

It's About You!

Eppendorf PhysioCare Concept®





»Ergonomics for a shaker? I'm not going to lift that!«

Ergonomics goes far beyond the »ergonomically designed chair«. At the beginning of the 1970s, Eppendorf began optimizing the ergonomics of its laboratory equipment. In 2003, we launched the PhysioCare Concept®, which was focused on liquid handling devices such as our pipettes. Today, the PhysioCare Concept covers our entire product portfolio. Ergonomic aspects are part of every new product development. The PhysioCare Concept is based on three areas that can be used as a holistic solution. The concept has been developed to ensure that the workflow in your laboratory is in harmony with your health and your well-being.



Spheres

Ergonomics covers more aspects than often assumed. From the user to the working environment up to the workflow in the laboratory – Eppendorf offers useful, easy-to-implement and practical suggestions on the subject of ergonomics in the laboratory using a sphere model.

> More information: Page 4



Workflows

The PhysioCare Concept offers a holistic solution for optimizing laboratory processes. Ergonomic product features are supported by recommendations for setting up ergonomically designed working areas.

> More information: Page 6

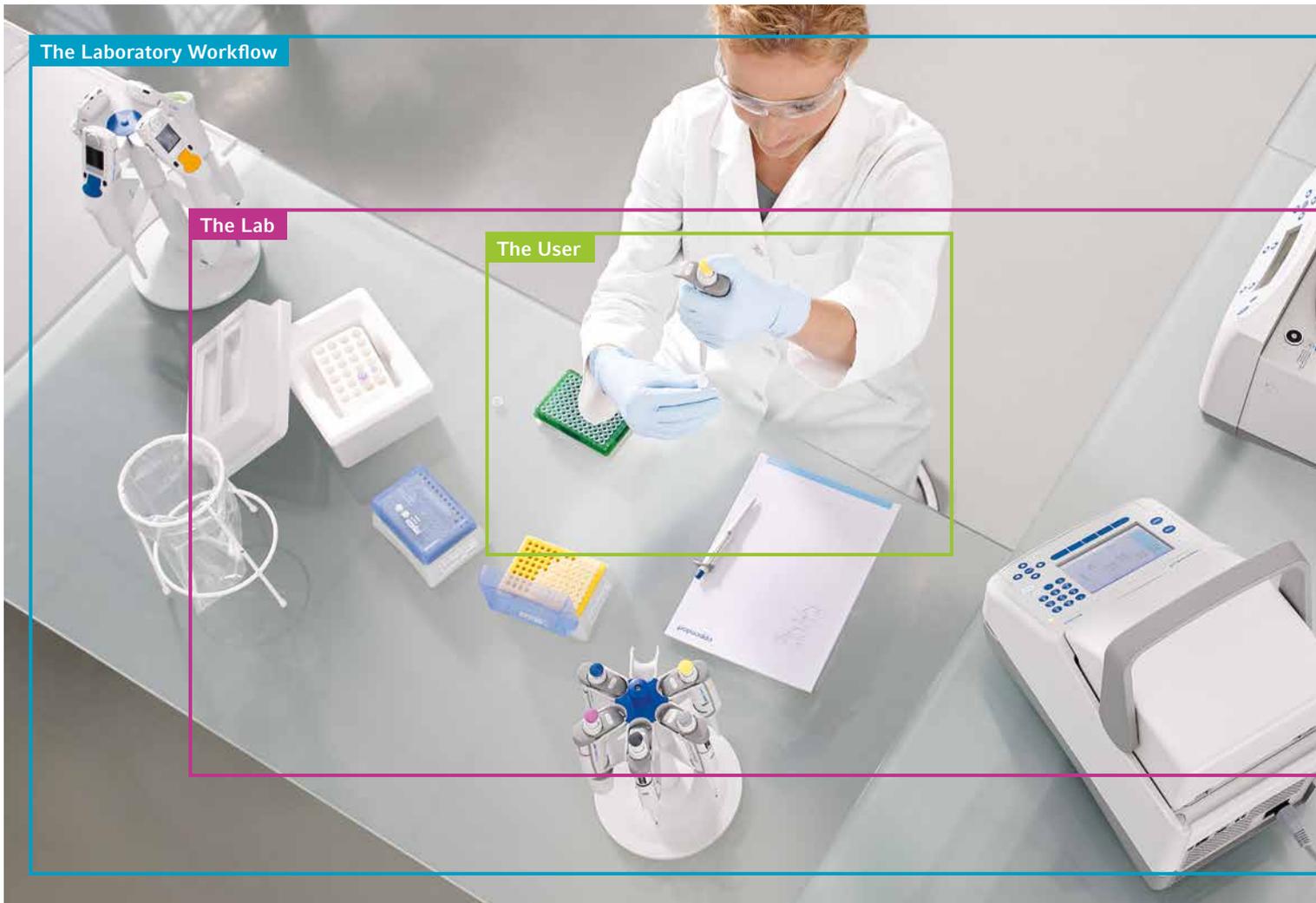


Products

In order to make daily laboratory work user-friendly and efficient, our products combine state-of-the-art technology with ergonomic aspects – tailored to you, the user.

> More information: Page 10

The Three Spheres of the Eppendorf



Everyday laboratory procedures can be optimized by an ergonomic approach. Based on the PhysioCare Concept, Eppendorf considers all building blocks that contribute to an improved working environment.

By providing ergonomic design of our products, we have a direct influence on daily applications and thus on the first sphere, you, the user.

The interaction between user, instruments, and consumables at the bench and thus the second sphere, the working environment, can be optimized with our products.

The arrangement of the instruments and accessories as well as the training is out of our direct zone of influence. This third sphere describes the interaction within the lab. Here, we are happy to support you with tips and recommendations based on our many years of experience.

PhysioCare Concept®



The user:

The products with which the laboratory employee works have a direct influence on the employee and his or her health.

A high amount of force required to operate a pipette or a device, and displays that are difficult to read or a confusing menu are both physically and mentally stressful and can quickly become tiresome.

Such fatigue during daily work should be avoided by selecting ergonomically designed products.

