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# THE JOURNAL

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## Shine a Light on Compliance

See how smart manufacturing  
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provide greater visibility into  
safety system performance  
and plant productivity.



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» High-speed, in-motion checkweighing often is a critical part of a manufacturer's overall quality control and consumer safety process. Checkweighing is used not only for verifying product weight but also establishing correct multi-piece packages, such as a bag of fasteners, chargers and cords, or even the presence of an instruction pack.

Using checkweighing for inspection also helps manufacturers meet regulatory requirements, and prevent under-

weight or overweight products from reaching consumers. In certain industries, checkweighing can help meet FDA regulations. For example, in the pharmaceutical industry, checkweighers can help verify and comply that the correct number of pills are in a container.

In addition, checkweighers that offer smart manufacturing capabilities provide further insight into plant operations. With real-time data, enterprise-level stakeholders gain further information about machine and production performance, maintenance issues, product quality and data for regulatory reports.

To determine if your operations can benefit from a checkweighing device, consider several regulatory guidelines and consumer safety concerns, checkweighing applications per industry, and production visibility.

### » What is a Checkweigher?

A checkweigher is an automatic or manual machine for checking the weight of packaged commodities, normally found at the offgoing end of a production process. It verifies that the weight of a pack of the commodity is within specified limits. Any packs outside the tolerance are taken out of line.



# HOW CHECKWEIGHING CAN HELP MEET COMPLIANCE, QUALITY GOALS

These in-motion devices can provide real-time production data to help meet regulatory requirements while reducing waste and improving productivity.

By Rodger Jeffery, Tim Norman and Janice Kall, Hardy Process Solutions

## Regulatory Guidelines

Different countries have different regulations regarding net content, but the general rule is that variations in contents must be kept to a minimum and must not have consistent underweight errors or other selling price errors based on weight.

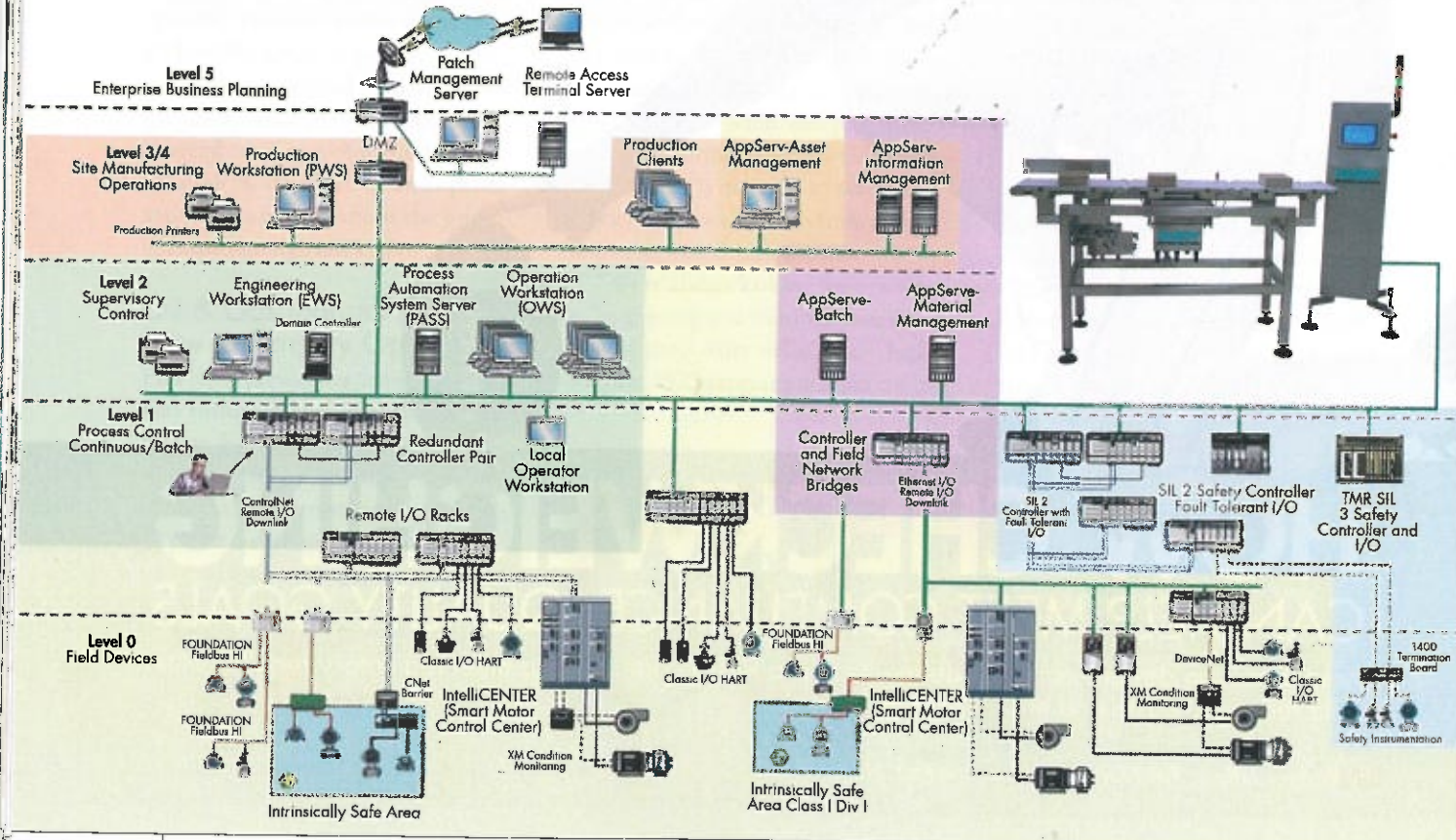
In November 2017, the National Institute of Standards and Technology (NIST) updated its Handbook #133 for 2018, establishing the most recent laws on the maximum allowable variation (MAV) for packaged items commonly inspected by checkweighers in the United States. OIML (International Organization of Legal Metrology) R87 2016 covers weight compliance internationally. Enforcement takes the form of warnings, fines, legal action or the prevention of sale for entire batches of products deemed not compliant of weight guidelines.

