been on the market for a period, components may be replaced, altered, adjusted or repaired as a result of damage, failure or upgrade. In these situations, the responsibility for the legal status of the instrument remains with the user of the instrument. Users rely heavily on manufacturers, installers and service companies to fulfil the obligation for legal compliance on their behalf.

The first question that should be asked after such an alteration, adjustment, repair etc. is: -

“Has the work that has taken place been such that the instrument could be disqualified, and therefore the instrument requires requalification?”

If the answer to this is 'yes', and it is considered that the instrument does need to be re-qualified before it is put back into service, the re-qualification authority, or organisation, must then address the practical question of what tests to apply.

Some tests are prescribed by regulation whereas others require a more practical approach to the specific circumstances. Ultimately the person re-qualifying an instrument must make a judgement on the totality of compliance of the instrument.

## **LEGAL BACKGROUND**

The need to re-qualify instruments comes from the ability or requirement for an Inspector of Weights and Measures to disqualify the instrument in the first instance. If the instrument has been disqualified, or could be so disqualified, then before it is used for trade again it must undergo re-qualification.

An inspector can disqualify an instrument for several reasons, and these are listed in the regulations that apply to that specific instrument.

In general terms, such reasons include the following situations: -

- The instrument has fallen outside of its permitted tolerance
- The instrument does not fully comply with the requirements which apply to it
- In the opinion of the Inspector, the instrument has undergone any alteration, addition, adjustment or repair that could affect its accuracy or function.

*Please note that: -*

- *These are paraphrases of slightly differently worded criteria in different Regulations.*
- *The thought process of an Approved Verifier should be the same as that of an Inspector in respect of these criteria.*

If any work has been done to an instrument, the process of deciding what to do, as a consequence of this work, is in two stages: -

1. Could the instrument be disqualified after the work has been done?
2. If so, the instrument needs to be re-qualified

There are a number of important points that need to be considered in deciding if work that has been done to an instrument could render it likely it to be disqualified, and therefore necessitate that instrument being re-verified.

- It is the opinion of the Inspector as to whether the requirements of the alteration, adjustment, addition or repair will necessitate the equipment being rejected and consequently re-verified. This will be a question of fact, and dependent upon the circumstances of each individual case.
- It is not implicit that all alterations, adjustments, additions or repairs will affect compliance, accuracy or function. Some of the changes may have no effect at all on

metrological performance, accuracy or compliance. Some changes to components in the instrument can therefore take place and will not necessitate the instrument needing to be re-verified.

- In deciding if an alteration, adjustment, addition or repair would render an instrument liable to disqualification under the criteria outlined above, it is essential that the Inspector, or Approved Verifier, ascertain all the activities that have been undertaken in connection with the instrument and then form their opinion based on the totality of the changes. This will normally involve a physical inspection of the instrument and paperwork associated with the change.
- If the opinion is formed by an Inspector or Approved Verifier that the instrument would not be disqualified and hence requalification is not necessary, *that opinion should be made positively, and it should be recorded in such a way that it is traceable for future inspections and audits.*

All instruments must maintain a status of qualification whenever they are used for trade, or a Regulation 3(2) application of the Non-automatic Weighing Instruments Regulations 2016.

This qualification status could have been achieved when the instruments were: -

- new and they were passed as fit for use for trade and stamped or
- first placed on the market and put into use and were properly 'stickered' or
- they were re-qualified and carry the prescribed stamp or re-qualification sticker which was applied subsequent to the alteration, addition, adjustment or repair.

These requirements are contained in;

- a) S11 of the Weights and Measures Act, and regulations made there under
- b) The Non-automatic Weighing Instruments Regulations 2016
- c) Regulations made for specific types of instrument under the Measuring Instruments Directive

For instruments covered by the EU New Approach Directives (The Non-automatic Weighing Instruments Directive and The Measuring Instruments Directive), an important point to be considered is the difference between conformity assessment and re-qualification.

The Guide to the implementation of Directives based on the New Approach and the Global Approach (colloquially known as THE BLUE GUIDE) offers an opinion that products which have been repaired without changing the original performance, purpose or type are not to be considered as new and are therefore not subject to another conformity assessment procedure.