The lab:

Frequent stretching to reach work equipment, a high noise level in the direct working environment and tiring, repetitive movements influence well-being, health and thus the quality of life.

The interaction between user, equipment, and consumables at the workplace should therefore be tailored to the individual needs of everyday working life.

The workflow:

The arrangement of equipment and accessories at the workplace is crucial for an ergonomically designed workflow.

Unnecessary paths and movements should be avoided, taking into consideration general GLP (Good Laboratory Practice) recommendations. This also includes the interaction between the various process steps and the documentation of the results. In many process chains, »one-way street controls« are required or at least recommended for the sample run.

Trials caused by a non-optimized work process or lack of documentation, cause stress, both subjectively and objectively.



> Further information about the PhysioCare Concept:
www.eppendorf.com/physiocare

Workflows & Processes

An important building block in the PhysioCare Concept is optimized laboratory organization.

The following questions are of importance: How do I avoid repetitive, stressful movements, unnecessary paths or frequent interruptions to my work? How do I optimally set up my workplace ergonomically?

The factors to be considered are in part subjective, but there are also some basic factors that should be considered when designing an optimal workspace.

Eppendorf supports ergonomics based on our decades-long experience and our close contact to users in laboratories worldwide. We want to support you with useful, easy-to-implement and, above all, practical suggestions.

Benefits

- A** When using aerosol-tight caps or lids for your centrifuge, ensure that they are easy to use – for example, they do not require multiple revolutions to close.
- B** Larger devices that are used by more than one person should be placed in a central location in the laboratory that is easily accessible.
- C** One dedicated contact person per device enables a reduction in training times, e.g. for new colleagues.
- D** The pipettes should be placed within direct reach as they are frequently used work equipment.
- E** Smaller devices, which are used frequently, should be located max. 50 cm away from the user so that they are easily and quickly accessible.
- F** The use of printed labels (e.g. with sample name, concentration, date, owner, or even with a barcode) for labelling tubes enables their safe identification and assignment.
- G** For different sample types (e.g. buffers, enzymes, samples), different colored tubes or plates can be used for faster and unambiguous differentiation.

