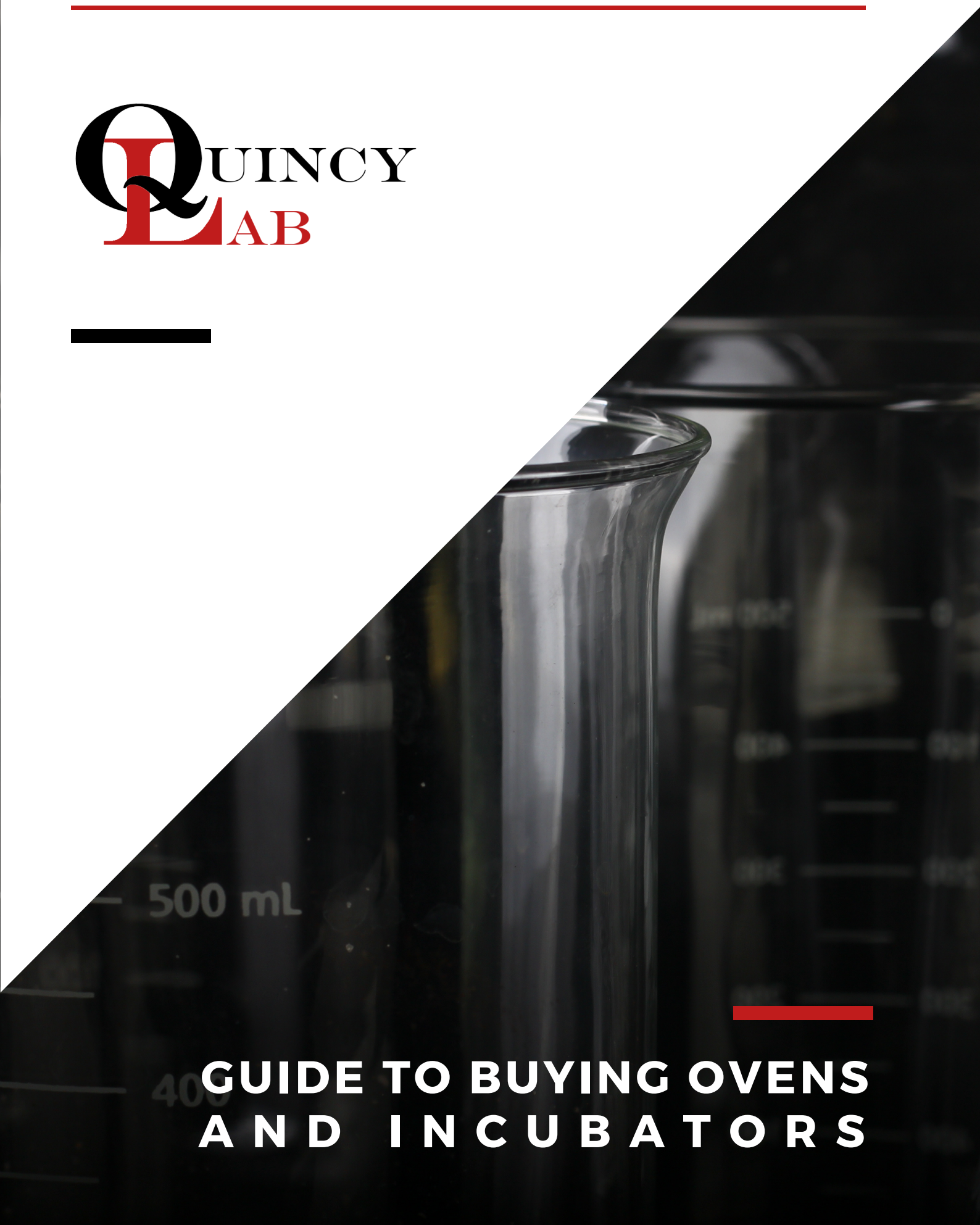
PREPARED BY
QUINCY LAB, INC.

CONTROL YOUR ENVIRONMENT

QUINCY LAB



GUIDE TO BUYING OVENS AND INCUBATORS

OVENS

HISTORY

Humans have used small chambers to control the environment surrounding foods, substances, and materials for thousands of years.
Today, ovens are standard in homes and found in laboratories across the world.