Re-qualification is an in-service provision, and may be carried out by an Inspector or, if within their scope, by an Approved Verifier.

In order to maintain the standards of metrological integrity in the UK, it is considered necessary to evaluate the performance of instruments following such repairs that could affect the accuracy or function of the instrument.

## **PRACTICAL IMPLEMENTATION**

From the legal points stated above, it is clear that the question of whether or not the change of a component which is part of an instrument would require re-verification will be dependent upon a number of factors which will be determined by the Inspector or Approved Verifier on a “case by case” basis.

The following examples and questions will assist in determining whether a specific circumstance necessitates the re-verification of the entire instrument.

Before the advent of self-verification, previous advice to Inspectors of Weights and Measures reflected the routine nature of instrument inspection. There was a presumption that changes do not affect accuracy and function *unless* there was information to the contrary.

Now, because of the integrated nature of public and private sector activities in this sector, it is more appropriate that advice should be to take a neutral position when confronted by such changes to instruments, and then to form a view based on the facts presented.

A definite opinion must therefore be formed by the Inspector or Approved Verifier *in each case, based on the actual changes and their impact*

A major point to be addressed in order to form this opinion is therefore the question: -  
*Could the accuracy of the instrument have changed?*

If the accuracy of the instrument could have changed as a result of changing a component or making an alteration or adjustment, it is difficult to argue that the instrument should not be re-qualified.

In order to help form an opinion, the following potential scenarios will need to be considered: -

### **1. Change of Component**

<b>Change of Component</b>	<b>Suggested Action</b>	<b>Questions that should be asked</b>
<b>Change of load cell in weighing instrument</b>	To be re-qualified	The load cell is a critical component and although an identical model of load cell may have been replaced, the functioning of a load cell is dependent upon a large number of local environmental factors which can only be confirmed in-situ
<b>Change of pulser;</b> • <b>in liquid fuel dispenser</b>	To be re-qualified	The Pulser is a critical component in “counting” the revolutions of the

<ul style="list-style-type: none"> <li>• on a road tanker meter measuring system</li> </ul>		<p>meter unit. The deterioration of the previous unit might have been compensated for in recalibrations over time.</p> <p>Physically identical units can be calibrated against different EPROM software thus “counting” different amounts of fuel.</p> <p>Pulsers are often required to be sealed in the type approval certificates</p>
<p><b>Change of meter;</b></p> <ul style="list-style-type: none"> <li>• in a liquid fuel dispenser</li> <li>• on a road tanker meter measuring system</li> </ul>	To be re-qualified	The meter is the most significant metrological component and is the main determinant of the measurement.
<p><b>Change of the indicator in a NAWI EPOS</b></p>	Not subject to disqualification if a one-way communication device and complies with type approval and appropriate Conformity documentation	<p>The indicator, when forming part of a system as a one-way communication device, contains no data manipulation capability.</p> <p>Consideration should be still be given to the Declaration of Conformity and its ability to cover the new configuration. The indicator may itself have modular approval and be subject to the same test certificate as the original configuration.</p> <p>If the indicator is not a one-way communication device, the instrument may be subject to disqualification, depending upon what the indicator is capable of doing</p>
<p><b>Change of a headwork in a;</b></p> <ul style="list-style-type: none"> <li>• weighbridge</li> <li>• liquid fuel dispenser</li> </ul>	To be re-qualified	When the headwork of a weighbridge or liquid fuel dispenser contains software that manipulates the electronic signal from the converter and could affect accuracy, the