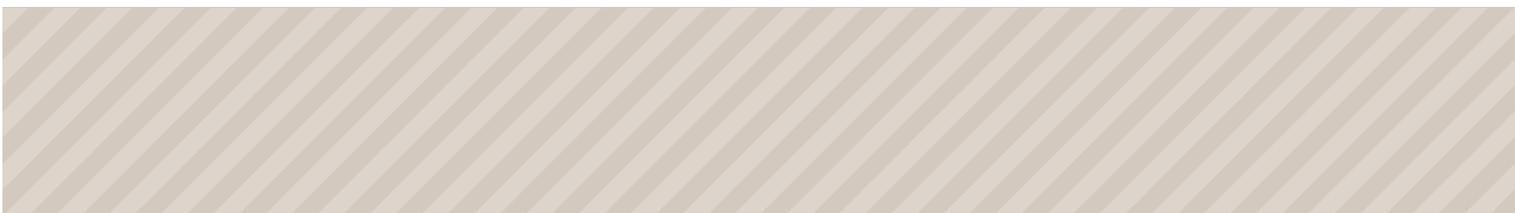


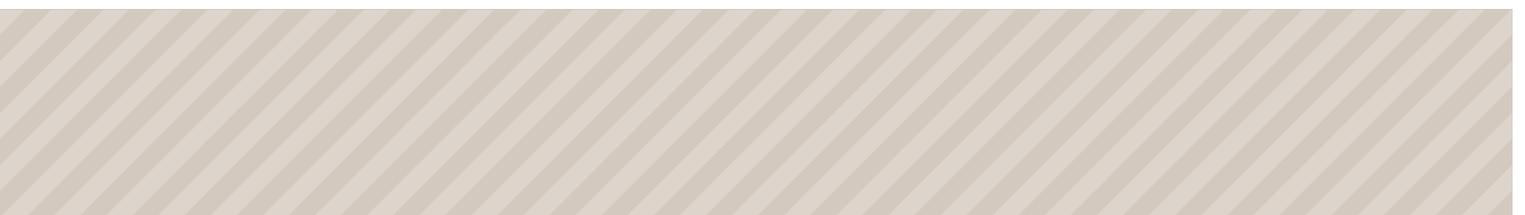
> For more information on workflows, please visit:
www.eppendorf.com/physiocare-workflows



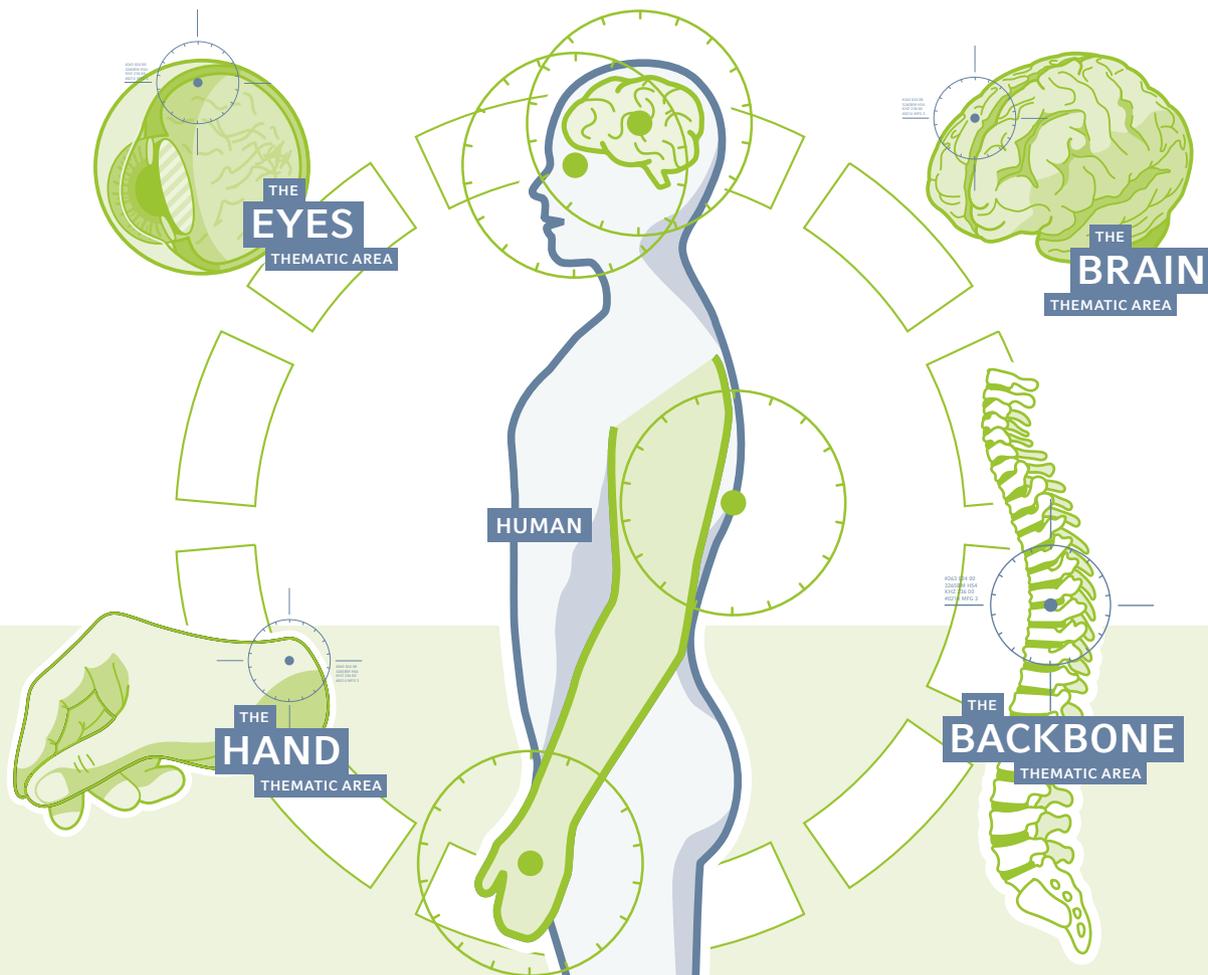
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We Care About You



