

# Technical Note

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## Checkweigher and weighing accuracy

A checkweigher is widely known as an automatic machine that checks the weight of items as they pass through a production line. You may have one at your facility but if yours is not appropriate for your production line, it may undermine production efficiency. There are various technical parameters for a checkweigher including weighing range, conveying capacity, measurement accuracy and scale interval, among which this paper explains measurement accuracy along with basic functions of a checkweigher.



### 【1】 Checkweigher checks product weight

Checkweighers have become critical quality assurance tools in many applications and products such as food, pharmaceutical, and industrial products. Besides checkweighers, there are various weighing instruments around us, such as weight scales, butcher scales, and electronic pharmacy scales. You cannot get on the electronic pharmacy scale to weigh yourself, or bathroom scales are not accurate enough to weigh drugs. The change of 100g is not a big deal on a bathroom scale but it makes a big difference in measuring ready-meal dishes. Required weighing range and accuracy vary depending on what you weigh. This is much the same as checkweighers, whose constructions and performances are different according to applications. Because the target items of checkweighers are mostly the products to be sold in retail shops, weight checking with inappropriate scales may cause inconvenience to consumers and retailers.

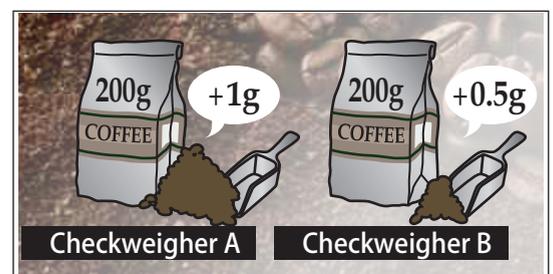


### 【2】 What is weighing accuracy?

The degree of scale precision is generally indicated as weighing accuracy. The smaller the weighing accuracy value is, the more precisely the scale can weigh.

Let's take a 200-g coffee pack as an example to see the difference of the measurement results between Checkweigher A with  $\pm 1$  g accuracy and Checkweigher B with  $\pm 0.5$  g accuracy. Generally they overfill a bit the packs to ensure that the final product net weight is at or above the specification weight. When weighing accuracy is included, the minimum fill amount per pack will be 201 g for A and 200.5 g for B. A consumes 0.5 g more content than B, which results in much more raw material used with A than with B for the same number of packs. Checkweighers with higher accuracy therefore work more efficiently with less material waste.

Unlike most scales, checkweighers measure weights while products are traveling on the weigh conveyor. Their weighing accuracy therefore vary depending on various factors. What are the factors, then?



### [3] Weighing conveyor length

First, let's look at the length of weighing conveyor. We conducted an experiment by comparing the weighing accuracy of two checkweighers having different conveyor length: 270 mm and 495 mm, with the same scale and at the same speed. The weighing accuracy were 2.3 g for 270 mm, and 1.0 g for 495 mm. The checkweigher with longer weighing conveyor showed 1.3 g better accuracy than the shorter one. This is because products take more time being weighed on the longer weighing conveyor, so that measurement results become more accurate (Fig.3-1).

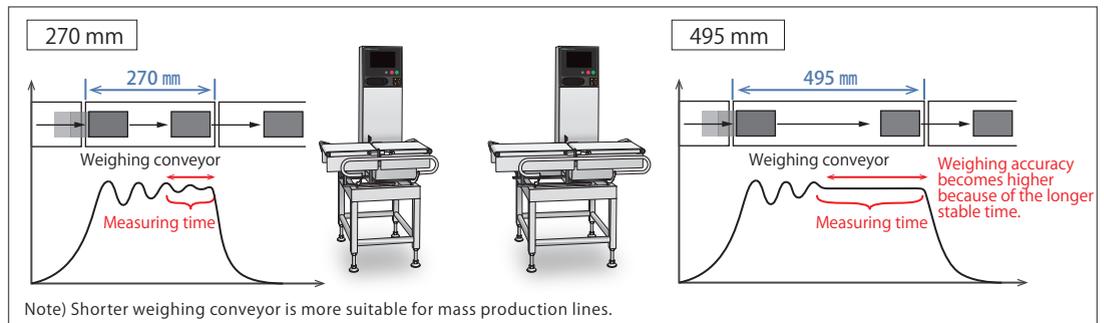


Fig.3-1: Comparison of weighing accuracy with different conveyor length

### [4] Scale type

Next, let's look at what happens if the same product is weighed by different checkweighing methods: a strain gauge load cell, which converts distortion of the load cell into electric signals (Fig.4-1), and an electromagnetic balance, which converts a force to balance the load into electric signals (Fig.4-2). With the same weighing conveyor length, the weighing accuracy of the strain gauge load cell was  $\pm 2.3$  g, while that of the electromagnetic balance was  $\pm 0.8$  g. Consequently, the electromagnetic balance with high accuracy is, for example, suitable for individual candies and chocolates before packaging, while the strain gauge load cell, less accurate but less costly, is recommended for checking missing packs of products in bags after boxing. You should select an appropriate checkweighing method based on the product and the location in the line.

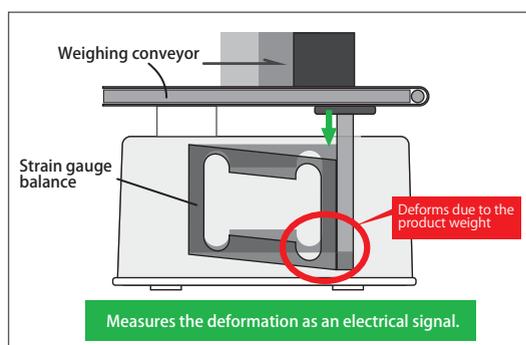


Fig.4-1 : Strain gauge

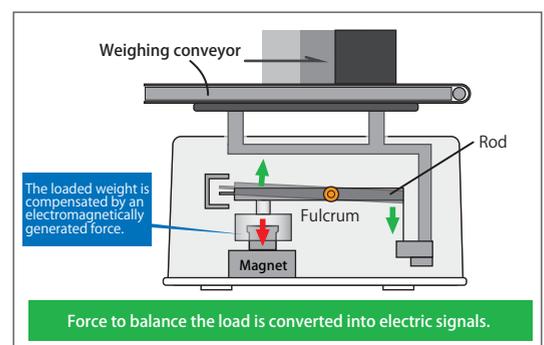


Fig 4-2: Electromagnetic balance

### [5] Conclusion

As shown above, the length of the weighing conveyor and the types of weigh cell make a big difference in weighing accuracy. Anritsu provides as many as 76 combinations of weighing conveyors and weigh scales, and even customized combinations to satisfy your diverse needs. Why don't you check the weighing accuracy of your checkweigher? Please don't hesitate to contact local sales representatives for details.