



DNA collection solutions for human identification

Enhancing efficiency in sample collection, storage, and downstream analysis



The first step is critical

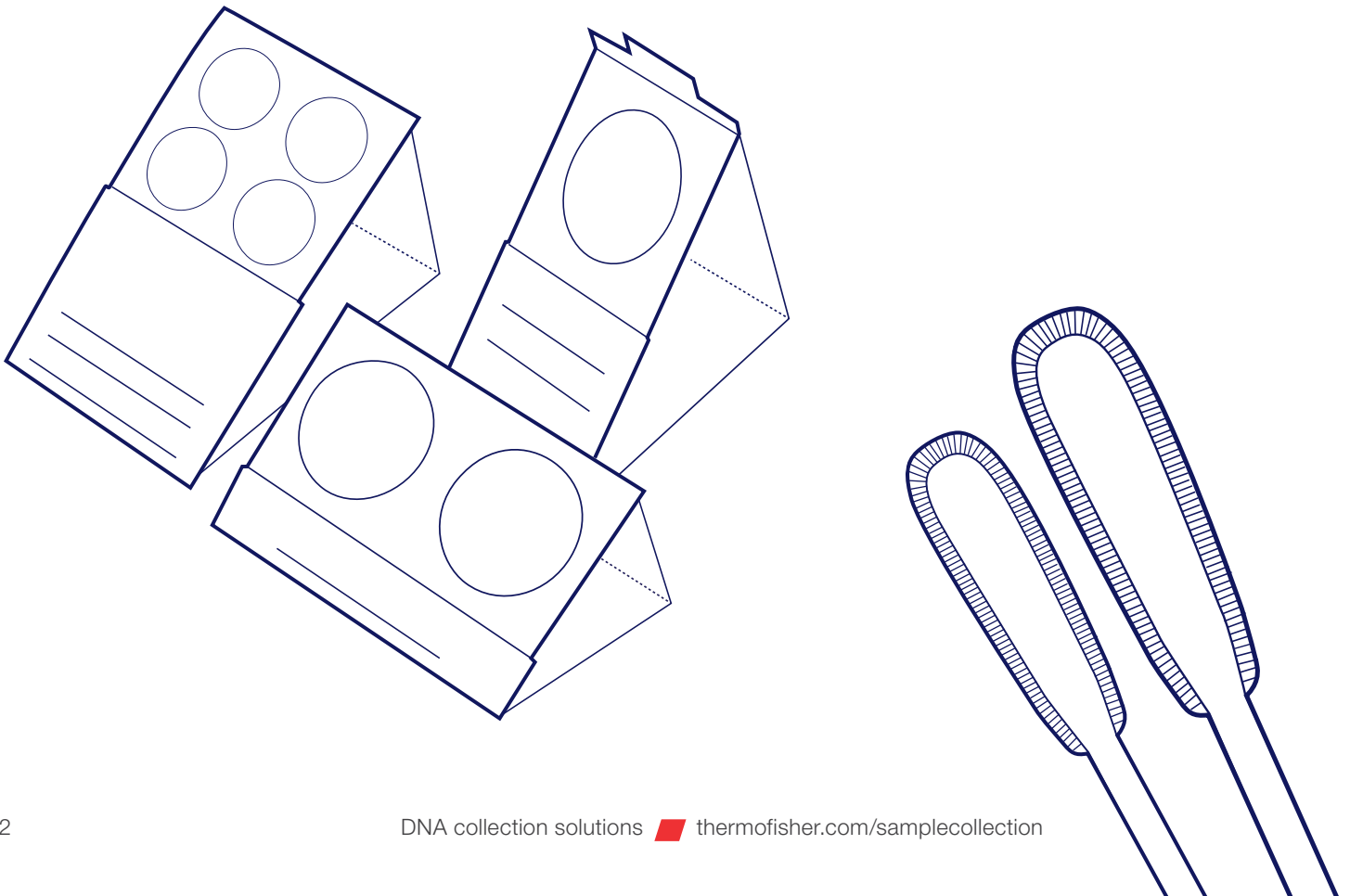
The challenge of DNA sample collection

Before a DNA sample can be processed for human identification purposes, it must first be collected from the crime scene or an individual. For optimal genotyping results, it is critically important that the collection is done with devices designed to:

- Enable efficient, high-quality PCR amplification for genotyping
- Facilitate automation, preservation, and storage
- Maintain chain of custody and sample integrity
- Optimally accommodate challenging samples—rapid absorption capability and excellent sample release are especially valuable with limited or trace amounts of DNA

Increase laboratory productivity with proven collection solutions from a trusted partner

