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## Enhancing Scale Performance for Multi-Component Batching

Batching systems, whether manual or automated, are everywhere. Compounding liquid solutions or blending powdered components into a final mixture is one of the most common industrial weighing applications.

For smaller material batches an industrial scale is the preferred tool for completing the task, especially where dispensing of several components is done in smaller quantities without permanently attached filling lines to the bulk batch container. Each component is added to the mixture one-at-a-time, weighed and accumulated with other component ingredients. This can be done manually or dispensed automatically from an overhead hopper. These systems work extremely well when individual components are relatively close in weight to each other and only a few components are needed to complete the batch.

A problem arises when weighing out several components of widely varied weight. A liquid catalyst, for example, can be 100 times lighter than other bulk material in the completed batch. The scale is equipped to handle several hundred pound loads but is incapable of weighing the catalyst in such small quantities accurately. The only alternative is to weigh the smallest ingredients on a separate low capacity scale with higher resolution. This always slows the process and necessitates use of two scales instead of one.

There is an effective alternative approach. Some modern weight indicators and controllers are capable of incorporating a high resolution “weighing window” that can be displayed at any point in the batching cycle on activation of a TARE command. Here is an example of a typical process. The scale has a 1000 lb. capacity and the ability to display 0.05 lb. under full load conditions:

BATCH COMPONENTS	FILL AMOUNT	TOLLERANCE	OPERATION
Component #1	200 pounds	+/- 0.05 lb.	Tare #1
Component #2	150 pounds	+/-0.05 lb.	Tare #2
Component #3	225 pounds	+/- 0.05 lb.	Tare #3
Component #4 (catalyst)	1.5 pounds	+/-0.005 lb.	Tare #4
Component #5	175 pounds	+/-0.05 lb.	Complete

Following every tare operation the scale displays increased readability of 0.005 lb. until 10 pounds is exceeded and then reverts to 0.05 lb. readability until the next tare operation or until capacity of the scale is reached.

While it is not wise to expect the entire 600 lb. load to be weighed within 0.005 lb. it is possible to weigh much smaller amounts to very high accuracy levels.

There are other weighing scenarios by which it is now advantageous to establish a small “weighing window” of high resolution even when the scale is fully loaded and near capacity.

For example, imagine a filled bulk feeder of 200 pounds of material sitting atop a 500 pound scale. The challenge is to dispense or manually remove a very small amount material with very tight weight tolerances. While the loaded scale might display 0.02 pound up to 500 pounds, pressing the TARE key could display 0.001 pounds to precisely dispense exactly 5 pounds of material with a +/- 0.001 lb. tolerance. Once 10 pounds or more of material is removed the display returns to 0.05 lb. readability.

Parts counting also has a unique requirement for the very precise determination of weight during the process of establishing an average weight per piece to be counted. Placing a small known quantity of parts on the scale allows the calculation of the average weight of a single piece. Extreme accuracy is desired during this critical calculation but once the average piece weight is determined significantly less accuracy is required to count the entire lot of parts.

The good news is that simply adding a modern indicator with the ability to display a high precision window to an existing scale is normally sufficient to produce more accurate batching, dispensing or parts counting results. Most commercial indicators are compatible with competitive weighing platforms or load cells. The best part of all; they can be quickly and easily installed to test the performance of any system. Cost is surprisingly low to improve weighing accuracy for disproportionately small batch components.