Ovens are one of the most identifiable parts of a lab and are used for drying, sterilizing, curing, and gentle heating by multiple disciplines, including:

- Chemistry
- Biology
- Pharmacy
- Forensic Science
- Education
- Veterinary
- Geological

These scientists, manufacturers, and creators have taken ovens into countless industries, including:

- Health Care
- Transportation
- Technology
- Water Treatment
- Aerospace
- Medical Innovation
- Civil Engineering

We put this guide together to help you pick the **ideal oven** by examining your **application requirements** and deciding on the most suitable **configuration, design, features,** and **price** under the following five considerations:

THE IDEAL OVEN

TEMPERATURE RANGE

Whether cooking or curing, reaching and maintaining the correct temperature for the appropriate time is vital to obtaining successful results.

When shopping for an oven, you should ask yourself:
What temperature does my application need?
Answering this fundamental question determines what Quincy Lab unit could meet your needs.

- **Incubators** range from Ambient +2F to +200F
- **Low-Temperature Ovens** range from Ambient +15F to +225F
- **Laboratory Ovens** range from Ambient +25F to +450F
- **Bench Ovens** range from Ambient +25F to +550F

Once you've determined your application's minimum and maximum temperature requirements, you can:

1. Consider a model with a maximum temperature rating slightly higher than your application requires.
2. Eliminate everything lower than your minimum target range.

Selecting a maximum temperature capacity higher than your application requires provides more flexibility when handling different tests and ensures greater accuracy and uniformity during routine procedures.

Hotter is not always better.

If your target temperature is limited, it's best not to go for high temperatures as this will cost more and have a larger footprint.
Models with a temperature range too high may:

- Not consistently deliver optimum stability and uniformity desired at lower temperatures
- Use costlier components and increase the purchase price
- Have a larger footprint and increase your operating costs

Consider the minimum operating temperature your application requires.

We always list a warming unit's lowest operating temperature as an addition to ambient room temperature.

If your application requires an operating temperature range of 250-300F, it would be best to find a unit that has a max operating temperature of 350F vs. 300F.

INCUBATORS

Quincy Lab incubators were custom-developed for laboratories that need a dependable, compact incubator for cultures, test kits, eggs, and biologicals.

They are ideal for most industrial settings, pharmacies, clinics, physician's and dentist's offices, schools, veterinary offices, and anywhere a general warming cabinet is needed.

They need only to be plugged in and set to the desired temperature to incubate and cure many things, including:

- Cultures and test kits
- Eggs and insect breeding
- Microbial and cell cultures
- Bacteria, fungi, yeast, and viruses
- Resin on PC boards
- Adhesives
- Gemstones and crystal growth

Our 140 series incubators have acrylic doors and a maximum temperature of 143 Fahrenheit.

Our 180 series incubators have steel doors and a maximum temperature of 200 Fahrenheit.

LOW-TEMPERATURE OVENS

Our Low-Temperature, or LT, series of ovens are the next step up from incubators in terms of temperature.

They were designed for drying, baking, curing, sterilizing, evaporating, heat treating, annealing, and testing.

They come in both air-forced and gravity-convection models, but more on that later.

The gravity-convection models cap out at 210 Fahrenheit, and the air-forced versions are slightly higher at 225 Fahrenheit.

LABORATORY AND BENCH OVENS

Progressing up the temperature chain, we get to our regular lab ovens and bench ovens.

The primary distinction between the two is size. Most of them have the same temperature range, 450 Fahrenheit

However, our least powerful bench oven only goes up to 300 Fahrenheit and the hottest up to 550 Fahrenheit.

Still, they are all perfect for preheating material, thermal testing, self-batch processing, part drying, curing, baking, evaporating, or dehydrating various media and soil aggregate, along with many other applications.

THE IDEAL OVEN

TEMPERATURE ACCURACY

Once you have determined how hot you need your oven to go, the next step is determining how accurate you need the temperature to be.

ANALOG CONTROLS

Analog temperature controls consist of automatic hydraulic or bimetal thermostats. They have a lower level of stability, which means they have a broader temperature range at a given setting.

- Hydraulic thermostat models offer convenient temperature dial markings in centigrade and Fahrenheit and combine with Spirit or dial thermometers to control temperature.
- Bimetal thermostat models offer power level dial markings and combine with Spirit or dial thermometers to control temperature.

When cost-efficiency is more important than accuracy, an analog model will suit your needs better.

