



UK WEIGHING FEDERATION

CODE OF PRACTICE

for the

CALIBRATION OF NON-AUTOMATIC

WEIGHING INSTRUMENTS

VERSION 6.0

AUGUST 2016

CONTENTS

SECTION	PAGE NO
Amendment history	2
1. Introduction	3
2. Scope	4
3. Test Equipment	5
4. Personnel / Training	6
5. Calibration Procedure	7
5.1 Tests	8
5.2 Repeatability	8
5.3 Eccentric Loading	8
5.4 Linearity / Hysteresis	9
5.5 Weighing with Tare	9
5.6 Sensitivity	9
5.7 Re-Verification	9
6. Substitute Materials	11
7. Certificates	12
8. Compliance with the Code	13
8.1 Complaints	13
8.2 Enforcement	13
Annexes	
A. Weights	14
B. Classes of Instruments and Tolerances	15
C. Glossary of Terms	17
D. Further Guidance of Re-Verification	19



AMENDMENT HISTORY

Edition 1 - published July 1997

From time to time it will be necessary to amend this document. In order to ensure your copy is up-to-date you should register your interest with the UKWF. The person inserting each amendment should complete the table above.

Edition 2 – published November 2002

The major aspect of the revision was to remove references to the “Verification” of machines used for legally controlled purposes. Consequent amendments involved the deletion of Level 1 and Level 2 testing requirements and replacing them with “mandatory”, “recommended” and “optional” tests. Minor changes to the requirements for calibration certificates were also made. A new section, 8.2 Enforcement, was also added at this time



Edition 3 – published January 2007

The Code was revised in October 2006. The major aspect of this revision was to bring the Code into line with current International Recommendations by adopting as many of the changes made or proposed to those documents whilst still retaining all the elements necessary to provide the industry’s customers with the service levels they expected and needed.

Edition 4 - published February 2008

The Code has been revised to bring Class II instruments within the scope. A corresponding change has been introduced to clarify the class of weights that should be used for calibration.

Edition 5 – published August 2012

The Code has been revised to ensure all references to legislation and relevant standards are up to date. The requirement in relation to the re-verification of equipment has been altered and there are different obligations with regard to this. There is a new Annex D, which relates to the requirements for re-verification

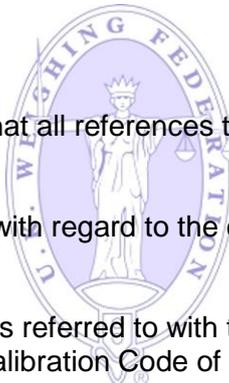
Edition 6 - published August 2016

The Code has been revised to ensure that all references to legislation and relevant standards are up to date.

It also makes some important changes with regard to the calibration procedure that must be followed by members.

1) Any members offering a service that is referred to with the term calibration must ensure that the service complies fully with the UKWF Calibration Code of Practice. Individual calibration certificates must be issued for each calibration and those certificates must reference the UKWF and this Code of Practice

2) This Code does not prevent members offering other services and executing other procedures. Any such procedures or services must not be referred to as calibrations. Any other services or procedures carried out by a member company which determine the accuracy of a non-automatic weighing instrument which are not covered by this Code must not have individual certificates and must **NOT** make reference to or imply that a calibration has been completed in compliance with this Code.



1. INTRODUCTION

This Code of Practice is provided by the UK Weighing Federation (UKWF) for the benefit of its members and their customers. It sets out the procedures for the calibration of weighing equipment, the selection of the personnel and test equipment which should be used and the methods of recording the results of the calibration. The Code requires UKWF Members to suitably train their personnel in all aspects of the Code and the industry.

The UKWF is the national trade association for manufacturers, dealers, repairers, installers and service organisations in the weighing machine industry. On behalf of its members it takes part in the development of new national, European and international legislation and Standards relating to all aspects of weighing. The UKWF believes that the principles of fair competition, equitable trading and value for money are the basis for good business between its members and their customers. The UKWF has been established for over 100 years.

