



Laboratory Weighing Balance Buying Guide

A complete guide to helping you choose the correct balance for
your laboratory



As with the specification of any weighing equipment the first place to start is to determine the capacity / weighing range and the readability (how accurately you want to weigh) you require in your application.

Maximum Sample Weight

You need to decide what the maximum weight of sample you want to weigh out and also take into account the weight of any tare vessels you may be using.

For example if you needed to weigh out 80g of sample to an accuracy of 0.1mg then a balance with a specification of 100g x 0.1mg would be suitable.

However if your process required a tare vessel which weighed 25g, the combined weight of the sample and tare vessel would be 105g (80g + 25g). Therefore you would require a balance with a higher capacity – since the combined weight exceeds the capacity of the balance.

Note when the tare vessel is applied to the pan and zeroed you do not have access to the full range of the scale. So in the above example you apply the tare container (25g), zero the scale by pressing the tare button, and then you can only weigh in sample up to 75g.





Minimum Sample Weight

This is an area that is often not considered.

A balance with a specification of 200g x 0.001g (1mg) will display a result when you weigh out 5mg. However this would not be considered an accurate weighing.

For guidance on determining the minimum sample visit our [minimum sample weight guide](#).





Readability

Balances are available with the following readabilities:

0.000 000 1g (0.000 1mg): Known as 7 place or micro balance, fitted with draft shield.

0.000 001g (0.001mg): Known as 6 place or micro balance, fitted with draft shield

0.000 01g (0.01mg) Known as 5 place or Semi-Micro, fitted with draft shield.

0.000 1g (0.1mg) Known as 4 place or Analytical, fitted with draft shield.

0.001g (1mg) Known as 3 place or Milligram balance, fitted with draft shield.

0.01g (10mg) Known as 2 place or Top Pan balance.

0.1g (100mg) Known as 1 place or Top Pan balance.

There is a trade off between capacity and readability. The more accurate the balance is the less range you will have in terms of capacity.



Calibration Type

The process used to correct a balance that is no longer weighing accurately. The word calibration is in common usage but is technically incorrect, the process of changing a balance so it weighs correctly is known as adjustment. There are three types to consider:

External

The balance is adjusted using an external weight. It is very important the weight used is UKAS calibrated and the person performing the process is trained on how to perform correctly

Internal

The balance is adjusted using an internal weight, which is housed within the balance. This weight has been accurately weighed and the value written into the balance software. When the user activates this function (usually one button press) the weight is lifted from its resting position and placed on the weighing mechanism and performs an adjustment as required. No training is required to perform this adjustment.

Automatic Internal

As the above for internal, which is triggered by a button press by the user. This feature also automatically triggers the internal adjustment function when there has been a temperature change or after a certain amount of time has elapsed.

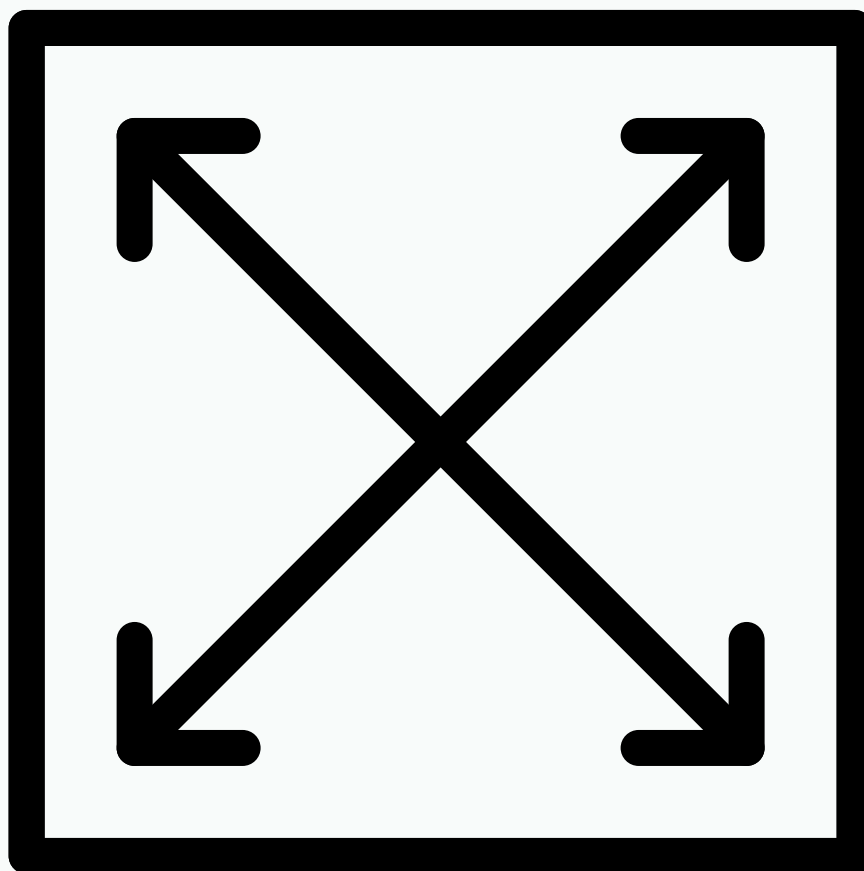
Our recommendation is always to have a balance with internal or automatic internal calibration. It does not usually cost that much more than the standard version with external calibration and it is a piece of mind solution to accurate weighing results. We suggest you activate this function before each series of weighing's.