DIGITAL CONTROLS

Digital temperature controls consist of PID (proportional–integral–derivative) microprocessors. They have a greater level of stability, accurately maintaining temperature setting even in differing ambient temperatures or power supply conditions.

- Digital controllers feature large LEDs that continuously display both process and set temperatures.
- Digital controllers have a lock mode that prevents accidental adjustment.
- Digital ramp and soak controllers can run and repeat heating cycles.

When accuracy is more important than cost-efficiency, a digital model will suit your needs better.

UNIFORMITY & STABILITY

Cold or hot spots within a heating chamber will affect overall accuracy and may affect test results.

- **Uniformity** refers to a unit's ability to achieve a specified temperature setpoint throughout the chamber.
- **Stability** refers to a unit's ability to hold or maintain a specified temperature setpoint over a fixed amount of time.

THE IDEAL OVEN

AIRFLOW

Heat is distributed throughout a chamber either by gravity convection or air-forced convection (forced airflow) to heat the contents.

GRAVITY CONVECTION (NATURAL AIRFLOW)

Gentle airflow movements keep the temperature reasonably uniform within the oven through natural air circulation, making it ideal for simple heating applications like:

- Baking
- Drying
- Conditioning
- Preheating
- Aging
- Curing

Gravity convection, or natural airflow, refers to heated air that naturally rises and provides a gentle circulation.

These ovens are ideal for application where a more substantial air current could damage or displace small or lightweight sample materials.

FORCED-AIR CONVECTION (FORCED AIRFLOW)

Air-Forced ovens use fans to push air across the chamber contents, allowing for more consistent heat distribution and increased uniformity.

They are best for applications requiring accuracy, precise temperature uniformity, multiple samples, and high moisture content.

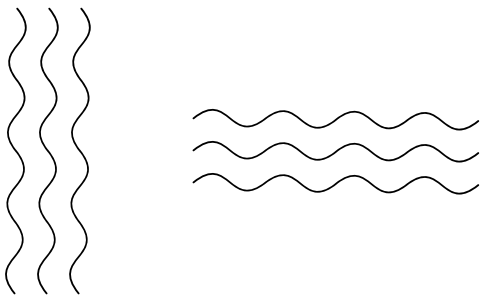
Forced air facilitates quicker moisture removal and is better for:

- Asphalt
- Drying wood
- Soil aggregate
- Protein and starch digestion
- Drug metabolism
- Electronic burn-in
- Epoxy and plastic curing
- Serum protein analysis
- QC batch testing
- Sterilization
- Suspended solids evaluation
- Vulcanization studies

If your work has lots of samples, a high moisture content, or requires greater temperature accuracy, your application could benefit from forced airflow.

There are two forced airflows available for Quincy Lab ovens:

- Vertical
- Horizontal



VERTICAL AIRFLOW PATTERN

Quincy Lab's **Air-Forced ovens** have vertical flow patterns and come in **analog, digital, or digital low-temperature variants**.

Vertical airflow is ideal for drying samples that require a low turbulence environment and excellent temperature uniformity.

Heated air is supplied at the bottom and pushed through the workload by a fan enclosed on the model's top.

HORIZONTAL AIRFLOW PATTERN

Ovens and incubators with a horizontal airflow pattern like Quincy Lab's bench ovens and AE incubator series use forced convection to direct heated air horizontally.

Bench Ovens

All Quincy Lab's bench ovens have horizontal airflow and are available in **analog or digital controls**. Heated air is forced from the *back of the unit to the front*. **Horizontal airflow** is ideal for multiple tiers of products or loaded trays as the air is forced consistently over the top of them.

AE Incubators

All Quincy Lab's air-forced incubators have **digital controls**.

Heated air is supplied at the bottom and *pushed upward* along the sides of the chamber.

The air flows through smaller holes on the side to pass over the samples and throughout the work chamber.

Cross-air flow from the sides is ideal for high-density loads or applications requiring faster warm-thru times.

Because each shelf receives an equal measure of heated air, these units can simultaneously process multiple Petri dishes, flasks, and beakers.

We developed the AE series incubators for laboratories that need a dependable, compact incubator for cultures, test kits, eggs, and biologicals.

They are ideal for physicians' offices, clinical, industrial, and school laboratories, and general-purpose warming cabinets.

THE IDEAL OVEN

SIZE

Bigger is not always better.

Larger ovens take up more lab space and increase daily operational expenses since larger ovens need more energy to reach the set temperature.