This Code of Practice has been produced by the UKWF as a means of demonstrating to all interested parties that UKWF Members operate to the highest standards of integrity and professional practice; **their compliance with it is compulsory with effect from 1st January 1998.**

It must be noted that any members offering a service that is referred to as a calibration must ensure that the service complies fully with the UKWF Calibration Code of Practice. Individual calibration certificates must be issued for each calibration and those certificates must reference the UKWF and this Code of Practice

The Code does not prevent members offering other services and executing other procedures. Any such procedures or services must not be referred to as a calibration. Any other services or procedures carried out by a member company which determine the accuracy of a non-automatic weighing instrument which are not covered by the Code must not have individual certificates and must not make reference to or imply that a calibration has been completed in compliance with this Code.

As with all such Codes it will from time to time need to be amended in the light of experience, changing customer needs and technological progress. To this end, the Code will be reviewed by the UKWF at regular intervals and will be amended as necessary.

The Code is not intended to provide an alternative for those users of Weighing Equipment whose Quality System requires that their machines are calibrated by a UKAS accredited organisation. It will, however, provide a calibration traceable to national/international standards, which will adequately provide the level of accuracy and traceability required by customers whose Quality System is in accordance with the ISO 9000 series of standards.

The UKWF will be pleased to receive comments and constructive criticism from users (calibrating organisations and their customers) of the Code. Customers' and members' attention is drawn to Section 8 of the Code in cases where dispute or disagreement arises. The UKWF's intention is to promote the highest standard of integrity amongst its Members and to provide their customers with the peace of mind, which comes from using the services of a member of the nationally recognised trade association for the weighing industry.

The Regulatory Delivery Directorate of BIS welcomes the introduction of this UKWF industry "Code of Practice for the Calibration of Non-Automatic Weighing Instruments" which should help ensure weighing instruments remain accurate when in use for trade in the market place and in medical facilities"

2. SCOPE

This Code of Practice is intended to cover non-automatic weighing instruments. However, the Code may also be used for certain types of automatic weighing instruments where it is possible to calibrate the equipment in a static or non-automatic weighing mode. Where an instrument may be used in both automatic and non-automatic weighing modes, the provisions of this code apply only for the non-automatic weighing mode and a Calibration Certificate issued in these cases will only be valid for the non-automatic weighing mode. In such cases, additional testing will be required to determine the accuracy of the instrument when it is operating in its automatic mode.

The Code applies to all non-automatic weighing instruments regardless of Class. However, the majority of Class I instruments are used in applications where the calibration requirements are laid down by UKAS or by the Good Laboratory Practice (GLP) Guides. In other instances, the manufacturers specify calibration procedures and requirements. In these instances, a calibration carried out which complies with those requirements and Calibration Certificates which are issued in accordance with those requirements are regarded as being in conformance with this Code.

It is expected that calibrations performed in accordance with this Code of Practice will satisfy the requirements both of customers and third party assessment bodies enabling users of the weighing equipment to show compliance with the appropriate requirements of the ISO 9000 series of standards.

The Code recognises that many weighing instruments are only used for weighings which are less than the maximum weighing capacity. In such cases, the customer may request that the calibration should be carried out over the normal "working" range of the instrument; in which case the recommendation is that the calibration is carried out over the normal working range plus 5% - 10% (e.g. a 1500 kg capacity instrument, used only for weighings up to 1000 kg may be calibrated up to 1050 kg - working range of 1000 kg +5%).

Where the weighing instrument is used for a legally controlled purpose it will need to meet the requirements of all relevant legislation. **Nothing in this Code should be taken as overriding that legislation.** UKWF members are expected to act in accordance with the legislation at all times and when legally controlled weighing equipment is outside the tolerances specified in that legislation or does not comply with the legislation in some other way, they will draw their customers attention to that fact. Customers are reminded that they have an obligation to comply with the Weights and Measures legislation, which cannot contractually be passed on to the calibrating organisation.

UKWF members are expected to work in compliance with Health and Safety legislation and to work in a safe manner; customers are reminded that responsibility for the Health and Safety of contractors working on their premises is as much theirs as the contractors'.

The Code does not recommend a specific frequency period for calibration as each customer's operating circumstances are unique. The frequency of calibration should be based on the usage of the instrument, the risks associated with inaccurate performance and calibration history.

This Code has been drawn up in consultation with LACORS (the Local Authority Co-ordinating body on Trading Standards) being an original contributor, CTSI (The Chartered Trading Standards Institute) and IMC (The Institute of Measurement and Control).