This function does not invalidate your certificate of calibration for your balance and does not replace the need for having your balances regularly service and calibrated.



Pan Size

When selecting a balance check that the sample / tare vessel do not overhang the pan if possible. If not possible the sample should be loaded evenly across the pan. On some balances it is possible to buy larger pans as an option to weigh filter papers.





GLP / GMP Compliance

Is your laboratory GLP compliant? If so you will have to maintain records of your weighing results. These records should identify:

- The balance / serial number used to perform weighing's.
- The date and time when the weighing's were performed.
- The weighing data.
- Some form of sign off to indicate who performed the weighing's.

Many balances (but not all) have a GLP function that will enable you to transfer this data to a printer or computer





CE Verified / Legal For Trade Weighing Applications

Some weighing applications in the UK are regulated by the Non-Automatic Weighing Instruments (NAWI) directive, for example, quality control tests in a pharmaceutical manufacturing organisation.

To comply with this directive weighing equipment needs to be CE verified (not to be confused with CE marked for electrical safety).

To find out more and determine if your application needs to comply visit [NAWI](#)



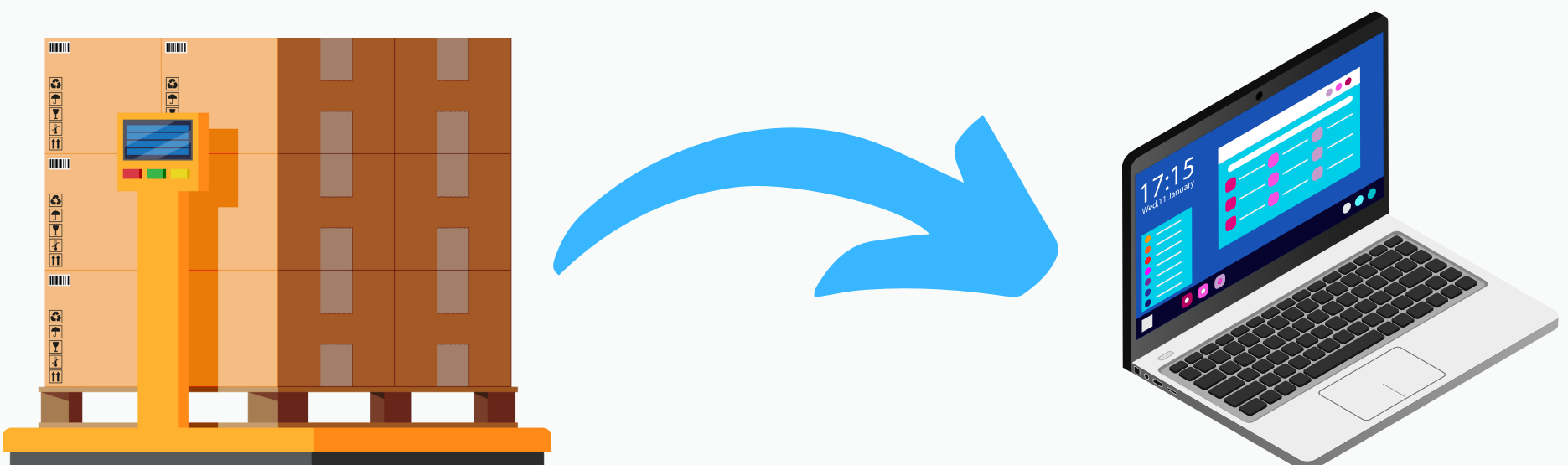


External Communication to Third Party Device e.g. Printer or Computer

There are typically two interface in use for balances RS232 (9pin or 25pin) and USB, some balances contain one or the other or possibly both.

RS232 / USB interface converters are available if your balance uses RS232 but your laptop only has USB. Bluetooth interfaces are available on some higher range balances.

It is always recommended to use the manufacturer's cables when connecting equipment, particularly when connecting using RS232. Although the cable may fit the port it may not be wired up correctly, so the best case scenario is that the cable will simply not work. In the worst case it can actually cause damage to the balance.





Features

Industrial scales will either be supplied with an indicator integrated into the body of the scale or the indicator and platform will be separated.

For scales where the indicator and the platform are separated it is often possible to buy different levels of indicator based upon functionality. Some of the most common features are:

IP Codes:

You can assign codes (such as product name, batch number, etc.) for identification of measured values on printouts.

Counting:

With the Counting application, you can determine the number of parts which each have approximately equal weight.

Date & Time:

Transmits date and time to printer or computer if connected.

GMP / GLP Compliant Print Outputs:

When this function, the printout is supplemented with a GMP header and a GMP footer.

