

1.5.2 USE OF AUTOMATIC CHECKWEIGHERS

Whichever method of quality control is employed, it is essential that records are kept of all sampling checks and, in the case of checkweighers, that the average weight of all production batches is recorded. These records must be saved for at least one year or possibly longer depending upon the shelf life of the product. In addition, recording adjustment changes to filling machines will be included in the records, this has been mandatory since April 2006.

Automatic Checkweighers

Checkweighers have evolved over time from the simple grading checkweighers, which simply accepted or rejected packs on the basis of a single set point, to average recording checkweighers which calculate and display statistical information about the production process.

Grading checkweighers may still be used for packages that have a minimum weight requirement. They may also be used to remove inadequate packs on a product line complying with average weights, but control by sampling will still be required to ensure that the average weight is maintained, and that non-standard packs are properly controlled. Counting checkweighers introduced in the late 70s may still be used to ensure compliance with average weight requirements, providing that product assessment is carried out to establish a suitable target weight.

The majority of automatic checkweighers produced today are average recording checkweighers. These machines inspect every pack and remove non-standard and inadequate product, calculate and record the average weight for a given batch size, and operate a suitable alarm if the average weight falls below the nominal net weight. Many checkweighers can be set to always enable the packer to maintain the 3 Packers rules. With optional features such as automatic mean weight correction they can prevent a defective batch by controlling the average weight.

The same Average Recording Checkweighers may also be configured to inspect packages to minimum weight requirements.

Certification or pattern approval

In the UK, automatic checkweighers do not have to be certified or approved. Due to the requirements of the 1979 Weights & Measures Act the onus is on the packer to ensure that the machine in use is suitable for the application. Therefore, the packer must assess the performance of the machine by off-line sampling, and then decide if an allowance is necessary due to the error of measurement.

Since October 2006, checkweighers fall under the control of the MID (Measuring Instruments Directive). The regulations implementation in the UK uses the optionality of the European Directive to keep Checkweighers as non-prescribed devices and therefore, there is no change from the former legislation above. Checkweighers for use in the UK market do not need to be approved. In doing this, the UK are taking advantage of the optionality of the Directive, which enables member States to choose whether to regulate instruments and to prescribe specific measurement tasks for which they must be used. This means that, as is currently the case, different member States may regulate different instruments and for different purposes than is the case in the UK.

A manufacturer wishing to export an instrument not prescribed in the UK to a member state, where such instruments are prescribed, would need to have the instrument assessed for Conformity.

Since the accuracy of an automatic checkweigher is highly dependent upon the package and the environmental conditions, the packer must assess the performance for all package types and sizes. If the error calculated for a given package is greater than 1/4 TNE (Tolerable Negative Error) for that nominal net pack weight, then the packer must increase the T1 & T2 set points by an amount equal to 1/2 the error minus 1/8 of the TNE. If the variation in packaging weight (the tare weight) is excessive then a further allowance will be required. Where the standard deviation of the tare weight exceeds 1/10 TNE then the packer must add an allowance of 0.85 times the standard deviation of the tare weight.

Having established the accuracy of the checkweigher after installation, the packer must perform frequent checks on the machine to ensure that performance is maintained. The Code of Practical Guidance suggests that tests are initially carried out every hour or every 10,000 packs, until the performance and stability of the checkweigher has been established. The checks may then be relaxed to once per shift or once per day. If re-calibration is found to be necessary, then the frequency of testing must be increased once again until the problem is cleared and the machine performance stabilizes.

Many packers prefer to carry out checks every hour, so that if a problem occurs it can be rectified quickly. Many checkweighers have a check mode, a simple but effective check may be performed by passing a normal production pack over the machine 20 times. The checkweigher will then display the mean weight and give an indication of variance or deviation. By also weighing this test pack on standard bench scales, the mean error is calculated by finding the difference between the actual weight and the checkweigher average weight reading. The calibration process is designed to minimize mean error, so if this is excessive simply re-calibrate.

With the use of proven software connected to checkweighers, the accuracy of the checkweigher can be monitored and functions such as drift from nominal and standard deviation can be seen in real time and therefore allowing the checkweigher monitoring to be simplified.

The variation from one reading to another gives an indication of the random error. This is often expressed as 1, 4 or 6 times the sample standard deviation (although officially the zone of indecision is based upon 6 times the sample standard deviation). The random error is influenced by checkweigher repeatability; the stability, size & shape of the package and any disturbances such as vibration and air currents. Therefore, the random error cannot be improved by re-calibrating the machine. If the random error is higher than normal, check for sources of vibration (both internal to the checkweigher and externally generated), and check the condition of the transport components.

The reject mechanism should also be checked by passing an out of tolerance pack at regular intervals.

Summary

After installing a checkweigher, introducing a new package size to an existing line, or major service or repair to a machine, carry out checks to establish the mean & random error and record these values.

Check whether the zone of indecision (equal to 6 times the standard deviation) exceeds 1/4 TNE (make allowances to T1 & T2 set points if necessary).

During production, check the performance of the checkweigher & the reject device on an hourly basis. Compare results to limits established during initial assessment.

Document test procedures to ensure that all staff checks the equipment at the same frequency, in a consistent manner.

Record the results of all tests and the time, date and person who carried them out.

For average weight operation, ensure that the checkweigher produces a production batch report every hour or every 10,000 packs.

Save batch reports (or summary data from batch reports) for 12 months.

Discuss your methods & procedures with the local Trading Standards Officer.