For a detailed technical explanation of the calibration process and the theory of calibration control, readers are recommended to refer to the Institute of Measurement and Control publication "A Code of Practice for the Calibration of Industrial Process Weighing Systems", WGC0496, reviewed and re-issued in 2011. A copy of this document can be found on the UKWF website.

3. TEST EQUIPMENT

Subject to Section 6 (Substitute Materials) the test equipment will comprise sufficient test weights to load the machine at all the test points.

Test weights will be needed of a class, which is suitable for the machine being calibrated. Test weights will generally be drawn from four of the nine classes defined in the OIML Recommendation R111 2004 which specifies tolerances for weights in the range 0.001g to 5000 kg. The maximum permissible error for test weights is shown in Annex A.

All test weights shall be in a clean condition and when not in use should be stored in conditions, which are not likely to affect their accuracy. Wherever practicable iron weights should be stored in dry conditions. Weights of classes F2 and higher must be handled with tweezers, chamois leather cloths or gloves.

The total of the errors on the weights used for the calibration of a machine shall not be greater than 1/3 of the maximum allowable error of the machine at the applied load.

Where a facility to increase the displayed resolution of the machine is provided, it may be used during the calibration and a comment to that effect should be made on the calibration certificate.

“Suggested suitable classes of weights:

Class II instruments with more than 20,000 scale intervals:	F ₁ or higher
Class II instruments with not more than 20,000 scale intervals:	F ₂ or higher
Class III and Class IIII instruments	M ₁ or higher

All test equipment should have a current certificate of calibration or certificate of accuracy traceable to national or international standards.

The calibration procedure for the test weights will require that the weights are calibrated either by a Weights and Measures Department, in which case the testing, adjustment and re-testing of the weights will be carried out in accordance with the current legislative requirements for Working Standards and Testing Equipment, or by a UKAS accredited laboratory in which case the testing, adjustment and re-testing will be carried out in accordance with the calibration procedures of the laboratory concerned. When the calibration is carried out by a Weights and Measures Department, the certificate issued by that Department may or may not contain all the information normally included in a certificate issued by a UKAS accredited laboratory; nevertheless, it will satisfy all the necessary legal requirements and the requirements of this Code.

Factors to be taken into account when determining the calibration frequency for weights will include the amount and type of use, whether the weights have been subject to damage which may have affected the validity of their calibration, and the variation in value between calibrations.

Recommended maximum interval between calibration:

E ₂ and F ₁ weights	-	2 years
Other weights	-	12 months

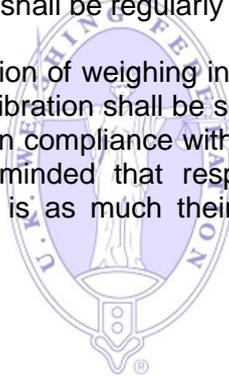
Calibration certificates for test weights must be kept for sufficient time to demonstrate that the weight values are stable; records should be kept for at least two previous calibrations. In the case of new weights the date they are brought into service shall be noted.

4. PERSONNEL / TRAINING

All personnel carrying out work covered by this Code of Practice shall be trained and be competent in the requirements of the Code.

They shall have received suitable training in the calibration techniques used and a training record shall be kept. Training and competence shall be regularly reviewed.

The nature and methodology of calibration of weighing instruments often requires the movement of large masses. Personnel involved in calibration shall be suitably trained to carry out the work safely: UKWF members are expected to work in compliance with Health and Safety legislation and to work in a safe manner; customers are reminded that responsibility for the Health and Safety of contractors working on their premises is as much theirs as the contractors'. Risk assessments should be completed.



5. CALIBRATION PROCEDURE

NOTE: In this section the word "test" is used to denote each aspect of the calibration. "Tests", "tested" and "testing" should be read accordingly.

If on initial testing it is found that adjustment is necessary, then wherever possible two sets of readings shall be taken. The first set of readings with the instrument in the "As Found" condition, i.e. no adjustments or repairs are to be carried out with the exception of any normal preparation for weighing. Any abnormal circumstance found prior to testing (e.g. machine is out of level) will be noted on the calibration certificate.

If there is no maintenance agreement in force, or if the customer does not want any maintenance or adjustment carried out, then only "As Found" results will be recorded.

The second set of readings - "Definitive" - will be carried out following any routine maintenance, adjustment or repair which may have influenced the "As Found" results. (Such maintenance, adjustment or repair is outside the scope of this Code of Practice and will usually be covered by a maintenance agreement or repair contract.)