The Eyes

The eyes are our optical sensors for the brain. Every day, an enormous amount of data is absorbed and processed by our eyes. Structured and intuitive information styles relieve the eyes and the brain. This results in less stress and fewer mistakes – and better results.

The Hand/Fingers

Our fingers are one of the most important ways to work and interact with our environment. Especially in the lab, your fingers are your primary tool to work with. Mechanical stress or even damage is the major risk.

The Brain

The brain is the human database where all information is collected and decisions are made. The less stressful and complex your daily work is, the more effectively the brain can control all processes.

The Backbone

The backbone is the stabilizer of our body. Many benchwork steps in the lab have an impact on the backbone. The more worksteps you perform in an ergonomic manner, the less stress you place on your backbone.

Product Design



Ergonomic product features are still reduced to well-formed handles, knobs, or round corners. But being comfortable to hold, doesn't make a product a 100% ergonomic. Ergonomics considers the usability in a holistic approach as well as in the context of today's increasing human-machine interaction. Still, an ergonomic product design is a good starting point for selecting your future lab equipment.



Does your pipette fit your hand?

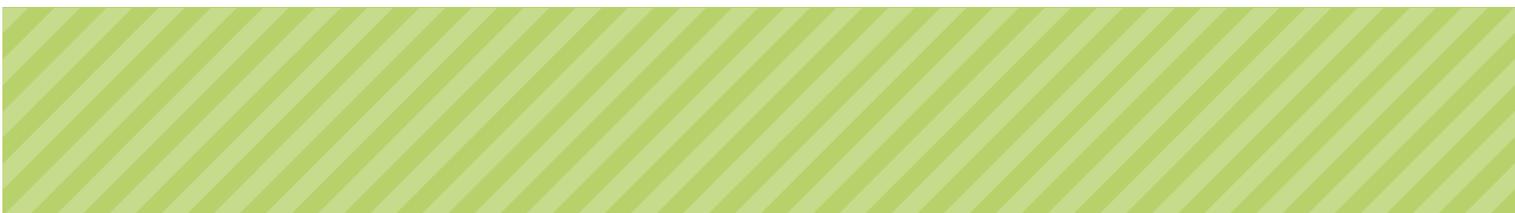
The handgrip of a pipette should fit the user's hand. After all, human hands come in assorted shapes and sizes, so a pipette's handgrip needs to accommodate various forms. An ergonomic design of this part of the pipette is crucial for stress-free working hours. The ejector button and finger hook need to be in comfortable reach for your fingers.

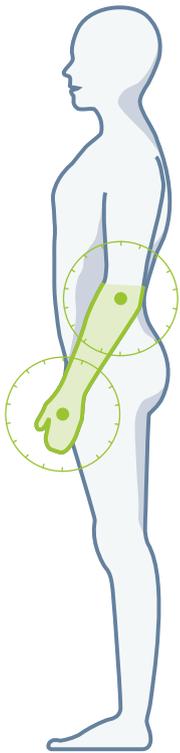
Missing the balance point?

