eppendorf

Clear Evidence

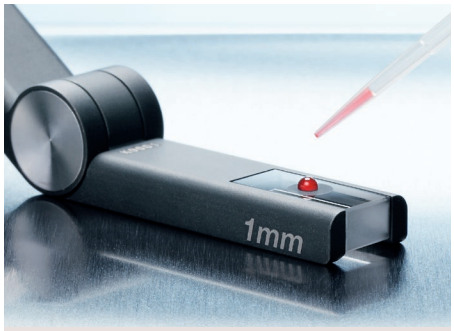
Premium solutions for forensic science applications

»There is nothing more deceptive than an obvious fact.«

Sir Arthur Conan Doyle

Forensic science plays a crucial role in our legal system with life-changing decisions often based on forensic data. It is a unique scientific discipline that faces unique challenges. Forensic samples are often the most difficult specimens to process. They are typically limited in quality and quantity, can be environmentally exposed, and may require purification from difficult substrates that contain PCR inhibitors. Extensive sample preparation is also required with DNA analysis. Obtaining accurate results from difficult samples is one of many everyday challenges in forensics. Forensic scientists also face intense regulatory requirements, increasing throughput demands and limited resources.

Reliability
Reliable sample preparation can be a challenge as forensic samples are often very difficult to process. The consumables and devices for processing and storing forensic samples should therefore be selected very carefully since they can directly influence the quality and reproducibility of the results.



Precision
Minimizing the technical influence on the results is crucial in all steps of the forensic DNA analysis process. Limited sample amounts or low sample volumes are routine situations for forensic DNA typing. In these cases, the choice of precise equipment is of utmost importance. Only then, accurate and correct results can be obtained.

Certainty
Even smallest traces of DNA contaminants could lead to false results. Avoiding contamination during sample handling is as important as the use of contamination-free reagents and consumables, e.g. tubes and pipette tips. Continual quality control including the qualifying of materials used in the workflow significantly contributes to the certainty of results.

No Room for Doubt

Sometimes, nothing less than infallibility will do. For example, when it's a question of DNA traces that could lead the police to a perpetrator. In cases where there is no room for doubt, flawless proof and reliable laboratory work are critical.

In most modern countries, far-reaching and sometimes even life-changing decisions often depend on data or expert opinions from government laboratories and regulatory authorities. Chemical and biological test results determine, for example who the father of a child is, or whether someone will be convicted of a crime because a DNA sample has revealed him or her to be the perpetrator.

In cases like these, the standard of infallibility is a great responsibility for all those involved. They must be able to produce conclusive, robust results, since important decisions depend on their data.

Your tools must be infallible, too
In these applications, the samples themselves are frequently material that is very difficult to process. For example, if there is only a minimal amount of evidence material available, the results must be absolutely reliable.

With DNA analysis in particular, the quality of the results stands and falls on the purity and freedom from contamination of the materials used in testing. Vessels used to store and process samples must meet the highest demands of quality and purity and may not contain any foreign DNA; otherwise, the test results – the »genetic fingerprint« – could easily point in the wrong direction.

Sample storage and the monitoring of storage conditions are also important aspects of quality assurance in laboratory work. A defective freezer, for example, could mean the irreplaceable loss of sample material. When laboratories purchase devices and consumables from Eppendorf, they also buy security: the certainty that they are using the best possible tools and can rely on the results these products attain.

Eppendorf guarantees the greatest possible purity and freedom from contamination in its consumables owing to state-of-the-art production technology and cleanroom production. All its one-way products are made of top-quality raw materials and produced using the highest quality and purity standards. In addition, we can deliver our products in different grades and classes of purity, all of which are certified and traceable.

