

5. TEST PROCEDURES

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

5.1 GENERAL

When necessary, two sets of readings should be taken. The first set of readings with the machine in the “as found” condition, i.e. no adjustments or repairs carried out with the exception of any normal preparation for a weighing. Any abnormal circumstance found prior to testing shall be noted on the calibration certificate. Where no adjustment is necessary only the “as found” results are required. If discrepancies are found, the “as found” calibration may be concluded after at least two consecutive readings are outside the specified tolerances.

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 be covered by a maintenance agreement or repair contract.)

If the “as found” results indicate that the weighing equipment is out of calibration and cannot be quickly or easily rectified, the responsible site representative shall be notified and this shall be recorded 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.

Machines which are in need of repair and not capable of being used before any testing can be carried out, will only be tested following such repairs and the results shall be recorded as “Definitive”. Newly installed machines shall be tested after installation and adjustment is complete and the results recorded as “Definitive”.

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

A list of the recommended tolerances, based on the recognised industry requirements is given in Annex B. Customers may specify their own tolerances if they wish to do so, these must be made known in writing to the calibrating organisation and this may form part of the contract between the customer and the calibrating organisation.

The appropriate tests shall be carried out as described below.

5.2 PRELIMINARY

- a) Ensure that personal protective equipment (hard hat, safety boots, high visibility clothing etc.) and other safety equipment is available and being used.
- b) Identify the company representative by name, (usually the batcher) present at the calibration.
- c) Liaise with company representative to ensure that adequate materials and assistance will be available for the calibration and that the weighing equipment will be available for use for the time necessary for the calibration to be completed. (“Adequate materials” means sufficient material to reach maximum capacity or maximum batch weight +5%.)
- d) Obtain any necessary work permits and authorities.
- e) Visually inspect the site to confirm safe working conditions including, but not limited to, safe and satisfactory access to the equipment, safe and secure methods of loading the equipment and “locking off” where necessary.

- f) Calibration shall not proceed if lock-out devices are not operating safely and the Calibration Certificate shall be endorsed to that effect.
- g) Check plant records for any work carried out on the measuring equipment or its associated equipment that may have affected its accuracy or operation and confirm that recommendations made during the previous calibration have been carried out.
- h) Ensure that adequate test equipment, including weights and loading systems, are available for the work to be completed and that any calibration certificates for this equipment are in force and valid.
- i) Calibration points shall be identified on the equipment. The calibrating organisation may advise the customer of the location of suitable points.
- j) Check customers Test Procedures for any deviations from those contained in this Code, and become familiar with all relevant site procedures.

5.3 CONVENTIONAL HOPPER SYSTEMS

5.3.1 Testing with weights

Ensure that the weigh-hopper is empty. Attach test equipment (weight supports, shackles, slings etc.) to the hopper and zero the system if necessary. The effort should be applied as close as practicable through the geometric centre of the load supporting structure. The customer should have ensured that the calibration points are clearly identified.

For new installations, following repair/replacement of load cells, or in those instances where the loading method may not reveal an incorrect or malfunctioning load cell, individual load cell checks shall be carried out. A load of 100kg or more shall be applied to each cell to confirm that the load cell output is acceptable.

QSRMC requirements are that the load cell output is checked on each quarterly calibration.

- a) Test to capacity or maximum batch weight plus 5% using weights and material. (Recommendation: The maximum batch weight as determined by the customer should be marked on the indicator and recorded in the calibration record book kept by the customer.)
- b) Apply test weights, note reading/indication and error.
- c) When applicable, remove the test weights and apply material to as close to the same reading/indication as is practicable. (Note: errors from the weight readings are to be carried forward to the next stage of the test.)
- d) Apply test weights, note reading/indication and any error.
- e) Continue as in points a to d (above) until maximum capacity or maximum batch weight +5% is reached.
- f) Any leakage of material, lack of venting or other circumstances that may affect the accuracy of the weighing equipment or its proper operation shall be noted on the calibration record.

5.3.2 Testing with load application (push /pull) systems

For new installations, following repair/replacement of load cells, or in those instances where the loading method may not reveal an incorrect or malfunctioning load cell, individual load cell checks shall be carried out. A load of 100kg or more shall be applied to each cell to confirm that the load cell output is acceptable.

QSRMC requirements are that the load cell output is checked on each quarterly calibration.