Especially electronic dispensing instruments can very often be top-heavy due to their battery. When working with 96-well or even 384-well plates, this results in wrist stress as the human hand tends to counterbalance the instrument while you complete your tasks. The dispensing tool should have a handrest designed to let the instrument remain balanced in your hand, so even a long dispensing series won't pose a problem.

Busting the freezer door open?

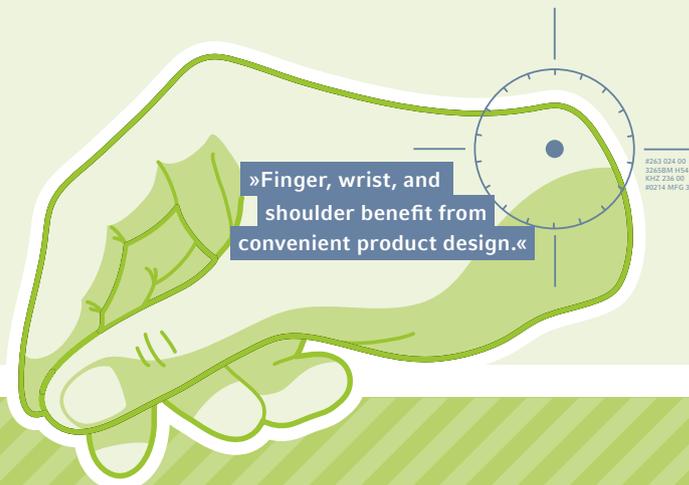
If all you have is a small, twig-sized handle or just a bar or triangle to grab hold of, you need to apply quite some force to get the freezer door open. An ergonomically designed door handle supports you with a good grip for easy opening/ closing processes. Leverage is enhanced by the long shape of the handle.





Is it closed now?

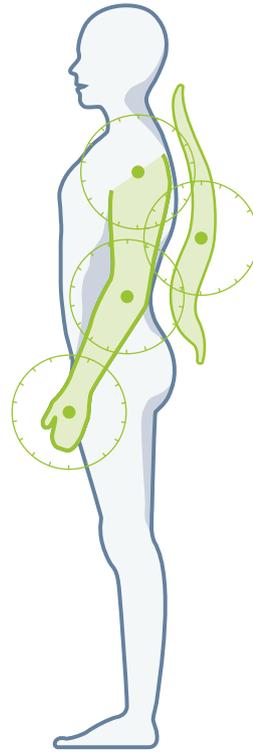
There are different closing mechanisms for cyclor lids. User satisfaction varies as well. Neither turning wheels nor small hinges are comfortable to handle. An ergonomically shaped and free-moving lid handle lets you conveniently open and close the cyclor lid.





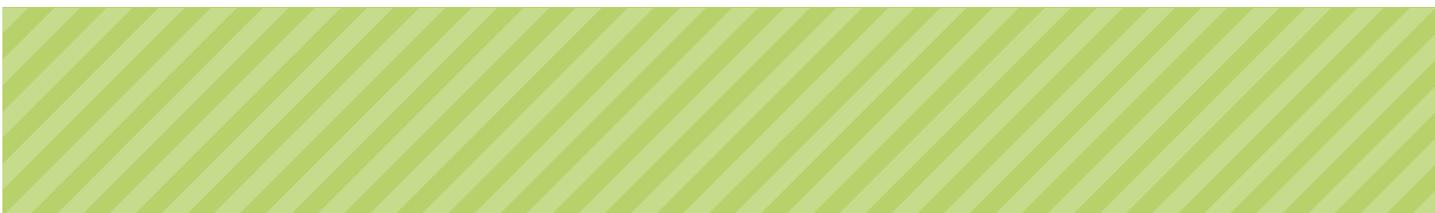
Force Reduction

Nobody wants to spend more force than needed to open and close a tube, handle a centrifuge lid, or rearrange the platform within a shaker. Handling poorly designed lab devices increases the load on your fingers, your hands, and your arms. In the end, your backbone will collect all those forces. Product design should promote less strain on fingers and arms as well as a backbone-friendly setup. This will result in better health for you and less sick days.



You need the flask in the middle of the shaker?

Especially when using a shaker with 15 or 20 flasks in a row, handling specific flasks on the platform can be a challenge. Easy, comfortable access to sample flasks by pulling out the platform offers an ergonomic improvement.





Can opener needed for your tubes?