For facilities that require larger volumes of small samples, opt for multiple smaller ovens. Deciding on the oven's size means first considering your internal and external constraints:

Consider the internal dimensions of prospective incubators and ovens carefully.

Your unit has to accommodate the size, shape, and number of samples you want to load at a given time.

- If your chamber is **too small**, your workflow is hindered.
- If your chamber is **too big**, you waste room in your lab and money heating unused space.

All Quincy Lab chambers are designed to accept additional shelves and reposition existing ones.

Make sure your prospective unit has or holds the number of shelves your application needs.

Your oven or incubator must fit your available floor space and ceiling clearances.

Be sure to consider the width of available door openings when considering a unit for your space.

- If space is **not limited**, then size shouldn't be much of a problem.
- If space is **limited**, benchtop ovens save considerable floor space.

All Quincy Lab incubators, lab ovens, and bench ovens are benchtop units.

You can even pair our bench ovens with optional stands or cabinets.

THE IDEAL OVEN

FEATURES

What features are important to you? Before diving into ovens with incredible features that you might not even need, remember that a long list of features often translates to a higher price tag.

To help you focus on the essentials, we've listed features you should look for in your oven.

Safety and Reliability

Even though ovens are considered a staple day-to-day lab instrument, these units still pose potential threats such as contaminant generation, overheating samples, and proneness to fire and explosions.

This is why finding reliable ovens with the proper safety features for your application is necessary to protect contents and users.

Search for ovens built with quality materials, reliable thermal and control units, and manufactured within recognized and accepted standards.

Choose a model that offers safety features that prevent overheating, fast heat up and recovery time, and excellent temperature control.

At Quincy Lab, you can find ovens equipped with state-of-the-art safety features, including overheat snap disk protection, digital controls, and digital backups.

Quincy Lab does not offer vacuum, inert, cleanroom, or explosion-proof ovens.

Energy Consumption and Efficiency

Ovens or incubators used for heating and drying processes often run for **long periods** and with **high-temperature** protocols.

Your oven will be the most substantial energy load that will consume **large amounts of electricity**.

That is why selecting ovens with an **optimal energy footprint** can help you with **significant savings** over time.

Look for ovens constructed with excellent **thermal insulation** that reduce thermal transfer rates.

This will prevent the generated heat from leaking out of the chamber and reduce **wasted energy**.

Check the electrical supply capabilities of your building before making a purchase decision.

We base our amp rating on start-up loads, but you may still need electrical upgrades before you're able to run your new unit. All Quincy Lab products are available in either 115v or 230v, except the 51-550 series, which is available only in 230v. Some high-amp 115v units use a NEMA 5-20P plug.

Data Logging Capabilities

Some laboratory ovens offer data logging capabilities to provide users a more consistent production of results.

Ovens equipped with data logs present you with the option to measure temperature profiles during routine procedures.

This enables users to save process values, setpoints, and alarms and help improve or make corrections to a process.

Timer

Timers come in analog versions or as part of digital controls.

Materials

When your application is in food, cleanroom, or your content is aggressive, using strong acids or bases, urine samples, excessive moisture, etc., choose stainless interior (where available) over aluminized steel.

- **Stainless steel** interiors and shelves are more resistant to corrosion but are more expensive.
- **Aluminized steel** interiors are corrosion resistant, don't retain odors, are generally easy to clean, and are more affordable.

Ovens with **double-wall construction** and **good insulation** between the chamber and outer cabinet operate more economically, uniformly, and safely than units with insufficient insulation.

Venting

Check for the ability to vent to the outside or attach to a ducting unit setup.

If your application has undesirable fumes, you will do well to consider venting your oven under a fume hood or porting it outside.

Some applications have such a high moisture content that venting could also be a good idea to improve drying performance.

Safe and effective ventilation may need the services of an HVAC professional to design and install an optimal system.

Maintenance & Cleaning

Select an oven that is easy to clean and maintain.

This will cut down unnecessary disruptions to your laboratory's operations.

Models with easily removable trays and doors that open wide enough for users to clean the oven's chamber allow for easy access.

THE IDEAL OVEN

CONCLUSION

We hope this guide has helped you decide on what oven or incubator best suits your needs. As with any decision, budgets constrain most of our purchase decisions.

At Quincy Lab, we are proud to offer reliable and affordable ovens and incubators made in the USA for your consideration. It's our pleasure to assist you in choosing the best incubator or oven to control your environment.