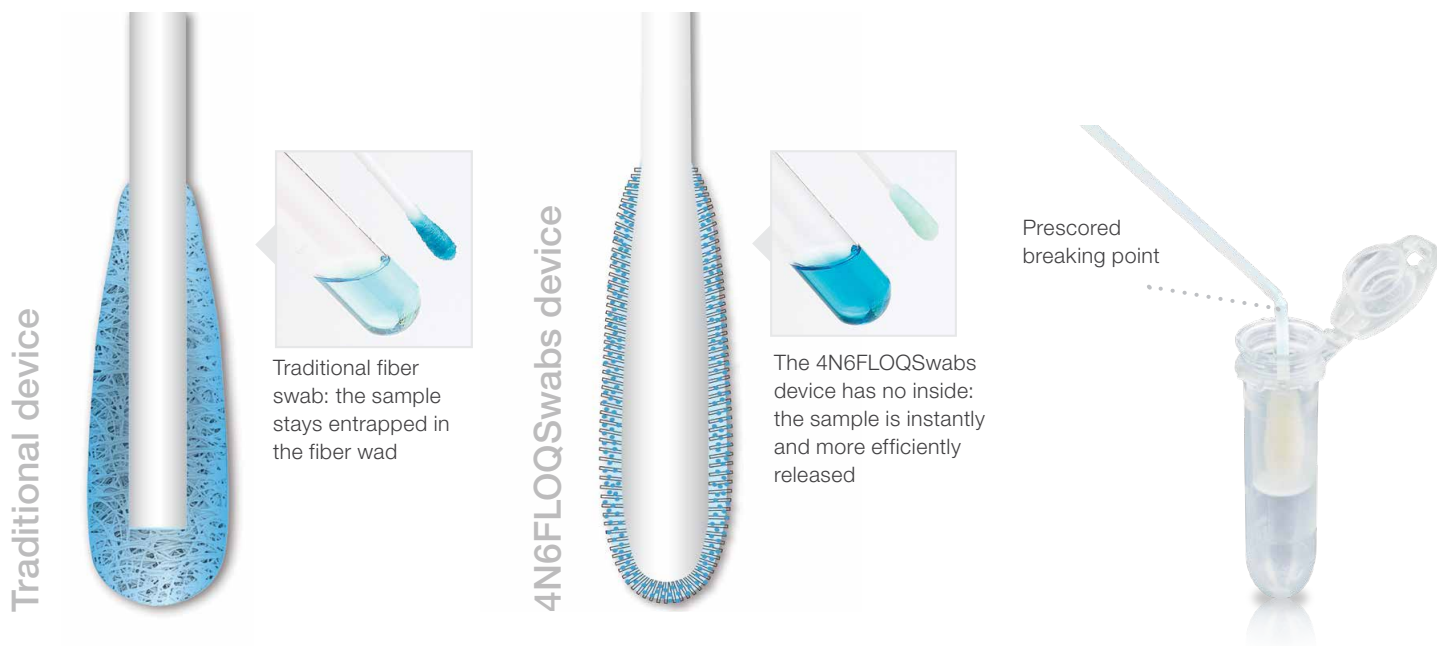
To meet the challenges of DNA sample collection, Thermo Fisher Scientific offers an innovative solution for forensic DNA-grade collection through a collaboration with Copan Italia S.p.A., a leading manufacturer of sample collection and DNA preservation tools. Validated on our human identification (HID) analysis workflows, the Applied Biosystems™ NUCLEIC-CARD™ Collection Device System and Applied Biosystems™ 4N6FLOQSwabs™ DNA collection devices enable forensic and paternity laboratories to help maximize efficiency and achieve high-quality results.



4N6FLOQSwabs devices

Optimized for collection of forensic samples

4N6FLOQSwabs collection devices are specifically designed for DNA collection in forensic applications such as human identification, databasing, sexual assault testing, paternity testing, and evidence collection. These swabs are ideal for collecting sweat, semen, blood, skin, and other environmental traces found at crime scenes. 4N6FLOQSwabs collection devices utilize proprietary flock technology to help maximize DNA collection and elution efficiency. The perpendicular nylon fiber design acts like a soft brush that facilitates improved collection of cellular material. Unlike traditional fiber-wound swabs, 4N6FLOQSwabs devices have no internal absorbent core to disperse and entrap the specimen—the sample stays close to the surface for faster and more efficient elution.



Key features

- Designed for rapid absorption and exceptional sample release, thus enabling increased sensitivity and performance for both reference and casework samples
- Prescored breaking point allows for easy breaking of the swab into tubes for processing
- Certified free of DNase, RNase, and amplifiable human DNA—the swabs use only selected inhibitor-free components



ISO 18385:2016 compliance minimizes the risk of detectable human nuclear DNA contamination in products used by the global forensic community.