Some sample tubes have very tight closing mechanisms. The snap-lock vessels are more »lock« than »snap«. Simple, practical, and ergonomic single-hand operation of both microtubes and conical tubes (0.2 to 25 mL) enables fast and easy processing without stressing the finger and wrist muscles.



Still turning the rotor lid?

Traditionally, the threaded rotor lids needed five or even more completed turns to fix the rotor lid in a proper manner. And you have to do this not just once for each daily spinning, but twice: After all, you have to both close and open the rotor. Quick lock rotor lids close with only a quarter of a turn. Besides saving time, you reduce the repetitive stress on your wrist. Just a quarter turn and you're done.



Leaning over your open shaker door?

Classic shaker doors open like your oven at home: You pull down the door and reach in with your (hopefully) long arms. This process is not very comfortable and blocks quite some space in the lab. Slide-up doors provide easy, direct access and limit the amount of force you have to apply to open them.



Leaning on the lid to close the centrifuge?

Many people have gotten used to applying a lot of force to get their centrifuges to close. But this puts a lot of stress on their backs and wrists. Especially for multipurpose centrifuges, the closing mechanism of the centrifuge lid should require very little force. It should only take a slight push with your fingers to get the lid to start closing.



Where's the screw driver?

Many mixers offer exchangeable blocks to accommodate different vessel formats. Quite often, the fixation process is done by a screw driver. This process takes time. The tool-free quick release system makes the block exchange very fast and easy. Just press the lever on the front of the block – no tools are needed; you're done in a matter of seconds.



»Ultimately your backbone profits when your fingers and arms need less force.«

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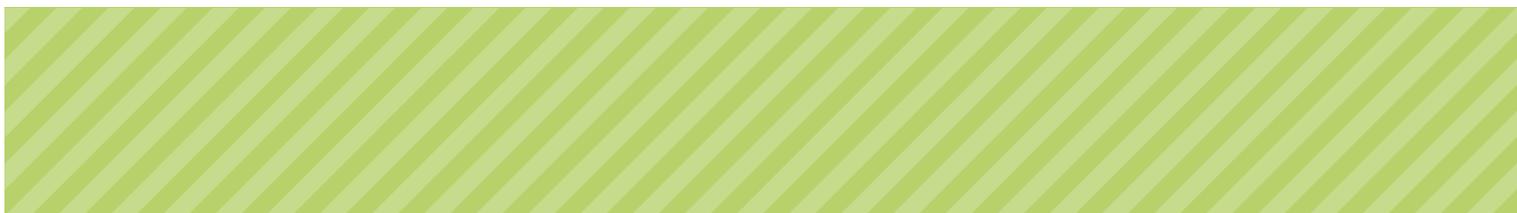
Ease of Mind

Science is stressful – lab life is full of quick decisions and a lot of jobs to be completed in parallel. All aspects that reduce the stress level in the lab, like less noise, easy identification, or comfortable automatic recognition, help. Focus your energy on the scientific success.



Is the color there to make a fashion statement?

The standardized, specific color code on the pipettes let you quickly and easily identify the volume class you need when selecting a pipette. Blue, for instance, indicates a pipette with a 1,000 μL volume class, yellow is one with 100 μL . Most pipette suppliers now use color coding.



What exactly is my sample?

Over the years, scientists produce hundreds and thousands of samples. All tubes look the same. Using different colors for the microtubes helps you sort and find your samples again: DNA samples are stored in clear tubes, for instance, protein samples are stored in blue tubes, and buffers are stored in yellow tubes.



Getting annoyed by the roaring centrifuge?

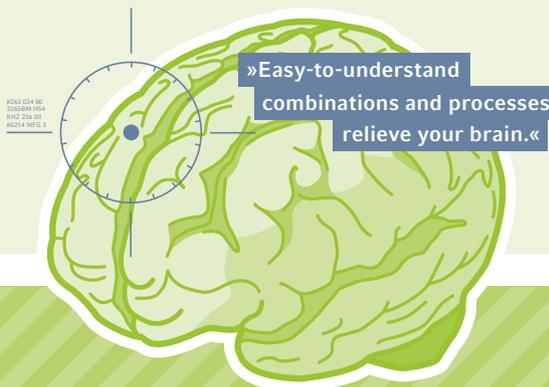
Many centrifuges, particularly older ones, but not limited to them, create a lot of noise during spinning. As many scientists save time by not using the rotor lid, the noise is even higher. Silence is golden – especially when working next to the centrifuge. Check the noise level before deciding on a specific instrument.