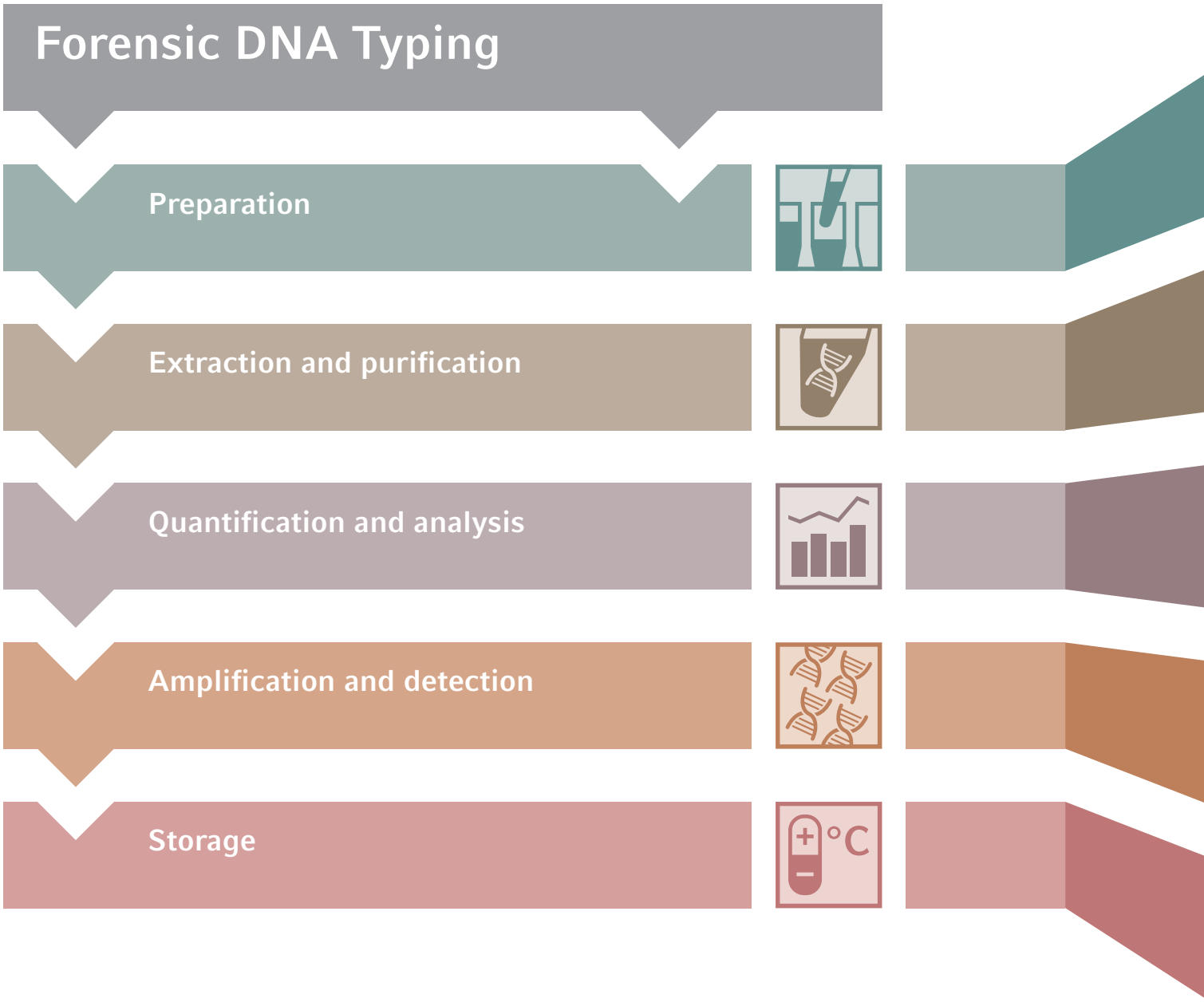
Greatest purity of consumables for error-free results
With the Eppendorf Biopur® grade, Eppendorf has developed a purity standard for laboratory consumables. Products with the Biopur purity grade are used everywhere where protection from contamination is especially important. A complex, automated production process ensures that our consumables are manufactured in a nearly contactless manner to exclude contamination through human contact or similar sources.