Instruments which are in need of repair and not initially capable of being tested will only be tested following repairs. The results will be recorded as "Definitive" and comment shall be made on the calibration certificate. Newly installed instruments shall be tested after installation and adjustment is completed and the results recorded as "Definitive".

A list of the recommended tolerances based on the requirements of OIML Recommendation R76: 2006 (E) is given in Annex B2. Customers may specify their own tolerances if they wish to do so. Instruments used for legally controlled purposes are required to be within the tolerances permitted under the appropriate legislation.

The results of the "Definitive" tests should be within the tolerances for the class of instrument being tested as specified in Annex B or as specified by the customer. When the results are outside the specified tolerances, these must be noted on the Calibration Certificate and brought to the attention of the customer.

When the instrument is used for legally controlled purposes and the Definitive test shows results, which are outside the legally permitted tolerances, this shall be indicated on the Calibration Certificate and shall be brought to the attention of the customer.

5.1 TESTS

There are a number of tests that can be carried out to determine the performance levels of weighing instruments. They are listed below. Some of these are suitable for all instruments, some are only appropriate to certain instruments under certain circumstances. The table below defines those tests that are essential for all instruments and those that may be appropriate depending upon the use and construction of the instrument. (In the table the term "Initial Calibration" refers to the first calibration after installation and set-up of a new instrument and after a major repair or service likely to affect the weighing performance. "Routine Calibration" refers to instruments which are already in-service and have not undergone a major repair.)

TEST	Initial Calibration	Routine Calibration
Repeatability	Mandatory	Mandatory
Eccentric Loading	Mandatory	Mandatory
Linearity / Hysteresis	Mandatory	Mandatory
Weighing with Tare	Recommended	Optional
Sensitivity	Recommended	Optional

5.2 REPEATABILITY

5.2.1

The test load(s) must be the same for each test but need not be made up of test weights. See Annex B2 for requirements regarding tolerances.

The load should be placed onto the load receptor in a consistent way and the displayed readings noted. The displayed readings should also be noted when the load is removed.

5.2.2

The Repeatability test shall be carried out at a load value of 50% or greater of the maximum capacity or as close thereto as is practicable. A minimum of three loadings is required.

5.3 ECCENTRIC LOADING

5.3.1 - Instruments with 'flat' load receptors for weighing stationary loads.

The load receptor is notionally segmented and a load chosen in accordance with the table below is applied centrally to each segment. The displayed readings should be noted. The errors should not be greater than those given in Annex B2 or as specified by the customer for the load in question.

No. of Points of Support (n)	Test Load	No. of Segments
1-4	Max/3	4
5	Max/4	5 } load placed
6	Max/5	6 } over each
7	Max/6	7 } point of
8	Max/7	8 } support
More than 8	Max/n-1	n }

5.3.2 Instruments for weighing rolling loads.

For machines which weigh rolling loads (e.g. weighbridges) the eccentric loading test may be carried out as described in 5.3.1 above or by placing the load at the beginning, middle and end of the load receptor in the normal driving direction. The positions will then be repeated in the reverse direction.

5.3.3 Instruments with other load receptors.

Eccentric loading tests should be carried out where it is practical to do so and when it can be said to duplicate a situation that may occur in normal use.

Test loads chosen in line with 5.3.1 above should be used and placed in or on the load receptor as is appropriate and safe to do.

5.4 LINEARITY/HYSTERESIS

5.4.1

The linearity and hysteresis test is performed using a minimum of 5 points within the weighing range of the instrument. (Multi-interval instruments will require more than 5 loading points; the number will depend upon the configuration of the instrument.) One point should be at or near zero and one at or near the maximum (working) capacity. Intermediate points should be chosen such that tests are carried out at, or just below, the break points at which the tolerances change.

5.4.1.1

The recommendation is that the calibration is carried out over the normal working range plus 5% - 10% (e.g. a 1500 kg capacity instrument, used only for weighings up to 1000 kg may be calibrated up to 1050 kg - working range of 1000 kg +5%).

Multiple range instruments should be tested over each weighing range as if each was a separate instrument.

5.4.2 Linearity

Apply each load in sequence by adding sufficient weights (or substitute materials, see Section 6) to the previous load. The displayed reading at each loading point should be noted.