Annoyed by the loud freezer in your lab?

Many ULT freezers are located in hallways or even in the basement to reduce excess noise in the lab. But that means having to take a long walk every time you need a sample from the freezer. Noise reduction of the freezer through air guide plates and smart air channeling at the back of the instrument can result in comfortable working conditions near the ULT freezer.

5 mL with a 0.5 mL Combitip?

Overloading of tips or Combitips may result in loss of sample and potential contamination of the instrument. You can manually define the maximum volume to reduce the risk. An integrated sensor at the bottom of the instrument automatically recognizes the Combitip volume type and displays this information so work continues smoothly. No need to manually adapt anymore.





Error Prevention

How often have you lost the current well in a 96-well plate during dispensing and needed to recalculate the last position? The dispenser counts independently from you, and color codes avoid trial-and-error. Smart instruments support you to reduce the risk of mistakes and ultimately improve your results and their reliability.

Which tip fits my pipette?

Reading the labels or checking in the manual are some ways to figure out which tips fit the best to your pipette. But that takes a lot of time. When you work with a set of different pipettes, you want to be able to quickly and conveniently select the correct tip. The standardized color codes used on a pipette correspond to the color codes used for the tip and the tip box tray: So, for example, the blue used to mark 100–1,000 μL pipettes will guide you to look for a blue box with 1,000 μL tips.



Is there any sense in the color code of the Combitip?

The standardized, specific color codes used for the Combitips® enable an easy and fast identification of the required Combitip volume class. Blue, for instance, indicates a pipette with a Combitip with a 1,000 µL volume class.



Annoyed by complex menu structures?

Standard photometric measurements should be as easy as possible. Just one »zzzt« and you have your results: Guided handling for easy processing of your samples.

Still turning and turning?

Many connectors require screw threads, resulting in time-consuming handling. Quick release systems let you comfortably and quickly connect your sensor cables and flexible tubes.

Finished dispensing step no. 15, 16 or 17?

Remember the last time when you were dispensing a buffer in your 96-well plate and your colleague distracted you with a question? After you answered it, you stood there wondering: Where did I leave off? Integrated step counters in the dispensing instrument provide helpful information about the number of wells you've filled and where you've left off.

Does programming take forever?

Programming electronic dispensing tools can be quite difficult: Go to the menu, select submenu three, switch to the fourth function, and select the volume class. A central selection dial lets you quickly and easily change operating modes.

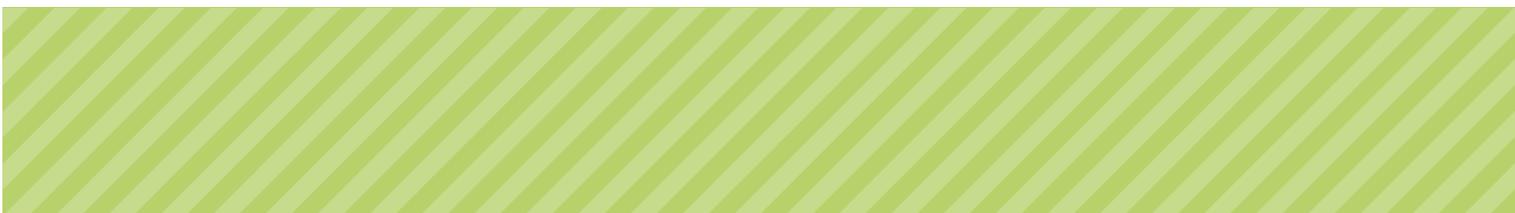


»Mistake-proof design
relieves your eye and mind.«



Readability

As humans, the reading of information is one of our most important data sources. Clear indications of what to do where, easy-to-read settings, and intuitive interfaces save time and energy based on easy readings.





Tiny display, difficult to read the settings?

Getting a pipette to weigh as little as possible means making all of its parts lightweight and small. But whereas a lightweight pipette helps your arm and finger muscles, a tiny display just strains your eyes whenever you try to read it. A four-digit display with a magnifying window lets you easily identify the volume of your pipette.

Struggling with cables?