The high degree of automation across the entire production process also ensures the conformity of the individual batches. Stringent internal and external inspections contribute to guaranteeing consistently premium quality in our products.

Absolute reliability and control
In order to safeguard samples or biobank material optimally, Eppendorf places great value on the absolute functionality of its devices. Certain applications call for additional security in the form of monitoring. That's why our TCA-3 Temperature Monitoring System is available for all our ultra-low temperature (ULT) freezers. It offers both a temperature monitoring system and documentation. Data generated by this solution is continually analyzed: in the event of temperature deviations from the established parameters, an alarm system sends a warning to the operator immediately. The approach ensures the greatest possible security - and is our contribution to applications that must meet the highest standards.

> Are you interested in learning more on the ep*Motion* and its use at laboratories? Please scan the QR code or visit the Eppendorf YouTube™ channel.

Forensic DNA Typing




Pipettes and tips


Tubes and plates


Centrifuges

Thermo mixing devices


Centrifuges


Pipettes and tips


Tubes and plates


Automation

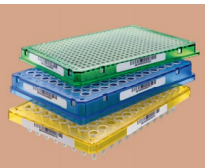

Photometers


Cuvettes

Microvolume Cuvette


Reader plates


Thermocyclers


PCR consumables


Photometers

Microvolume Cuvette


Freezers


Concentrators


Freezer boxes


Deepwell plates

Preparation

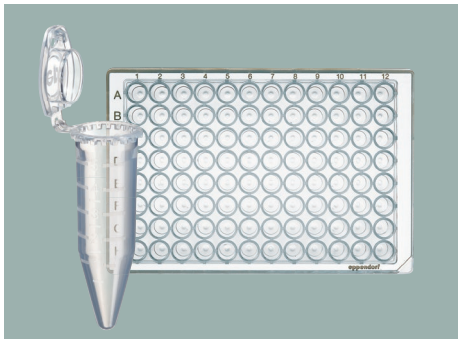
In forensic DNA analysis, the primary material can come from a vast variety of sources and brings along a lot of unique challenges. No single molecule can be waisted lighthearted, no potential source of contamination can be uncared for.

Electronic pipettes allow fatigue-free pipetting and minimize pipetting errors. Where high sensitivity and reproducibility are essential, ep Dualfilter T.I.P.S.® build the perfect system with Eppendorf pipettes for contamination-free pipetting by practically 100 % retention of aerosols and biomolecules.

Pipettes and tips

Electronic pipettes
> Intuitive operating concept for quick and easy work
> Fatigue-free pipetting
> High precision and accuracy

Pipette tips
> Contamination-free pipetting with ep Dualfilter T.I.P.S.
> Maximum reproducibility by ultrahomogeneous surface of epT.I.P.S.® LoRetention
> Certified sterile and PCR clean



Tubes and plates

> Highest sample integrity due to the usage of high quality virgin raw material and the avoidance of any plasticizers, slip agents, and biocides during manufacturing
> Five certified purity grades available
> OptiTrack®: Faster well identification and less pipetting errors in plates via high-contrast alpha-numeric labeling
> Eppendorf LoBind® material available

Thermo mixing devices

> Two-in-one instruments for combined incubating and mixing
> Superior mixing performance due to ^{2D}Mix-Control
> Simple and intuitive operation using pre-defined temperature keys
> Eppendorf ThermoTop® reliably prevents condensation

Purification and Extraction

DNA needs to be extracted and purified before it can go into analysis. This step is especially crucial—if DNA is lost or a bias for certain DNA regions occurs, it can never be corrected in the following steps. Also, PCR inhibitors need to be separated here to guarantee powerful amplification of the target DNA and to avoid false-negative results.