		<p>instrument will be subject to disqualification.</p> <p>If the headwork is a one-way communication device and contains no data manipulation capability, the instrument may not be subject to disqualification, dependent upon what else the indicator is capable of doing. Consideration should be given to the Declaration of Conformity, and its ability to cover the new configuration.</p>
<p><b>Addition or activation of stage II vapour recovery system in liquid fuel dispensers</b></p>	<p>Not subject to disqualification unless the answers to any of the questions are 'yes', in which case they are to be re-qualified.</p>	<p>Could the modification affect the accuracy of the delivery?</p> <p>Is the fuel capable of being 'sucked back' after being metered and before entering the customer's fuel tank or container? (Where VR systems are not adjustable for each dispenser, it should normally only be necessary to check one dispenser)</p>
<p><b>Addition, activation or de-activation of STA (standard temperature accounting;</b></p> <ul style="list-style-type: none"> <li>• on a road tanker meter measuring system</li> <li>• in a liquid fuel dispenser</li> </ul> <p style="text-align: center;">or</p> <p><b>Change of fuel type when STA is already activated;</b></p> <ul style="list-style-type: none"> <li>• on a road tanker meter measuring system</li> <li>• in a liquid fuel dispenser</li> </ul>	<p>To be re-qualified</p>	<p>The activation, or de-activation, of STA will require access which should be sealed in accordance with the type approval certificate.</p> <p>The change of fuel type to one of a different density will require the STA mechanism to be reconfigured with the correct parameters for the new fuel, and re-qualified.</p> <p>The NMO Guidance Note for Retail Fuel Dispensers and Road Tanker Mounted Meter Measuring Systems fitted with Standard Temperature Accounting Displays gives further specific guidance.</p>

## 2. Change of a Self-contained Module

If the change of the module has affected or may affect the functionality of the metrological aspects of the instrument, it should be re-qualified, but if no functions have been added to, or removed from the instrument, it is likely that it will be considered a "like for like" change and not need to be re-qualified.

<b>Change of component</b>	<b>Suggested action</b>	<b>Questions that should be asked</b>
<b>Change of a “like for like” EPOS in a weighing system</b>	No need to re-qualified	If the replacement module is the same type and make as that which has been removed and had been conformity assessed in conjunction with an identical system, it is felt that there is no change of functionality
<b>Replacement of EPOS in a weighing system</b>	To be re-qualified	If the replacement module is not the same type or make as that which had been removed or is not covered by the Declaration of Conformity
<b>Replacement of a weighing module</b>	Not subject to disqualification	If the replacement module is identical, retains the validity of the Declaration of Conformity and has undergone conformity assessment already, it is felt that there is no change in functionality
<b>Change to a different weighing module</b>	To be re-qualified	If the module is not identical, or has itself been subject to alteration repair etc. or is not covered by the Declaration of Conformity
<b>Change of a ‘like for like’ POS on a forecourt liquid fuel measuring system</b>	Not subject to disqualification	If the replacement module is the same type and make as that which has been removed and had been conformity assessed in conjunction with an identical system, it is felt that there is no change of functionality
<b>Replacement of POS on a forecourt liquid fuel measuring system</b>	To be re-qualified	If the module is not the same type or make as that which has been removed or is not covered by the Declaration of Conformity
<b>Upgrade of software</b>	To be re-qualified	It would only be necessary to re-qualify if the software

		upgrade is metrologically significant. For further guidance see WELMEC 2.3 and 7.2
<b>Change of card reader on a forecourt liquid fuel measuring instrument</b> NB. Inspectors / Approved Verifiers need to ascertain if other work has also been completed at the same time, such as EPROM upgrades	No need to re-qualify	If the module is of the same make and type as that which has been removed, or only non-metrological changes have taken place (such as swipe card changed to chip and pin), there is no need to re-qualify
<b>Addition of card reader to a forecourt liquid fuel measuring instrument</b>	To be re-qualified	The addition of a card acceptor or outside payment terminal changes the function of the equipment allowing it to operate without the presence of one of the parties to the contract.

### **Matters to be considered with all Changes and Modifications**

#### **3. If the changes made to an instrument are so significant that the Type Approval Certificate has to be changed to a different one: -**

The instrument will normally be considered as a new instrument. It will then be subject to either conformity assessment for the first time or full national verification.

If the changes made to an instrument mean that different amendments or variants of *the same type approval certificate* apply, then the instrument would not normally be considered new, and the above conditional provisions will apply.