5.4.3 Hysteresis

Hysteresis testing is essential where the instrument is used for “weighing out” (e.g. discharging by weight); in which case loads are removed in the reverse sequence to the order in which they were applied and the displayed reading at each point shall be recorded. For other applications, observations of the indications shall be made as the instrument is unloaded and any indications outside the specified tolerances shall be noted on the calibration certificate and be brought to the attention of the customer.

5.5 WEIGHING WITH TARE (MECHANICAL INSTRUMENTS ONLY)

This test is conducted in the same way as Linearity/Hysteresis test (5.4) but with a tare value set into the instrument. One weighing with tare test is sufficient for both Initial and Routine Calibration.

A tare value should be chosen which reflects the normal use of the instrument.

5.6 SENSITIVITY (mechanical weighing machines with analogue indication)

This test requires the addition of a small weight, usually equal to the tolerance allowed being added to the load receptor. When the weight is added there should be a discernible movement of the indicating element (pointer). The test may also be carried out by removing a small weight from the load receptor. The test should be carried out at full load/maximum weighing capacity.

5.7 RE-VERIFICATION

Whenever any weighing instrument used for a legally controlled purpose is subject to adjustment, alteration, addition, repair or replacement that **could** affect its accuracy or function, it is likely that the instrument will need to be re-verified. Further guidance on this can be found in Annex D.

It should be noted that that the adjustment, alteration, addition, repair or replacement does not need to have affected the accuracy, the important element is whether it **could** have affected the accuracy.

If, in the judgement of the UKWF Member Organisation, the instrument needs to be re-verified; this should be carried out immediately after the instrument has been repaired.

If the re-verification is not carried out immediately following the repair, the member organisation shall have regard to the following;

- Provide written notification to the person responsible for the instrument of the need for the instrument to be re-verified. This notification should outline the fact that its continued use for commercial transactions may be illegal until this has been completed.
- The following phrase is suggested as sufficient to clearly outline to the user of the instrument their obligations with regard to re-verification:

Dear Customer

We are required to advise that today [Date] the repair to your weighing instrument is complete. Due to the nature of the repair, the calibration of the weighbridge could have been affected and it is therefore a legal requirement that your installation is re-verified for a regulated use.. Should you wish to obtain further advice on this matter, please contact us on the number below, or contact your local Trading Standards Department on

This is suggested wording and other phrases may be suitable.

- If the instrument has a capacity equal to or greater than 5,000kg the re-verification should be carried out within a period not exceeding 28 days from the date of the completion of the

work. It is highly recommended that the user of the instrument is advised to contact the local Trading Standards Department to advise them of the intended course of action.

- If the instrument has a capacity equal to or greater than 5,000kg the UKWF Member Organisation shall subsequent to the verification, notify the local Trading Standards Department in writing as soon as is practicable that the verification has taken place.



6. SUBSTITUTE MATERIALS

In many instances for high capacity instruments, it may be uneconomic to transport the quantity of weights needed to reach maximum/working capacity; in such cases it will be necessary to use substitute materials.

For all calibration, the amount of calibrated test weights used before substitute materials are employed should be as high as is practicably possible; only in exceptional circumstances should substitute materials be used to calibrate instruments with a maximum capacity of 500kg or less.

Suitable materials will depend upon local conditions and availability. Vehicles, both empty and loaded, sand, ballast, water, or loose materials may all be used in appropriate conditions.

The test procedure when using substitute material is to carry out as much of the testing as possible using the calibrated weights and then remove the weights and add substitute material to the same weight or as near as is practicably possible below that value. The calibrated weights are then used to reach the next point(s). This procedure is repeated until the maximum (working) capacity of the machine has been reached.

Use of substitute materials requires that the error found during that part of the test using calibrated test weights be carried forward.

The use of substitute materials shall be noted in the comments section of the calibration certificate.