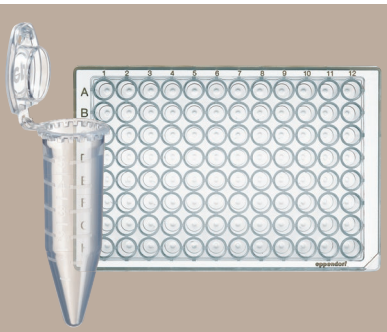
Ramp up your centrifuge capacity to 48 tubes in a very small footprint. The aerosol-tight rotor helps to prevent contamination.

Centrifuges and rotors

> Small footprints and low access heights
> Large variety of centrifuges and rotors available
> Eppendorf QuickLock®—System for quickly opening and closing the rotor lid
> PTFE-coated rotors for increased chemical resistance available

Automation

> ep*Motion*® systems are available in three models, all designed with minimal footprint
> Self-checking robotic system, that reduces startup time
> High precision dispensing tools for 1 to 1000 µL in one or eight channels (autoclavable)
> Flexibility for Eppendorf ThermoMixer®, vacuum or magnetic separation, UV & HEPA



Tubes and plates

> Eppendorf LoBind Tubes and Plates minimize sample loss
> High *g*-Safe® centrifugation stability
> User-friendly lid design of the Eppendorf Tubes® allows one-handed operation
> Five certified purity grades available

Quantification and Analysis

Only a reliable analysis of your DNA concentration and integrity allows you start the following steps with the correct concentrations. This analysis will not only show the quality of your DNA sample, it will also show the quality of the previous steps.

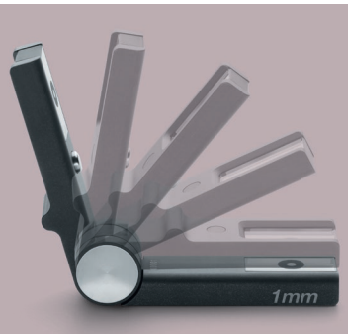
Reliable and precise sample positioning thanks to innovative surface coating. The Eppendorf µCuvette® G1.0 features an optical path length of only 1 mm, which makes it ideal for low sample volumes.

Photometers

> Data transfer via USB interface
> Xenon flash lamp with very long service life
> Help box with explanation of each individual step in five languages
> Direct printer port available
> Perform UV/Vis, Vis, fluorescence or kinetic measurements
> Designed to work with low sample concentrations

Uvette®

> Suitable for measuring small volumes (≥50 µL)
> UV and Vis-transparent between 220 nm and 1,600 nm
> Two built-in optical path lengths in a single cuvette-just turn
> Available in individually packaged PCR clean and protein-free quality



Eppendorf µCuvette® G1.0

> Microvolume measuring cell for measuring 1.5 - 10 µL sample volumes
> Low self-absorption (≤0.05 A @ 260 nm)
> Hydrophobic surface coating on quartz glass for precise formation and positioning of the sample volume

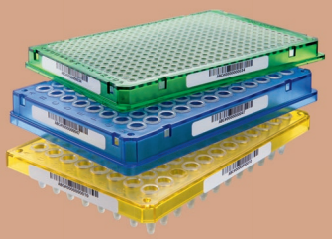
Amplification and Detection

The power of PCR with its logarythmic amplification is still unbeaten in forensic DNA profiling. A reliable amplification of the relevant DNA fragments is a prerequisite for the genotyping of the sample. Getting these results quickly can be crucial in forensic laboratories.

Precise and accurate temperature control combined with efficient prevention of evaporation gives your PCR the reliability you need.

Thermocyclers

> Extremely fast heating and cooling rates (up to 8° C/s)
> Ultimate reduction of evaporation
> Intuitive graphic programming
> Gradient blocks with SteadySlope® technology



PCR consumables

> Thin-walled polypropylene wells for optimum heat transfer
> Five different plate colors help to organize your workflows
> Tubes and plates are certified free of any detectable human DNA, DNase, RNase, and PCR inhibitors
> Plates are available with barcode (upon request) and as LoBind version

Photometers

> Data transfer via USB interface
> Xenon flash lamp with very long service life
> Help box with explanation of each individual step in five languages
> Direct printer port available
> Perform UV/Vis, Vis, fluorescence or kinetic measurements
> Designed to work with low sample concentrations

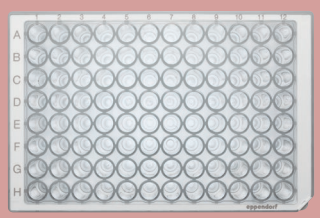
Storage

To be available for future reevaluation, more and more samples will be stored over a longer period of time. More freezer capacity is needed and samples need to be stored at defined conditions, maybe for decades to come!

