

## TECHNICAL ARTICLE WEIGHING ACCURACY



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# How to install your scale for better weighing accuracy

**Off-spec batches and over- or underfilled packages are just some of the weighing problems a bulk solids plant can have when an electronic scale performs poorly. Taking care to correctly install your scale in the first place can prevent problems that lead to customer complaints and lost profits.**

Electronic scales are common in bulk solids plants, where they control feedrates in batching systems, check package weights, and perform other critical functions. To provide accurate weighments, these devices must operate without external disturbances, particularly when weighing small material quantities.

Whether your electronic scale is a simple platform scale or part of a gravimetric feeder, it includes a weight sensor – commonly a load cell (or cells) – and electronic controller. These sensitive elements must be protected from environmental influences to ensure that the scale can perform with the accuracy your application requires. As the following tips explain, carefully installing the scale to protect it from drafts, temperature changes, and other external disturbances will minimize weighing errors.

### Isolate the scale from vibration

Vibration from nearby processing and handling equipment, railroad or truck traffic, passing forklifts, and other sources can be transmitted through the floor, wiring or sleeve connections, and other components to your scale. The vibration will disturb the scale's weighing mechanism and lead to weighing errors.

You can choose a scale that has a controller with vibration-filtering electronics, but proper scale installation is equally important. To prevent vibration from being transmitted through the floor to the scale, you can isolate the decking under the scale from the plant floor, reinforce the decking around the scale to minimize flexing, or install the scale on a vibration-isolation platform or mounts, a high-mass pedestal, or structural members. To prevent vibration transmission through the scale's connections, make sure that all wiring and inlet and outlet sleeves are flexible and have some slack.

Another common hazard to scale accuracy can be forklift collisions. A forklift bumping into the scale disturbs the scale mechanism, creating weighing errors and, in some cases, damaging the scale. You can avoid these problems by placing the scale in a location protected from forklift traffic and by training forklift drivers to avoid the area.



*To prevent floor vibration from creating weighing errors, each feeder in this batching system rests on a scale mounted on a vibration-isolation platform.*

## Protect the scale from air disturbances

Wind and drafts from open windows and doors and strong currents from heating, air conditioning, and ventilation ducts will disturb the air around the scale. This can translate into false scale movements that lead to inaccurate weighments, especially when the scale has a small load cell capacity to provide high weighing accuracy.

To prevent air disturbances near the scale, install your scale away from windows and doors or take steps to ensure that workers keep them closed when the scale is operating. Choose a scale location away from heating, air conditioning, and ventilation ducts, or reroute the ducts so their air currents can't affect the scale's operation. Enclosing or shielding the scale can also protect it from air disturbances.

## Control the ambient temperature

A load cell is temperature-compensated, meaning that its performance is adjusted to compensate for temperature changes. As a result, the ambient temperature in the area where your scale is installed must not exceed the load cell's temperature limit. With a gravimetric feeder, you'll need to control the ambient temperature within the limits specified for the controller and feeding device, as well. An effective way to do this is to install the scale in a temperature-controlled environment, such as an air-conditioned room or enclosure.

Sunlight and material temperature can also affect the scale's performance. Sunlight can heat up a weigh hopper's support structure and cause the metal in it to expand, leading to weighing errors. Cold material from a chiller can land on a scale and cause the metal in it to contract, while hot material can cause the metal to expand; both will throw the weight readings off. To prevent or minimize these effects, protect your scale from sunlight and allow cool materials to warm and hot materials to cool before they land on the scale. If it's not practical to avoid these heat and cold sources, select a scale that's built to withstand temperature effects.

## Supply clean electrical power

For accurate weighing results, the scale's controller needs clean electrical power, free from large inductive or capacitive loads, to maintain strong, clear signals during the scale's operation.

If you're not sure that your plant's power supply can meet this requirement, use an isolation transformer or an uninterruptible power supply for the scale.



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