## When to Use a Checkweigher

Whether it's a pouch, bag, bottle, can, box, case, tote, or even a piece of meat or poultry, checkweighers capture the finished product's weight data to establish conformity to permissible quality control standards. Common checkweighing applications include:

- Verifying package contents, including checking for and identifying missing components by weight.
- Checking product tolerance for under/overweight. Rejecting underweight packages helps meet regulatory compliance requirements while keeping tabs on overweight products helps reduce product giveaway by using machine data to tighten tolerances on filling machines.
- Classifying or sorting product for grading or portioning, such as sorting apples by weight.
- Net weighing for pricing of items sold by weight such as meat or produce.
- Identifying parts. For example, a five-zone machine can sort five different parts by weight into different containers.
- Weighing an article before and after a process such as coating to measure the performance of the process.
- Verifying cases are not missing a product, such as 11 out of 12 bottles of wine in a case.

**Figure 1.** Checkweighers generate production information that can be instantaneously shared across plant floor operations and business level stakeholders.

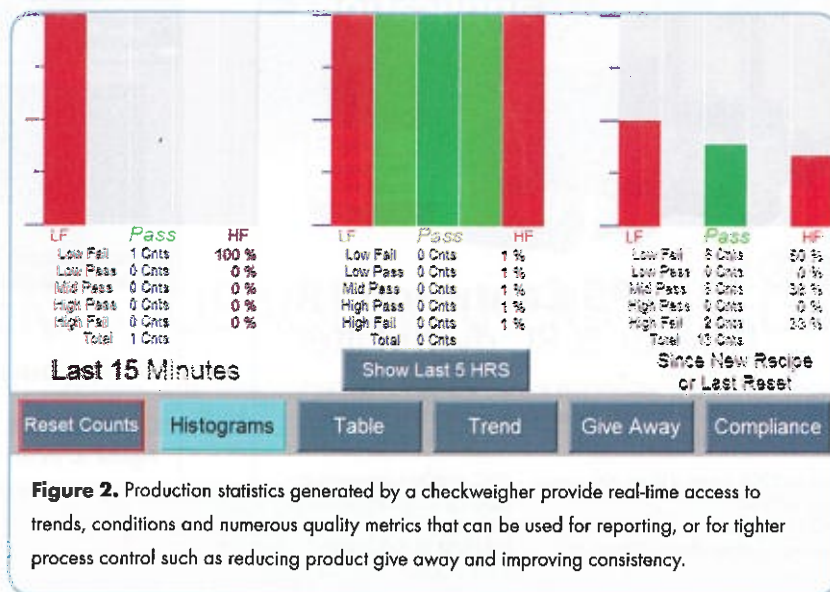


Industrial manufacturing and food processing operations contain numerous processes for checkweighing. It's useful to break down these processes into categories to determine if adding checkweighers would be beneficial. These categories include:

**Portioning or pre-packaging.** Checkweighers can be used before packaging. For example, in a snack cake line, after forming raw dough into individual portions, weighing and categorizing prior to baking helps confirm each cake meets specifications. In a poultry line, checkweighing can help categorize breast portions and leg portions into the proper packaging lines. Another example is a metal piece manufacturer that weighs each piece prior to packaging to help spot any voids in the part before being assembled into a finished product.

