

Balances and weighing scales are essential for accurate mass measurements across teaching labs, research environments, clinical work, and industrial quality control. While they may look similar, choosing the right model depends on sensitivity, capacity, calibration, environmental conditions, and workflow needs. This guide breaks down everything you should know before purchasing.



Balance Components



1. Identify Your Primary Use Case

Different settings demand different levels of precision and durability. Start by clarifying where and how the balance will be used.

Environment	Requirements
School/Teaching Labs	Robust design; easy operation; spill-resistant housing; readability of 0.1 g or 0.01 g; safe for repeated student use.
College/ Further Education	0.01 g to 0.001 g readability; internal calibration; draft shield for better precision.
Research/Professional Labs	Analytical or semi-micro balances; stable weighing chamber; anti static features; vibration resistance; calibration traceability.
Clinical/Diagnostics	Reliable precision; easy clean surfaces; calibration certificates; compliance with traceable standards.
Industrial / Quality Testing	High capacity balances; durable platforms; fast stabilisation; IP rated housings for dusty or wet environments.

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2. Choose the Balance Type

The correct type depends on your required capacity and readability.

Common Balance Types

Top Loading Balances

Best for: General laboratory weighing

Readability: Typically 0.1 g to 0.001 g

Pros: Easy to use; fast; versatile

Great for routine measurements of powders, beakers, samples, and reagents.

Analytical Balances

Best for: Precise measurements

Readability: 0.1 mg (0.0001 g)

Features: Draft shield, stable weighing chamber, antistatic coatings

Used in chemistry, pharma, research, and precise solution preparation.

Semi Micro Balances

Best for: High precision research

Readability: 0.01 mg (0.00001 g)

Suitable for analytical chemistry and advanced R&D.

Micro & Ultra Micro Balances

Best for: Trace analysis, environmental testing, high end research

Readability: 1 µg to 0.1 µg

Only needed for highly specialised work.

Platform / Industrial Balances

Best for: Large, heavy samples; drums; production environments

Readability: Typically 0.5 g to 0.01 g

High durability and large weighing surfaces.

Moisture Analysers (Specialist)

Combine a balance with a heating unit

Used for: Determining moisture content in samples

Ideal for food science, materials testing, and industrial QC.



3. Capacity & Readability

Balance performance revolves around capacity (maximum weight) and readability (smallest increment displayed).

Teaching labs:

200 g – 5000 g capacity, 0.1 g – 0.01 g readability

Analytical labs:

100 g – 300 g capacity, 0.1 mg readability

Industrial labs:

5 kg – 150 kg capacity, 0.1 g – 1 g readability

Tip: Never purchase based on readability alone—ensure the capacity matches your typical sample sizes plus containers.



4. Calibration: Internal vs. External

Internal Calibration

Built in motorised weight adjusts the balance automatically

Quick, convenient, ideal for teaching and research

Minimises operator error and environmental drift

External Calibration

Requires certified calibration masses

More manual effort; can be precise if performed correctly

Good for industrial use where large capacities matter

Calibration Certificates

Essential for regulated environments (ISO, UKAS, GLP, GMP)



5. Environmental Considerations

Balances are sensitive instruments, choose features that counteract disturbances.

Typical environmental issues:

Air currents
Vibrations
Static electricity
Temperature fluctuations
Humidity



Look for:

- **Draft shields** (for 0.001 g readability and better)
- **Anti vibration** feet or dedicated balance tables
- **Anti static** weighing pans or ionisers
- **Smart stabilisation** algorithms
- **Temperature controlled** or ventilated enclosures (for micro balances)

If your lab is busy or drafty, a shielded analytical balance will massively improve consistency.



6. Construction and Durability

A well built balance ensures long service life.

Look for:

- **Stainless steel** weighing pan for chemical resistance
- **Metal chassis** for strength and stability
- **Sealed keypad / membrane overlay** for spill protection
- **Overload protection** to prevent damage from heavy accidental loading
- **Chemical resistant** housing (especially in school and industrial settings)

Avoid thin, lightweight frames or unshielded electronics.