Smart engineering and highly effective insulation give you a high capacity and dependable freezer.

CryoCube® Upright Freezer

> Preserve outstanding sample quality while minimizing energy consumption
> Quick temperature pull down and recovery times
> Advanced lock and alarm features for improved sample security



Deepwell plates

> OptiTrack: Faster well identification and less pipetting errors via high-contrast labeling
> RecoverMax®: Optimized well geometry for maximum sample recovery
> Robust and precise design allows automation and enables a high *g*-Safe centrifugation stability
> Plates are availabe as LoBind version

Concentrator plus*

> Extremely quiet operation <50 dB(A)
> Chemical-resistant, maintenance-free PTFE diaphragm pump eliminates the need for changing pump oil
> Small footprint saves valuable bench space
> Brushless induction drive and chemical-resistant, stainless steel chamber for trouble-free operation

* in North America: Vacufuge plus

»Eppendorf Forensic DNA Grade – for results you can trust.«

Eppendorf Forensic DNA Grade according to ISO 18385

DNA contamination is one of the main concerns in forensic DNA analysis. To address this adequately, the international forensic community has recognized that there is a need to define and implement standards for manufacturers of products used in forensic DNA laboratories. As a consequence, the ISO 18385 has now been published. It determines the requirements for manufacturing products used in the collection, storage, and analysis of biological material for forensic purposes.

Consumables with the new »Eppendorf Forensic DNA Grade« are now available for sample preparation and PCR setup in forensic DNA analysis. The stringent requirements of the ISO 18385 are fulfilled in the manufacturing process, the production sites and the final products, as follows:

Production

> Minimal interaction of staff due to extensive automation of manufacturing lines
> Restrictive access authorization to production sites and protection due to strict gowning procedures
> Lot-specific production quality control checks and process controls
> Regular checks of production environment for human DNA contamination

Products

> Testing for a short multicopy human DNA fragment (62 bp) by a sensitive real-time PCR carried out by an external laboratory accredited to ISO 17025
> Samples for lot-specific testing are taken at various points during the lot production cycle
> Packaging sizes adjusted to the needs in forensic DNA analysis laboratories