7. CALIBRATION CERTIFICATES

A calibration certificate must be issued in all circumstances when a calibration has taken place in compliance with this Code

The format of a calibration certificate may be adapted to meet the business needs of the user and customer, but as a minimum should contain the following:-

- Name and address of the organisation carrying out the calibration.
- The UKWF logo and statement of compliance with this Code except where stated.
- Name and address of the customer.
- A unique identification to allow the calibration to be traced.
- The name and identification of the authorised person.
- (Where the identification is not the person who carried out the calibration, a means of tracing the certificate back to the calibrator must be available).
- The date of the calibration.
- Identification of the weights used.
- A description of the instrument being calibrated e.g. serial number, plant number, and model.
- Location of the instrument, if moving or re-siting the machine is liable to affect the calibration.
- The results of the calibration tests.
- Maximum weighing capacity and scale interval (division size).
- Calibrated range if less than the maximum weighing capacity.
- Tolerances.
- Comments section:
 - If necessary, the notification required by Paragraph 5.7 - Re-verification.
 - A statement of uncertainty if requested by the customer. (For information on determining the uncertainty value, reference should be made to the UKWF Members Handbook.)

7.3 Stickers and customer records

A sticker shall be attached to all calibrated instruments that provides traceability back to the organisation calibrating the instrument and includes the date of the calibration and/or the date that the next calibration is due.

To satisfy external auditors/assessors customers may ask for copies of calibration certificates for test weights. Subject to the commercial terms of the contract between the customer and the calibrating organisation, these shall be supplied if requested.

It is the customer's responsibility to maintain the certificate/record issued by the calibrating organisation, and additional copies may not always be available. When copies are supplied, this should be subject to the commercial terms of the contract between the customer and the calibrating organisation.

In certain instances, customers require that calibrating organisation use the stickers and calibration certificates provided by the customer. In these cases, completion of the customer's documentation is sufficient for compliance with this Code.

8. COMPLIANCE WITH THE CODE

Sufficient information must be recorded to allow customers' queries to be answered and records shall be maintained for a reasonable time, at least 2 calibration periods is recommended.

Calibrations carried out to this Code of Practice satisfy the requirements of customers and ISO: 9000 assessment bodies. Any complaints about the validity of the procedures described in this Code should be brought to the attention of the UKWF without delay.

8.1 COMPLAINTS

Complaints arising over any other aspect of the calibration service provided under this Code of Practice should initially be discussed and resolved between the customer and the UKWF member concerned. If the complaint cannot be resolved, details of the complaint should be sent in writing to the Company Secretariat of the UKWF, at The UK Weighing Federation, UK Weighing Federation Unit 3, Curo Park, Frogmore Herts AL2 2DD or by email to admin@ukwf.org.uk the complaint will be acknowledged on receipt.

The complaint will be referred to the UKWF Board of Directors for investigation and action. The decision of the Board will be made known in writing to both parties. In the event of a prolonged enquiry both parties will be advised at regular intervals of progress.

A serious breach of this Code of Practice may result in the expulsion of the member from the UKWF.

8.2 ENFORCEMENT

Compliance with this Code of Practice is mandatory on all members of the UKWF carrying out calibrations of non-automatic weighing instruments. The UKWF will monitor compliance with the Code by its members. Monitoring may be by questionnaire, by an on-site audit or by other suitable means such as the provision of copy certificates. The results of monitoring may be reported to the Board and Members of the UKWF.

A failure to participate in any reasonable monitoring activity by any member will be reported to the Board. Such failure may be regarded as a serious breach of the Code and may result in the expulsion of the member from the UKWF.



ANNEX A**MAXIMUM PERMITTED ERROR FOR STANDARD WEIGHTS (in mg)**

Weight	E ₂	F ₁	F ₂	M ₁
5,000kg		25,000	80,000	250,000
2,000kg		10,000	30,000	100,000
1,000kg	1,600	5,000	16,000	50,000
500kg	800	2,500	8,000	25,000
200kg	300	1,000	3,000	10,000
100kg	160	500	1,600	5,000
50kg	80	250	800	2,500
20kg	30	100	300	1,000
10kg	16	50	160	500
5kg	8.0	25	80	250
2kg	3.0	10	30	100
1kg	1.6	5.0	16	50
500g	0.8	2.5	8.0	25
200g	0.3	1.0	3.0	10
100g	0.16	0.5	1.6	5
50g	0.10	0.3	1.0	3.0
20g	0.08	0.25	0.8	2.5
10g	0.06	0.20	0.6	2.0
5g	0.05	0.16	0.5	1.6
2g	0.04	0.12	0.4	1.2
1g	0.03	0.10	0.3	1.0
500mg	0.025	0.08	0.25	0.8
200mg	0.020	0.06	0.20	0.6
100mg	0.016	0.05	0.16	0.5
50mg	0.012	0.04	0.12	0.4
20mg	0.010	0.03	0.10	0.3
10mg	0.008	0.025	0.08	0.25
5mg	0.006	0.020	0.06	0.20
2mg	0.006	0.020	0.06	0.20
1mg	0.006	0.020	0.06	0.20