#### **4. The continued application and validity of the Declaration of Conformity will depend upon how the Declaration was drafted when the instrument was first placed on the market.**

If the Declaration cannot apply to the instrument after the component in question has been changed, it is likely that it will need to be re-verified. For example, if the Declaration of Conformity lists serial numbers of the individual components it is unlikely that the existing Declaration of Conformity will apply if the modules are changed and the instrument will need to be re-verified. If the Declaration of Conformity only lists the test certificate numbers of the components, as long as those test certificates remain the same, the instrument will not need to be re-verified.

#### **5. The role of the Primary or Home Authority**



This is of great importance as many changes to weighing and measuring instruments are undertaken as part of a regional or nationwide upgrade for whole companies. In this case the Primary Authority or Home Authority has a key role in advising the company on the need to ensure that their instruments retain qualified status when they are used. This should include the tests deemed to be necessary as a result of the change. Whilst the Primary Authority or Home Authority can supply useful information to Inspectors of Weights and Measures and Approved Verifiers about the intended changes, it is often the case that at any specific location, the proposed changes give rise to additional work. In some cases, engineers may use the opportunity presented by the change to undertake other essential maintenance or upgrade work. It is the responsibility of the Inspector or Approved Verifier to make an assessment of the work done in their area based on all the available information, and to form a specific opinion on the need to disqualify or not.

## **6. Required Tests**

The tests needed in order to satisfactorily conduct a re-verification will be dependent upon the change. For example: -

- a. The change of a meter in a liquid fuel measuring instrument will require a full test
- b. Where new POS systems and / or outdoor payment terminals are installed and re-verification is required, this does not necessarily need to be of all the dispensers on the site. In addition to this, it could be only one nozzle on one side of a multi-product dispenser (MPD) for any MPD on the forecourt that should be tested and not necessarily every nozzle. It would be helpful if the POS installer has a site-specific plan which includes the verification activity of the Inspector or Approved Verifier.

The POS system and outside payment terminals need to be checked to ensure they are working correctly with the associated fuel dispenser(s) and are in compliance with its Type Approval Certificate. As the basic metrological aspects of the dispensers in relation to accuracy are unlikely to have been affected, a re-verification of each individual connected dispenser is not normally necessary, but it is important to establish that the POS is correctly displaying the readings of the dispensers, that the outside payment terminals are functioning correctly and that all associated safety cut outs function properly. A re-verification (initial MPEs apply), by either an Inspector or Approved Verifier, of one pump connected to the POS system is required as a minimum to ensure the changes have definitely not affected the accuracy or functionality of the dispensers or any associated equipment. It would normally only be expected to carry out a single test e.g. 20 L fast. For sites with a mix of dispensers covered by different type approval certificates, each dispenser type would need one dispenser to be re-verified (i.e. one of each national and one of each MID). There is, however, no need to adjust a meter if it is within the prescribed limits of error for inspection.

Once the dispenser(s) have been re-verified, evidence of this should be found on the dispenser(s): -

- UK dispensers should have their seals over stamped, or a single seal on the pulser could be replaced by a new seal.
- MID dispensers should have stickers applied to their data plate.

This then provides evidence for the future that the dispenser has been tested in its new configuration, in the eventuality that the paperwork is not available.

The Local Weights and Measures Authority must be formally notified of the work undertaken by an Approved Verifier (as part of their approval conditions), and whether such equipment was adjusted or not. They must also be advised if any proposed work would involve any equipment that is outside the Approved Verifier's scope of approval, so that a re-verification appointment can be made.

**Please Note**

The views expressed in this opinion are based on the current information and practices operated in both the public and private sector of the industry. These can and will change over time and it may be necessary to add to or amend this opinion as time progresses. If you wish to include any specific examples etc. that would support the document, please contact OPSS. Any suitable examples can be added to this document as a revision.

## Document Control

<b>Version No.</b>	<b>Date of change</b>	<b>Substantive changes</b>
1.0	November 08	Original document
2.0	July 2010	Addition of guidance on stage II vapour recovery (at the end of the table in point 1)
3.0	July 2012	Complete review and overhaul of the document
4.0	March 2020	Amendment in relation to testing (Section 6) for new POS systems or outside payment terminals