> More information at:
www.eppendorf.com/purity

Beyond the products

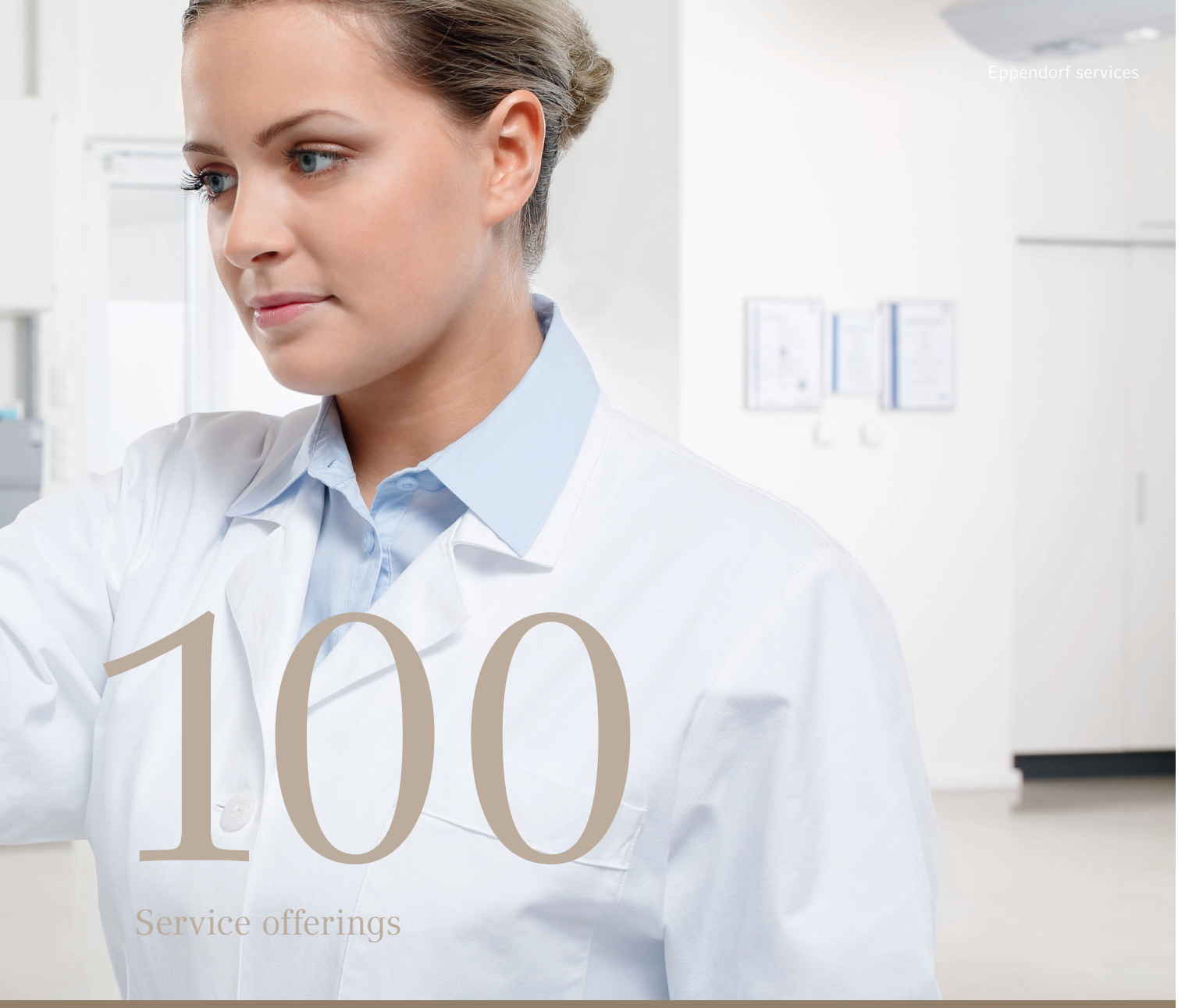
Quality calibration and certification—reliable performance, reliable results.
Pipette and instrument performance can significantly impact forensic analysis.

epServices

Eppendorf has more than 100 globally standardized service products. From pipette calibration to preventive maintenance and our Rotor Assurance Program, we can help you to make sure our products work in pristine conditions in your labs.

From a Quick Check to a Premium Performance Plan package—you can choose from different levels of maintenance and service according to your needs. Just let us know how we can help you and enter a world of possibilities.

www.eppendorf.com/epServices



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Service offerings

Logistics

Especially labs with high throughput need on-time delivery. This is even more important for high-running consumables. Our logistics experts are very successful in getting the right products to you on time—no matter where you are.

Various logistic hubs and warehouses allow us to manage incoming orders efficiently—so you get your order as fast as possible.

Eppendorf Training Center (since 1997)

Optimally serviced premium products alone do not guarantee reliable results. The operator's experience is just as important. With the innovative Eppendorf Training Center, we extend your knowledge and, thus, assure your professional future. In the easy-to-understand and active environment of our practice-oriented seminars, you will learn the operation of our devices, understand specific workflows and receive important hints to run applications in your lab properly. Our experienced application specialists will support you in small groups. Learn something new or brush up your knowledge. Certificates for successful participation will be provided.

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