Taken from OIML R111-1:2004 (E)

ANNEX B.1

CLASSES OF INSTRUMENT

CLASS	Scale Interval	Minimum Number of Scale Intervals	Maximum Number of Scale Intervals
II	0.001g to 0.05g	100	100,000
II	0.1g or greater	5,000	100,000
III	0.1g to 2g	100	10,000
III	5g or greater	500	10,000
IIII	5g or greater	100	1,000

Taken from OIML R76-1 Edition 2006 (E)

ANNEX B.2

RECOMMENDED TOLERANCES

Class II Instruments

Load =	Zero to 5,000 Divisions	5,000 to 20,000 Divisions	Above 20,000 Divisions
Initial Calibration Allowance	$\pm \frac{1}{2}$ Division	± 1 Division	$\pm 1\frac{1}{2}$ Divisions
Subsequent Calibration Allowance	± 1 Division	± 2 Divisions	± 3 Divisions

Class III Instruments

Load =	Zero - 500 Divisions	500 to 2000 Divisions	Above 2000 Divisions
Initial Calibration Allowance	$\pm \frac{1}{2}$ Division	± 1 Division	$\pm 1\frac{1}{2}$ Divisions
Subsequent Calibration Allowance	± 1 Division	± 2 Divisions	± 3 Divisions

Class IIII Instruments

Load =	Zero - 50 Divisions	50 to 200 Divisions	Above 200 Divisions
Initial Calibration Allowance	$\pm \frac{1}{2}$ Division	± 1 Division	$\pm 1\frac{1}{2}$ Divisions
Subsequent Calibration Allowance	± 1 Division	± 2 Divisions	± 3 Divisions

Repeatability Testing: Indications must not vary by more than the absolute value of the tolerances given above.

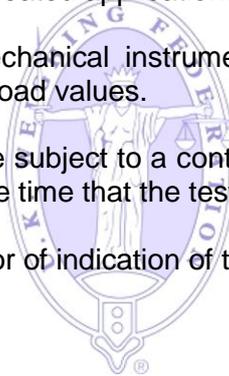
NOTE: These tolerances are based on maximum permissible errors specified in OIML R76-1 Edition 2006 (E) Customers may specify tolerances differing from these recommendations.

ANNEX C

GLOSSARY OF TERMS AS USED IN THIS CODE OF PRACTICE

- As Found - The initial calibration recorded on the certificate prior to any routine maintenance or adjustments being carried out to the weighing instrument.
- Automatic - An automatic weighing instrument is one, which performs a weighing or series of weighings without intervention by an operator in the weighing process or determination of the weighing result.
- Calibration - The set of operations which establish under specified conditions the relationship between the values of the loads applied and the corresponding value of the weighing system output (the indications).
Note: The term does not include adjustment, repair or preventive maintenance work carried out on a machine even if this work is carried out during a calibration exercise.
- Calibration Certificate- This is a certificate issued in line with Section 7 of this Code
- Definitive - The final calibration recorded on the certificate following any routine maintenance and /or any adjustments to the weighing machine
- Hysteresis - The difference between the measurements of the weighing system output (indications) for the same applied load, one indication being obtained by increasing the load from zero load the other by decreasing the load from the maximum applied load.
- Linearity - The measure of deviation of an instrument as the load applied increases or decreases.
- Load Receptor - The part of a weighing instrument on or in which the load being weighed is placed. (Sometimes referred to as goods plate or platform.)
- Multi-interval - Having a weighing range divided into two or more partial ranges with differing division sizes e.g.
Maximum capacity 30 kg
Range 1 0 - 6 kg in 2 g divisions
Range 2 6 - 15 kg in 5 g divisions
Range 3 15 - 30 kg in 10 g divisions
- Multiple ranges - Having more than one weighing range for the same load receptor e.g.
Range 1 0 - 30 kg in 10 g divisions
Range 2 0 - 60 kg in 20 g divisions
Range 3 0 - 150 kg in 50 g divisions
- Non-automatic - A non-automatic weighing instrument is one, which requires the intervention of an operator during the weighing process and/or for determining the weighing result.
- OIML R76-1 - The International Recommendation for non-automatic weighing instruments Part1: Metrological and technical requirements, Edition 2006 (E), published by The International Organisation of Legal Metrology (OIML)