- a) Ensure that the fixing system and fixtures are secure and safe, and apply the effort as close as practicable through the geometric centre of the load supporting structure. The customer should have ensured that the calibration points are clearly identified.
- b) Ensure that the “push” or “pull” generated by the system can be applied vertically, and will be stable for sufficient time for reliable readings to be taken.
- c) Connect the load application system and zero the equipment if necessary.
- d) Apply load, and note reading/indication and any error.
- e) When applicable, remove load and apply material to the same reading/indication or as near thereto as is practicable. (Note: errors from the weight readings are to be carried forward to the next stage of the test.)
- f) Apply load and note reading/indication and any error.
- g) Continue as points b to e (above) until maximum capacity or maximum batch weight +5% is reached.
- h) In some instances, where only one material is available, it may not be possible to reach maximum capacity; when sufficient material is not available the calibration record shall be endorsed as appropriate.
- i) Any leakage of material, lack of venting or other circumstances that may affect the accuracy of the weighing equipment or its proper operation shall be noted on the calibration record.

5.4 BACKWEIGH SYSTEMS

NOTE: Experience has shown that a large number of these systems including those using quarter-bridge load cells are less stable and accurate than conventional weighing systems.

The UKWF recommends that quarter-bridge load cells be replaced with full bridge load cells, and this Code of Practice specifically excludes weighing systems using quarter-bridge load cells.

For full-bridge load cell systems, two methods of calibration are given below. Attention is drawn to the note at the end of section 5.4.1.

5.4.1 Direct weighing method

For new installations, following repair/replacement of load cells, or in those instances where the loading method may not reveal an incorrect or malfunctioning load cell, individual load cell checks shall be carried out. A load of 100kg or more shall be applied to each cell to confirm that the load cell output is acceptable.

QSRMC requirements are that the load cell output is checked on each quarterly calibration.

- a) Identify a local weighbridge for use during the calibration. The weighbridge must either bear a valid indication (stamp or sticker from a Trading Standards Officer or accredited verification organisation) that it is suitable for use for trade or must have a valid calibration certificate.

- b) If the weighbridge is a “public” weighbridge, (within the meaning of Part III of the Weights and Measures Act 1985) and the keeper/operator holds a valid certificate of competence from a Chief Inspector of Weights and Measures, then the ticket issued for each weighing can be accepted as the correct indication of the weighbridge. It will not be necessary for the person signing the calibration certificate to witness the individual weighings.
- c) Identify a suitable vehicle for use during the testing and ascertain the tare weight. (Note: during the testing, allowance must be made for the loss of weight due to fuel usage, this will vary on distance travelled between weighings and local traffic conditions. Significant changes to the vehicle during the testing phase (e.g. refuelling, wheel changing) will invalidate the testing and require the complete process to be restarted). A check weighing of the vehicle tare weight shall be taken at the completion of the test to determine what allowances need to be made for fuel usage per journey etc during testing.)
- d) With the hopper, discharge material into the vehicle, note the readings/indications and compare with the material weight determined by the weighbridge. Note any error.
- e) Repeat point d at least 4 more times until the maximum capacity or maximum batch weight +5% has been reached.

QSRMC does not recognise the above method as having sufficient accuracy to be acceptable to them).

5.4.2 Load application method

For new installations, following repair/replacement of load cells, or in those instances where the loading method may not reveal an incorrect or malfunctioning load cell, individual load cell checks shall be carried out. A load of 100kg or more shall be applied to each cell to confirm that the load cell output is acceptable.

QSRMC requirements are that the load cell output is checked on each quarterly calibration.

- a) Ensure that the hopper is empty. Affix load application equipment (cradle or push/pull kit). The customer should have ensured that the calibration points are clearly identified. Tare machine and note reading.
- b) Apply load and note reading/indication and error.
- c) Add material until the noted reading, or as close below thereto as is practical is achieved, then reapply load.
- d) Repeat point b and c (above) until the maximum capacity or maximum batch weight +5% is achieved.

5.5 OTHER EQUIPMENT

The scope of this Code of Practice is restricted to the weighing equipment used for directly batching the concrete. Water meters and Volumetric measuring equipment are outside the scope of this Code.

Where the customer asks, or the contractual arrangements require this type of equipment to be calibrated by the organisation calibrating the weighing equipment, the calibration shall be carried out in accordance with the documented local site procedures. If no specific procedures are available, calibration shall be carried out in a way that appears suitable to the calibrator, and the calibration record shall include a statement to the effect that the calibration has not been performed according to any documented procedure.