**Primary packaging.** Checkweighing in the primary packaging line helps monitor fillers to prevent over/under errors prior to sealing. In pharmaceuticals, a checkweigher can determine if the correct number of pills in a bottle are present or the right number of milliliters in an ampule. In snack foods, checkweighers substantiate the right number of chips or cookies are in a package. Checkweighing also helps eliminate rework and the expense of waste when non-conforming product is redirected at this stage.

**Final assembly.** Many products are assembled in kit fashion where multiple items of different weights are placed in a package. Checkweighing at this stage confirms that all parts are included. It also can help determine which piece is missing and spot extras that can help eliminate waste to increase profitability. Checkweighing can even capture lightweight items such as instruction



**Figure 2.** Production statistics generated by a checkweigher provide real-time access to trends, conditions and numerous quality metrics that can be used for reporting, or for tighter process control such as reducing product give away and improving consistency.

leaflets required for regulatory compliance or safety.

**Case weighing.** The primary goal in case weighing is to establish that every item in the case is included. A case of wine needs to have 12 bottles and a case of canned goods needs to have 24 cans. Depending on the item's size and weight, case weighing may require a more heavy-duty checkweigher model. These could include bags of cement, 50-lb. bags of pet food, sheets of lumber or other large or heavy items. At this stage in the manufacturing process, the checkweigher data can be sent to the manufacturing system to transmit final goods information to shipping.

### Production Visibility

Checkweighers generate valuable production information that can be instantaneously shared across plant floor operations to other operations or business level stakeholders. By performing inspection on every discrete product manufactured or case of goods produced it becomes easier to tie data to upstream processes for real-time closed loop control.

Production data provides real-time access to trends, conditions and numerous quality metrics for reporting, or for tighter process control such as reducing product give-away or improving product consistency. Monitoring production efficiency over time will help to increase throughput or eliminate waste, and even audit standard deviation to predict when processes are out of tolerance.

Production information generated from checkweighers include:

- Under/over errors, alerting operators to an out-of-tolerance trend.
- Line efficiency and accuracy using total count and total weight.
- Speed using number of items per minute.
- Data for regulatory record keeping.
- Throughput performance by hour, shift, day, week or month.
- Filler or feeder performance by head to determine if one needs adjustment or service.

Checkweighers can serve up production analytics simply by pointing at data tags in the machine,



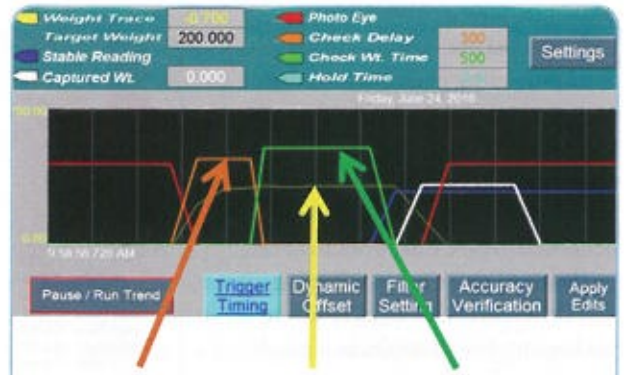
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**Check Delay      Weight Trace      Check Time**

**Figure 3.** Visualization tools eliminate the trial and error of setting up each product, allowing operators to capture the entire checkweighing process and display results on the machine's high-resolution HMI screen.

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making that data available on an industrial network. The checkweigher's programmable logic controller (PLC) communicates with the Rockwell Automation PlantPAx® system, linking the machine to the production process or to provide control remotely.

Rockwell Automation FactoryTalk® Security provides permission-based control and distribution of data through a centralized administration counsel.

### Quality Control

Checkweighers are a quality manager's best friend when it comes to protection for both the manufacturer and the end user.

Checkweighing helps manufacturers comply with local and national regulations. They are also assured that they contain the right amount of product, ingredients or parts increasing consumer confidence and reducing costly returns. Strict quality control reduces overall costs and helps increase efficiency through process control.

Customers also can rest easy knowing they received high quality products that conform to labeling requirements and that all pieces are included, increasing their satisfaction and consumer safety. □

*Hardy Process Solutions, San Diego, California, is a participating Encompass™ Product Partner in the Rockwell Automation PartnerNetwork™ program. Hardy provides process weighing and packaging equipment, including tension and compression load cells for a variety of industries ranging from food processing and automated manufacturing to chemicals and plastics production.*