- OIML R111-1 - The International Recommendation for weights of classes E₁, E₂, F₁, F₂, M₁, M₁₋₂, M₂, M₂₋₃, M₃ Part 1: Metrological and technical requirements, Edition 2004 (E), published by The International Organisation of Legal Metrology (OIML).
- Repeatability - This is the ability of an instrument to indicate the same value (within tolerances) for repeated applications of the same load.
- Sensitivity - The ability of mechanical instruments with analogue indication to react to small changes in load values.
- Test weights - Weights which are subject to a controlled calibration procedure and which are in calibration at the time that the testing is carried out.
- Tolerance - The allowable error of indication of the weighing instrument.



ANNEX D

FURTHER GUIDANCE ON RE-VERIFICATION

There have been a number of questions raised recently regarding when a weighing instrument may need to be re-verified. There has been guidance issued on this subject by the NMO in the document WM1003 (Version 3) that can be found at:

<http://www.bis.gov.uk/assets/nmo/docs/enforcement%20of%20weights%20and%20measures/wm-bulletins/wm-1003-reverification-guidance-version-3-july-2012.pdfnotes>.

These notes are supposed to be read in conjunction with that document.

The criterion as to whether an instrument needs to be re-verified derives from the ability of an Inspector of Weights and Measures (or other authorised person) to disqualify the instrument in the first place. The general assumption is that if an instrument:

- a) Has fallen outside of its permitted tolerances
- b) Does not fully comply with the requirements which apply to it,
- c) In the opinion of the inspector, has undergone any alteration, adjustment, addition, repair or replacement that could affect its accuracy or function.

an inspector has within his power the authority to disqualify the instrument.

It is advised that if you form the view that any of the above criterion has been met it is likely that the instrument should be re-verified.

The next question we must ask is what kind of alteration, adjustment, addition, repair or replacement would cause us to believe that an inspector may disqualify an instrument which therefore means that we must re-verify it.

Unfortunately, it is very difficult to offer clear guidance on this, as it will ultimately be decided by the view of the Inspector. This means that it will be decided on a “case by case” basis. Some of the questions that may help in resolving this are:

1) Could the accuracy of the instrument have changed?

If it is possible that the accuracy of the instrument **could** have changed because of any work that you have carried out, then it is recommended that you re-verify the instrument. It must be remembered that the work does not actually have to change the accuracy; it is a question of whether it **could** affect the accuracy that is important. The examples that are referred to in the NMO document are the change of a load cell or headwork in a weighbridge.

2) Could the change of a module affect the functionality of the metrological aspects of the instrument?

If the change of the module adds new functionality to the weighing aspects of the instrument, it is likely that it will need to be re-verified. An example of where an instrument would need to be re-verified would be if a software upgrade added extra weighing applications

3) Is the type approval certificate still applicable?

If you are the view that any alteration, adjustment, addition, repair or replacement means that the type approval certificate would no longer apply, the instrument will need a new or updated type approval and then be re-verified.

4) Does the Declaration of Conformity (DoC) still apply?

If you believe that because of the work that you have carried out, the original Declaration of Conformity may no longer apply to the machine, you will have to re-verify the instrument. This will obviously depend on how the original DoC is worded. An example of this may be; if the DoC specifies a location for the instrument or a serial number and the instrument is in a different place or has a different serial number, you will need to re-verify the instrument.

These questions are supposed to be guidelines to help you decide whether or not you may need to re-verify a weighing instrument. If the answers to any of them lead you to believe that an inspector may have a good reason to reject an instrument, it is advised that you re-verify it after you have undertaken any work.

Please remember it is the responsibility of the owner of the instrument to have it re-verified, not the responsibility of the company servicing or repairing the instrument.

If it is your view that the instrument should be re-verified and the owner of the instrument contradicts this view, you should ensure that the organisation, which owns the machine, is informed of your view. This should be in writing to a responsible person in that organisation and should clearly state that its continued use may be illegal if it is not verified.

If you have decided that the instrument should be re-verified, this must be done as soon as is practicable after the work has been completed. The local weights and measures department should be notified when the verification has been completed.