Product Data Memory:

The product data memory stores initialization data and user data (product and tare values).

Examples include saving Average Piece Weight in a counting application, value of tare vessels.



Application

Consider if the following factors could influence your weighing result

Static

Static can be a problem in weighing, particularly when weighing out powders. Anti-Static accessories can be purchased to dissipate static. These can either be integrated in to the balance or available as a standalone piece of equipment.

Tare Container

Your tare container could be a potential source of static. Wherever possible avoid using plastic or glass and use metal. If you have no choice perhaps using one of the static options described above would be worth considering.

Magnetism

Balances operation is based upon the use of powerful magnets. Introduce another source of magnetism in your application and it can seriously affect your weighing results. For example a common stirring application involves the use of magnetic stirring bars. These must be removed before any weighing operation.

Moisture Loss / Gain

Does your sample evaporate or is it hygroscopic (absorb moisture)

If so this could influence your weighing results.

Examples of the above effect are not always obvious. Eg finger prints on glassware are hygroscopic , so when used in a weighing application they could influence the result on a balance with a high readability

Temperature of Sample

Wherever possible weigh samples at room temperature. Samples that are very hot or cold can affect the weighing results as they acclimatise to room temperature



Environment

The environment in which a balance is used impacts on how well it weighs. This is particularly relevant to balances with a readability of 0.1mg and more accurate. Below are the most common factors that can influence performance. These should be taken into consideration when locating the balance.

Temperature

Balances subject to wide variances in temperature are subject to calibration drift (causing the balance to weigh inaccurately). To correct this the balance needs to be adjusted once it has reached a stable temperature.

Sources of temperature change are not always obvious. For example it could be sun shining through a window onto the balance, or perhaps there is another piece of equipment on the bench which generates a lot of heat in use. Another source could be an air-conditioning duct blowing cool air onto the balance, this could also cause disruption through air movement.

Vibration

Performance will deteriorate if a balance is subject to a source of vibration. Sources of vibration could be other equipment on the bench, for example a centrifuge.

The surface on which the balance is located plays an important part in dampening out vibration. So locating the balance on a sturdy bench or weighing table will mitigate the effect of vibration.

Air Movement

Although balances with a readability of 1mg or higher will be equipped with a draft shield this does not protect them completely from draft or air movement. When locating a balance try to find a location away from potential drafts, such sources could include being near opening and closing doors, busy areas where there are lots of people walking past, fans / air conditioning vents.

Static

Sources of static can come from the sample being weighed but also from the environment the balance is being used. This may include the floor or even the person who is using the balance since some are more statically charged than others. If you are weighing powders you may have to take steps to minimise all sources of static.

Humidity

Although not a significant factor it may need to be taken into account if you have problems with static. Environments with low humidity increase the possibility of static.



Balance Software

Balances are equipped with a range of software applications which may be of use in your application. The list below is not extensive, but covers the most common applications found from a range of manufacturers. Not all applications are available on all ranges, so you would need to check it is available before purchasing

Minimum Weight

Once you have calculated the minimum weight for the balance this can be entered into the balance memory. Should a user try to weigh below this level the balance will warn them their weighing is inaccurate.

Level Assist

As a service provider for balances one of the most common problems we encounter is that a balance is not levelled, which can have a significant effect on the performance of a balance. The level assist function guides the user through the process on how to level the balance by supplying on screen instructions. Some balances also provide a warning when out of level and can even level the balance automatically.

ID Codes

You can assign codes (such as product name, batch number, etc.) for identification of measured values on printouts.

Density Determination

This application determines the density and volume of a liquid or solid material. Typically there is a density determination kit available as an option.

Statistics

Adding up and statistical analysis of a number of weight values. This function typically includes: Sum of all values, Average (mean value), Standard deviation, Lowest value (minimum), Highest value (maximum), Difference between maximum and minimum.



Balance Software

Calculation

This application is used to calculate the weight value using an algebraic formula that you define yourself.

Counting

With the Counting application, you can determine the number of parts which each have approximately equal weight.

Averaging

Calculate averages from several weighing operations. It is used when either the object to be weighed or the environment during weighing are unstable.

Checkweighing

Check whether the sample on the weighing pan matches a target value or lies within a given tolerance range. Checkweighing also makes it easy to fill sample materials to a specified target weight.

Totalizing

Adding up weight values and calculating values. The weight values of all individual components as well as the total weight results are recorded and can be logged.

Formulation

This application is used to weigh while adding several components consecutively. The balance is tared automatically after each component. The weight values of all individual components as well as the total weight results are recorded and can be logged.

Date & Time

Transmits date and time to printer or computer if connected.

GMP / GLP Compliant Print Outputs

When this function, the printout is supplemented with a GMP header and a GMP footer.

Product Data Memory

The product data memory stores initialization data and user data (product and tare values). Examples include saving Average Piece Weight in a counting application, value of tare vessels.

Percent Weighing

Obtain weight readouts in percent, which are in proportion to an initial reference weight.