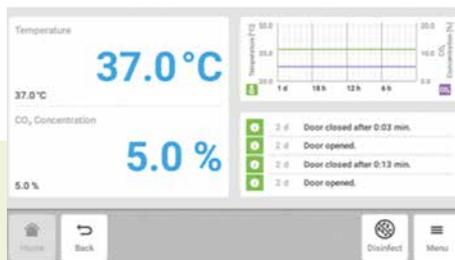
Are you having to turn the incubator to the left and right just to get everything plugged in? 100 kg can get very heavy... To make connecting the device as easy as possible, all cable interfaces should be located at one corner of the incubator to provide convenient access.

Too many labels to read manually?

Proper labeling is recommended to make reading as easy and reliable as possible for everyone. Printed labels affixed to vessels may contain either plain text, a barcode, or both. Smart labeling of your high-value samples is crucial for safe identification and ultimately for safe results. Barcodes are the next step to make safe sample identification as easy as possible.



Innova® S44i shaker



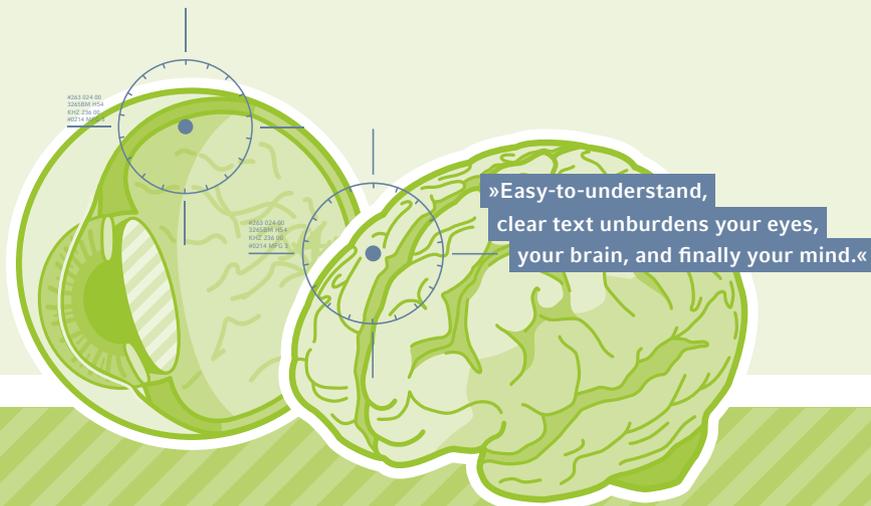
CellXpert® C170i CO₂ incubator



CryoCube® F740hi freezer

Who knows how to...?

Standard labs use a broad range of different instruments. Every instrument has a different kind of interface. Interaction needs to be learned. Standardized user interfaces make handling of different devices as easy as possible. You know one, you know them all. Equipment touchscreens should provide an intuitive arrangement of all information.





Product design

Check if your instrument or consumable has a well-designed ergonomic approach:

- > Well-formed handles, knobs, or round corners
- > Low force needed to perform movements like opening and closing of lids or doors
- > Color-coding indicating a match for ease of understanding
- > Low noise levels for a good working environment
- > Intuitive software interfaces for easy settings

Usage

Daily routine usage of equipment can be further improved:

- > Check if everyone knows how to use the equipment in the best way, offer training
- > Define a fixed location for the operating manual
- > Optimize instrument control software for dedicated use
- > Ensure sufficient space around the instruments for safe positioning of samples and accessories

Workflow

Optimize your processes and workflows in the lab:

- > Position different instruments within the lab to achieve the greatest possible efficiency
- > Document your steps within the protocol in a reliable manner, preferably in a digital lab notebook
- > Provide reliable consumable stock in the lab which fits the daily/weekly demands, incl. a dedicated person in charge of this stock

Insights

Ergonomics is not limited to single topics like design, usage, or workflow. The holistic approach, symbolized by the PhysioCare Concept, combines a broad range of aspects. Improved ergonomic aspects provide more reliable results by easing access and effort, reducing mistakes, and much more.



»But the major benefit of improved ergonomics is your well-being and your health. Ergonomics is about you.«

Make your lab a better place.

You want to find out more about the specific ergonomic aspects of our Eppendorf products and how they can help you develop a more ergonomic workspace?

Visit our website:

> www.eppendorf.com/physiocare



How ergonomic is your lab already and where can you improve?

Download your personal checklist for improved lab ergonomics for free:



> www.eppendorf.com/physiocare-checklists

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