

Living With Powder Scales

(Your life in the balance)

Powder scales, both digital and balance beam, are precision instruments that require careful handling and attention to detail in order to achieve the most accurate and consistent measurements. The following tips will help you get the most from yours. Listed in no particular order.

Keep Things Level

The surface that your scale is used on should be as level as possible, front to back, and left to right. While it is more of an issue with balance beam scales even digital scales can be affected. Balance beam scales usually have an adjustable foot to align the zero mark with an empty scale, but not all allow front to back adjustment which can affect the sensitivity of the scale due to end contact of the knife edge. If your bench is level enough that bullets aren't constantly rolling off in random directions you are probably OK.

Cleanliness

As with all precision instruments, dust and dirt are their enemies. Keep your scales covered when not in use and inspect them for dust or dirt under the platform on digitals and in the knife bearing areas for balance beam scales.

The weighing platform of most digital scales can be removed so you can easily clean underneath. A soft artist's paintbrush or a gentle puff of air is about all that should be needed to clean it. Whatever you do, don't flip your scale over and shake it to dislodge dust and powder grains. Shaking could permanently damage the load cell! With balance beam scales remove the beam from the cross bearing slot and blow or brush out any dust from the groove and from the knife edges on the pivot.

Don't forget to clean your powder pan. Over time, a film of powder residue can build up on the powder pan. This can cause powder grains to stick to the pan, and not be transferred to the cartridge case. This is often misinterpreted as static cling and most frequently treated by rubbing the pan with an anti-static clothes drier sheet. Repeated use of drier sheets may also leave residue buildup. Residue buildup happens with both metal and plastic powder pans. The cure is simple. Just wash the powder pan with a drop of liquid dish soap, rinse thoroughly and let dry. Do not use abrasive soaps or scouring pads. The resulting scratches can cause powder grains to cling.

Stability & Vibration

Your scale must be on a rock steady platform. A table that moves and shakes will make it impossible to get accurate and consistent readings. If your bench doesn't have adjustable feet, place shims under the legs to remove any wobble. Remember to protect your scale by taking it off the bench before hammering any shims into place. Even with a solid bench don't weight things when any other operations are being performed and watch out for appliance induced vibrations in your work area.

Drafts and Air Currents

Most electronic scales come with a cover. On some of these, the cover isn't just to keep dust off when not in use. Some covers are designed to be used during measurements and blocking air currents that can affect accuracy. You can sometimes identify covers that are designed to be closed during measurement as they may have a hole in the top. The hole allows you to add powder with the lid already down.

Some high end scales come with a "draft ring", which is usually a glass ring that fits around the weighing pan to protect it from air currents. Make certain it is in place for all measurements.

Balance beam scales are not usually supplied with such shields so it may be necessary to make a homemade enclosure to keep air currents away from the scale. Make it tall enough to extend at least 3 inches above the weighing pan or the beam.

Even if your scale has a draft ring or a cover designed for use during measurements, make sure the scale is located away from air currents in the room. You may need to put a deflector on the air vent(s) in your room to direct airflow away from where the scale is located.

Static Electricity & Magnetic Fields

Keeping a clear space around your scale. Static electricity near digital or balance beam scale can affect measurement accuracy just as much as a stray air current. Always use a powder pan made from metal or from static dissipative plastic. You can also wash your scale's pan with a little dish soap and allowing the soap film to dry on the pan. You can also occasionally wipe the pan with a non-scented fabric softener sheet to achieve the same results.

Keep items made from plastic away from the scale, including plastic or Styrofoam loading blocks, die storage boxes, ammunition storage boxes, Akro bins, etc.

Don't forget the static on your body! If you have a carpeted work area or leading to it you can build up a rather large charge. A static spark to electronic powder scale is not only bad for accuracy; it can destroy the scale's circuits! Even if you don't build enough charge to cause a spark, you can build enough charge to affect your powder scale's accuracy. You can spray the carpets in your area with the commercial Static Guard TM or make your own with a spray bottle containing a tablespoon or two of fabric softener in a pint of water. Spray either directly on the carpet. Also, touching a grounded metal object once in a while will drain any charge from your body.

If you have a Formica covered loading bench you should wipe it down with an anti-static preparation before doing any loading. You should also ground the surface by attaching a thin copper wire to the Formica with a screw and attached the other end of the wire to a grounded surface.

Digital scales can be strongly affected by magnetic fields and electrical interference generated by various devices. Don't use a digital scale near any electronic device such as a computer, monitor, radio,

or cell phone. Note that fluorescent lights can create interference. If you are experiencing a problem with your digital scale and you have fluorescent lights or electronics in your work area test things with the lights and equipment turned off.

Batteries and Power (Digital Scales)

A weak battery can make a digital powder scale give erroneous readings long before it ever goes dead or gives a low battery warning. Keep your batteries fresh and buy quality batteries. Use the manufacturer's recommended battery type and don't replace alkaline batteries with lithium batteries as the voltages are slightly different (in spite of them frequently being labeled the same).

