Finding the Right Scale for Your Operation

Choosing the right scale

Choosing a scale seems like a simple task: just make sure the scale can hold what you usually weigh and the display shows the right number of digits. In reality, there is a little more you need to know to choose the best scale for your application. If you know the weight of the smallest and largest things you measure, your process tolerances, and the environment, you can choose the perfect scale every time.

Accurate & repeatable measurements

Just because a scale gives you a value doesn't mean that number is correct or consistent. A quality weighing system is built to ensure that you get accurate and repeatable measurements every time for the life of the scale. Aside from the construction of the equipment, having it spec'd out by an expert for your application is just as important.

Knowing the maximum amount of weight that you will put on a scale helps you define the. You want a scale that can handle the heaviest things you will be weighing to avoid damaging the load cells, which can impact accuracy and repeatability. The capacity of a scale is related to its resolution, which is the smallest change that can be measured on the scale. This is the difference between a scale that measures in 1.0 mg increments and a scale that measures in 0.05 mg increments. Higher capacity scales may not be able to provide the resolution you need.

For example, we occasionally have requests from customers who want a floor scale with expanded readability beyond the standard capability of a floor scale. While this isn't impossible, it is quite complex to properly spec a scale with the correct platform size and capacity that will meet the customer's requirements. Correctly matching equipment to an application is critical and can require higher quality equipment for repeatable and accurate measurements over the lifetime of the equipment.

Your process tolerances are hugely important in determining which scale to purchase. A process tolerance should be a percentage of the target weight rather than a specific weight. Listing the tolerance in percentages helps ensure your process is accurate no matter what the target weight of the product is. For example, a tolerance of ± 1 oz is very different when we're talking about a 3 oz meatball vs a 3-pound bag of meatballs (48 oz). In one meatball, ± 1 oz tolerance is 33%, but in the 48 oz bag, ± 1 oz tolerance is only 2.1%. If the tolerance is measured as a percent, a tolerance of ± 1.0% would be ± 0.03 oz for the 3 oz meatball and ± 0.48 oz for the 48 oz bag of meatballs.

In addition to knowing your process tolerances, you need to know what the accuracy of the scale is. No scale is absolutely perfect, and there is a measurement uncertainty that indicates how close the scale could be to the weight displayed. (For a complete

explanation of uncertainties, check out our article What are uncertainties and why do they matter?) For example, a scale might display 48 oz when a bag of meatballs is weighed. If the uncertainty of the measurement is ± 0.01 oz, the true weight of the bag could be anywhere from 47.99 oz to 48.01 oz.

Uncertainty is also related to the measurement – relative uncertainty goes down as the weight being measured goes up. The uncertainty of the scale is ± 0.01 oz, which is ± 0.33% of 3 oz meatball and 0.021% of the 48 oz bag of meatballs.

Your process tolerance must be greater than the relative measurement uncertainty. If the uncertainty is greater than your process tolerance, you'll never know if you're actually in the specification or not.

It's also important to know what the minimum accurate weight is on your scale. Scales can't accurately measure something if the uncertainty is the same or higher than the process tolerance. In our example, the ± 0.01 oz uncertainty matches the process tolerance of ± 1% at 1 oz, so we can't accurately weigh anything on the scale below 1 oz.

Environment

Where will your weighing system be used? Will your scale sit under a fan, or are you working in an area with lots of vibration? A measurement professional will be able to tell you if you will need to move your scale to another location, if it needs to sit it on an isolation pad, or if your balance will require draft shield. Seemingly small environmental factors can have a huge impact on your scale performance.

The more interference you have, the higher you want to set that minimum accurate weight. If our example scale is in a laboratory, we might go with 1 oz as the minimum accurate weight, but in the production environment, it might not accurately be able to weigh the 3 oz meatballs. So, we might need a more accurate scale with lower uncertainty.

When you purchase a scale, you want to make sure that it will hold up in your specific conditions whether it be exposed to liquids, chemicals, or dust particles. If your scales will be in a wash down or other harsh environment, you will want to make sure that they have the proper ingress protection rating. See our article on IP ratings to learn more about this. While quality scales have the proper protections in place to ensure they hold up to your specific conditions, there is no such guarantee with a more cost-effective scale that you may pick up from an online retailer.

A critical factor to consider is whether or not your environment requires special equipment due to explosion risk. In such areas, the equipment must be intrinsically safe, meaning that the internal electrical systems are contained to avoid igniting

flammable materials in the area. It is important that the entire system complies with the recommended certification standards and has been evaluated by a professional. Even within J.A. King there are certain highly trained professionals who must evaluate any system that will be installed in such an area to ensure it meets these requirements. We cannot emphasize enough that working in these areas is inherently dangerous, and it is highly inadvisable to attempt to purchase it on your own without consulting a trained professional. You can visit the intrinsically safe portion of our website to learn more about hazardous environments.

What is the difference in scale brands?

It's no secret that we are living in an Amazon-based, online ordering world. It is easier than ever to quickly compare prices online and find the cheapest option that can be shipped to you in two days. While this is incredibly convenient for household products like lightbulbs, dog food, and paper towels there are some items that you simply cannot price shop.

We are constantly talking to customers about scales for a specific application. However, after getting a quote, it is becoming more and more common for customers to then do a Google search to find a cheap online scale retailer. In many cases, they can find a lower cost scale that seems similar to what we have quoted. Though every application is different, generally when it comes to weighing, the cheapest option isn't always the best. To help you to make the right choice, we have laid out some of the top reasons that quality matters.

Total cost of ownership

A quality weighing system is a significant investment. One of the key things to consider beyond the initial price tag is the total cost of ownership over the life of the equipment. Regular service and calibration is needed to keep any scale in optimal operating condition. Low quality products are significantly more likely to go out of calibration or require repair, if they can be repaired at all. If your scale is going to take daily abuse, and let's be honest – most do, you want something built tough enough to hold up. As a bonus, most quality scales are protected by warranty for an initial period if they are installed and serviced by an authorized dealer. This gives you added protection for your investment.

The bottom line is that a well-built scale will last longer, perform better, and require less repair. For this reason, investing more up front will help you to save money over the life of the equipment. To learn more, check out our series on the Total Cost of Ownership.

The bottom line is that you get what you pay for when it comes to scales and weighing systems. This could mean that you end up spending more to keep the scale running, that your readings aren't as accurate as you need, or in the worst-case scenario the

wrong scale could lead to serious safety hazards. With the right information, you can identify the scale that best suits your needs. You might not need a scale with an accuracy of ± 0.01 oz if you're weighing 5-pound bags of flour, but it might not be good enough if you're weighing 1 oz bags of potato chips. Before you buy your next scale, let one of our application specialists help you figure out what scale will provide you the information you need to control your process effectively. We always recommend talking with a measurement expert before purchasing weighing equipment; contact us today to discuss your specific application with a J.A. King specialist.