Determining Mass With a Triple Beam Balance

A triple beam balance can be used to measure masses to ± 0.05 gram. This amount is the measurement error you can expect when using this type of balance. If you were to measure the mass of an object, take it off the balance, reset the balance, and measure the same object again, you might find the mass to be different from the first measurement by as much as ± 0.05 grams. This doesn't mean that the mass of the object changed between measurements.

So we can expect that any one measurement of mass on this type of balance could be off by as much as ± 0.05 grams. The smallest divisions on the balance are tenths (0.1) of a gram. However you can estimate to one more decimal place, and therefore you need to record all of your measurements to two decimal places as either xxx.00 g or xxx.05 g.

To use the triple beam balance to determine the mass, follow the steps below.

1-Remove any object or materials from the measurement pan, then move the three sliding masses on the three beams to the far left. If the pointer on the right moves the same distance above and below the zero mark, then your balance is correctly calibrated, and you can proceed to step 3. If not, then go to step 2.

2-Under the measurement pan is an adjustment knob called the tare or zero knob. Turn the tare/zero knob slowly clockwise to make the pointer move down, or counterclockwise to move it up. The pointer does not have to line up with the zero mark. It just has to move the same distance above and below the zero mark. Once this is done, your balance is now properly calibrated to read zero with nothing on it.

3-Put the object to be measured on the measurement pan. This will cause the pointer to move above the zero mark.

4-Move the 100 gram sliding mass to the notches on the beam, one notch at a time. If the pointer doesn't drop below the zero mark, move it to the next notch. If the pointer drops below the zero mark, move the sliding mass back one notch. The position of the sliding mass on this beam, tells you how many 100's of grams your object is. Keep this sliding mass in this position until you are done massing the object.

5-Now do the same with the 10 gram sliding mass, again moving it one notch at a time along the beam to the right. If the pointer doesn't drop below the zero mark, move it to the next notch. If the pointer drops below the zero mark, move the sliding mass back one notch. The position of the sliding mass on this beam, tells you how many 10's of grams your object is. Keep this sliding mass in this position until you are done massing the object.

6- The beam in the front measures single grams and does not have any notches along the beam. The numbers along the beam represent single grams, and the divisions between the numbers represent tenths of grams. Move this sliding mass back and forth until the pointer moves the same distance above and below the zero mark. Estimate your mass along this beam to the nearest 0.05 grams.

7-Add up the totals of the three beams for the mass of the object.

8-Remove the object from the measurement pan, and move all sliding masses to the far left.

9-When transporting the balance, move the two heaviest sliding masses to the far right. This protects the balance from damage due to rocking motions of the beams and pan. With one hand under each side of the balance, it is now safe to move it to another location. NEVER carry the balance by holding the beams or the measurement pan.

A labeled diagram of the balance is on the back of this page.

Parts of the balance