7. Weighing Modes and Functionality

Many modern balances offer useful built in functions.

Common Features:

- Tare (zeroing containers)
- Piece counting
- Percentage weighing
- Density determination
- Dynamic/animal weighing
- Formulation/mixing modes
- Check weighing with pass/fail indicators
- Data logging and GLP printouts

More advanced units may offer touchscreen control or programmable workflows.



8. Connectivity and Data Handling

Digital integration is increasingly important. Options include:

USB

RS 232 (for older printers and serial devices) Ethernet

WiFi

Bluetooth

Direct connection to LIMS or data management software

Choose based on how you plan to export results or document experiments.



9. Safety and Compliance

A good balance should support safe lab operation.

Look for:



Anti-tilt or overload warnings



Lockable settings (for teaching labs)

Good for shared facilities or supervised areas



Password protection

Prevent forced entry



GLP/GMP compliant reporting



Approved safety marks (CE, UKCA)



10. Ease of Maintenance

Balances should be easy to clean and maintain.

Look for:

- ~ Smooth surfaces
- ~ Removable stainless pans
- ~ Replaceable draft shield components
- ~ Easy access for internal cleaning
- ~ Availability of spare parts
- ~ Service contracts or local calibration support

Avoid balances with deep crevices around the pan that trap powders.



11. Buying Checklist

Before purchasing, make sure you confirm:

What level of accuracy do I actually need?

What readability (e.g. 0.1 mg 1 mg 0.01 g) is necessary for my applications?

What is the required repeatability and linearity?

Do I need an analytical balance, precision balance, or microbalance?

What is the required weighing capacity?

What is the maximum sample weight I will measure? Do I need additional capacity to account for containers, filters, or accessories?

Will I ever weigh bulky items or large vessels?

Is internal calibration required?

Do I need internal automatic calibration, manual calibration, or external weights?

Should the balance auto calibrate based on:

time intervals?

temperature changes?

user-defined triggers?



11. Buying Checklist (contd.)

What environmental conditions will the balance be used in?

Is the lab drafty, humid, or temperature variable?

Do I need: a draft shield? vibration damping? anti-static features for powders?

Is there adequate bench space?

What sample types will I measure?

Powders, liquids, volatiles, filters, small solids? Any corrosive samples requiring special pan materials? Any magnetic samples affecting readings?

What weighing applications do I need?

Ask whether the balance supports:

Density determination

Percent weighing

Check weighing

Formulation/recipe batching

Dynamic weighing (animals, unstable samples)

Pipette calibration

Statistics functions



11. Buying Checklist (Contd.)

□ What connectivity or data management is required?

USB, RS232, Ethernet, Bluetooth?

PC, LIMS, ELN integration?

Do I need GLP/GMP compliant data output?

Does it store results internally?

□ What kind of user interface do I prefer?

Touchscreen vs. button controls

On screen guidance or tutorial modes

Multi language support

User lockout and permissions

□ What is the balance's build quality and durability?

Is the weighing cell electromagnetic force compensation (EMFC) or strain gauge?

Is the housing metal or plastic?

How easy is it to clean?

Are components protected from spills and powders?



11. Buying Checklist (Contd.)

What is the warm-up time and stabilization time?

How long before the balance is ready after power-on?
How fast does a measurement stabilize?

What safety or compliance standards does it meet?

Does it support ISO, GLP/GMP, USP Class I/II requirements?
Are certificates provided (e.g. ISO 17025 calibration certificate)?

What accessories are needed? Possible extras:

Anti-static ionizer
Weighing table
Printers
Density kits
Bar code scanners
Filter weighing kits



11. Buying Checklist (Contd.)

What is the total cost of ownership?

Ask not only for the price but:

Cost of calibration services

Cost of spare parts (pans, draft shield glass)

Warranty length

Are service engineers local?

Expected lifespan of the weighing cell

What support is available after purchase?

Warranty & guarantee

Instruction manuals

Repair service

Great customer support from retailer and manufacturer