If your scale has an AC Adapter, use it. It will allow you to leave the scale on for extended periods without worrying about the battery going dead in the middle of a reloading session. Note, however, that most of the inexpensive powder adapters are not “regulated” and their outputs can vary with changes in line voltage. If your scale is acting strange and you are using the power adapter, try running off batteries (use fresh batteries).

Warm-up (Digital Scales)

Warm-up time can affect a digital scale's stability. Some scales can take as long as 30 minutes to warm up to a stable internal temperature, especially if the room is unusually cold. With an AC powered scale, you can just leave it on while you are making other preparations. If your scale has an Auto-Off feature, you may need to disable it or set it for a longer time if possible. Battery powered scales may not allow long warm-up periods especially if it is one that drains batteries quickly. In that case, allow 30 to 60 seconds warm up time, keep the room temperature as stable as possible before starting a reloading session and use the zero button before every weight measurement.

Calibration

Check your scale calibration every time you set up for use. Calibration is a good way to tell if your digital scale has warmed up and is ready to use and that there is nothing amiss with your balance beam.. You should also check calibration if the scale has been moved, is being operating at a significantly different temperature than when it was last calibrated, and after you change the battery. If you just bought a new scale, checking the calibration is the first thing you should do before using the scale.

Perform the calibration procedure as described in the owner's manual only if the calibration is off. With digital scales be sure the scale has had a chance to warm up and the readings are stable. Always use the calibration weight(s) that came with your scale.

In addition, you might want to keep some objects that you have previously weighed that are lighter and heavier than the supplied calibration weight, or close to powder charge weights you commonly use. I use a couple of bullets that I have previously weighed on the calibrated scale and handle them only with tweezers.

You can also use miscellaneous small items like paper clips, coins, and small metal scraps and handle them only with tweezers. If they don't weigh the recorded amount after calibrating your scale you need to check things out before continuing.

Thanks to Bob Gillett for this idea.

Zeroing

Always zero your digital scale immediately before every measurement, or frequently check the zero point with a balance beam scale. Some may feel this is overkill, but it is worth the few extra seconds it takes to ensure the best accuracy you can get from your scale.

Some digital scales may have a "Tare" button rather than a zero button but its function is the same.

The tare button is used to set the scale to zero with a weight on the pan.

The most basic use as a zero button is to "tare" the weight of your powder pan so the scale reads 0.0 grains with the empty pan in place and the scale will display the weight just the powder charge. It can also be used for sorting bullets, cartridge cases or even loaded cartridges by weight by using the following procedure.

1. Press Tare/Zero button to zero the scale.
2. Place the sample bullet on the scale and note the weight
3. With sample still on the scale, press the tare/zero button to zero the display and remove the sample
4. Weigh your bullets. Bullets that weigh the same as the sample will read 0.0 grains. Bullets that are under or over the sample weight will display the difference in weight. Sort the bullets into weight groups depending on how close you need them to be to the example bullet weight.

Another trick that can be useful. If you have a sneaking suspicion that you may have double charged or not charged a cartridge, just tare the weight of a known good cartridge and then start weighing the suspect cartridges. All the good cartridges should weight 0.0 grains (or very close too it). So all you need to do is look for one that weighs too much or too little by the weight of the powder charge. This greatly speeds up the inspection process!

Center What You Weigh

Place the load (powder pan, bullet, calibration weight, etc,) at the center of the weighing platform or powder pan. With digital scales an off center load may cause binding of the load cell resulting in error. If you are weighing a bullet, loaded cartridge or some other oddly shaped object, try to center it as best as possible.

Don't Exceed Your Scales Rated Weight

The "load cell" is the heart of every digital scale and can be irreparably damaged if subjected to over limit weight or impact..

Never leave any load on a scale for an extended period of time as this can cause the load cell to take a set. Never place more weight on a scale than its uppermost limit. Note that the scale's weight limit includes any "tare" weight. For instance, if your scale has a 500 grain maximum capacity and you "tare" the scale (zero) with an object that weighs 100 grains, the remaining capacity is now only 400 grains. Even though the scale reads zero, if you place a 500 grain weight on the scale, you will overload the scale.

Never drop anything on the weighing pan. Always place the load or calibration weight gently onto the scale. Dropping weight on the scale can damage the load cell, or a balance beam's knife edges even if the weight is well below the scale's uppermost limit.

If you ever do accidentally overload your digital scale, turn it off and allow to sit for a few minutes. Then attempt to recalibrate it according to the manual. If it calibrates check a few known weights of greater or less than the cal weight. If the damage is minor, you may be able to save it. If it won't calibrate properly you'll have to return it to the manufacturer.

While balance beam scales aren't as susceptible to over-weight damage the knife edge of the pivot can be damaged resulting in a loss of sensitivity and accuracy. Balance beam scales so damage should be returned to the manufacturer for resetting of the knife edge.

RTFM (Read the "Factory" Manual)

Real men read the manuals for their equipment. It is amazing what you can learn from them.

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Updated 2018-01-21