4N6FLOQSwabs devices (cont.)

Casework and reference workflows

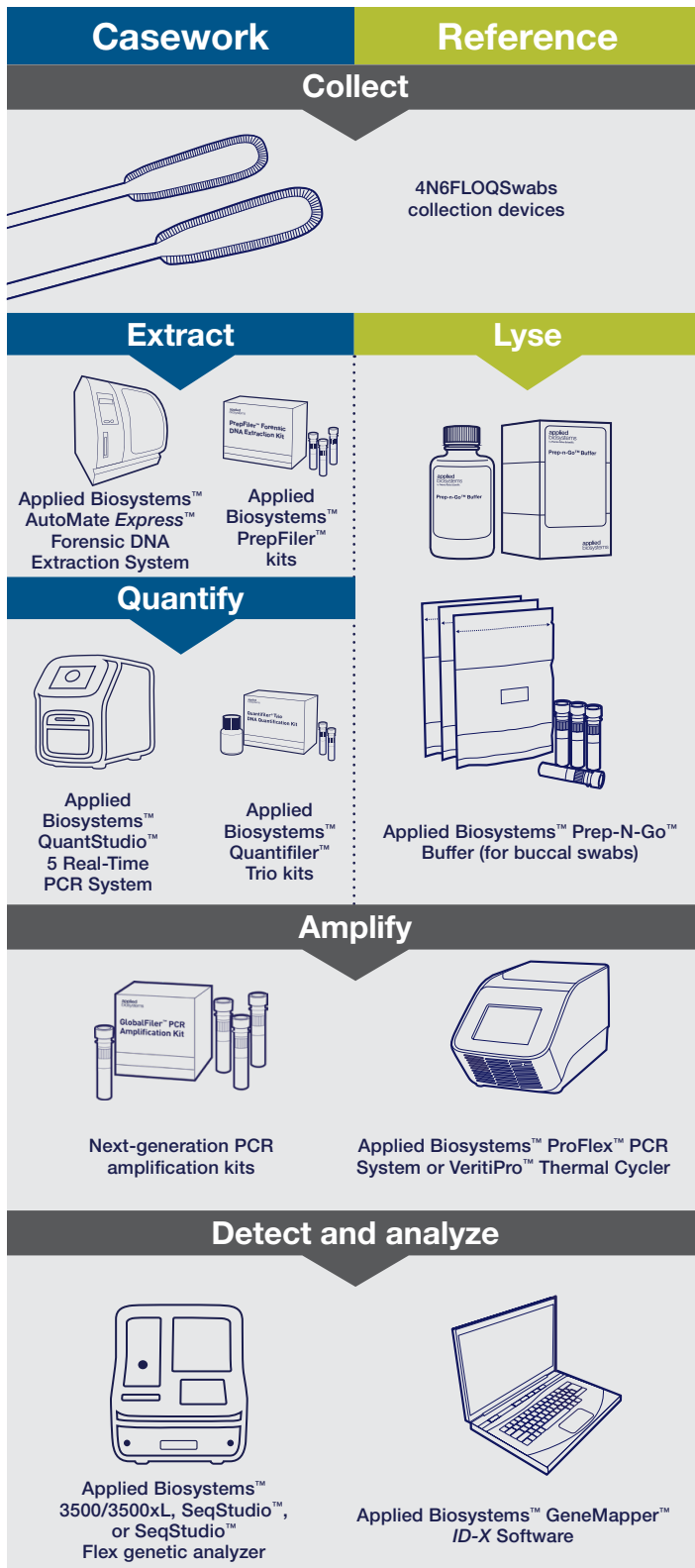


Figure 1. Our complete, integrated workflow for DNA samples using the 4N6FLOQSwabs collection device. This workflow enables laboratories to go from sample to answer with confidence.

Workflows

Thermo Fisher HID products offer a complete, integrated workflow for reference samples using 4N6FLOQSwabs collection devices. For single-source samples using these devices, laboratories may go from sample to result in as little as two hours.

Reference samples are single-source and from a known contributor. The sample type is consistent, usually buccal swabs or blood on filter paper. The amount of DNA is usually high, and the sample is fresh. With such samples, the direct workflow is optimized to maximize the first-pass success rate, in a minimal amount of time.

Casework samples are unpredictable. They often are collected from highly variable substrates and include different sample types. These samples may have a low amount of DNA and low-quality DNA; they may include a complex mixture, or be compromised or aged, and their probative value may be unknown. Therefore, it is important to maximize DNA collection and elution efficiency.

4N6FLOQSwabs are validated for direct PCR amplification. Reference samples collected with 4N6FLOQSwabs collection devices can be easily processed using the Prep-n-Go Buffer, eliminating the need for extraction and quantification (Figure 1).

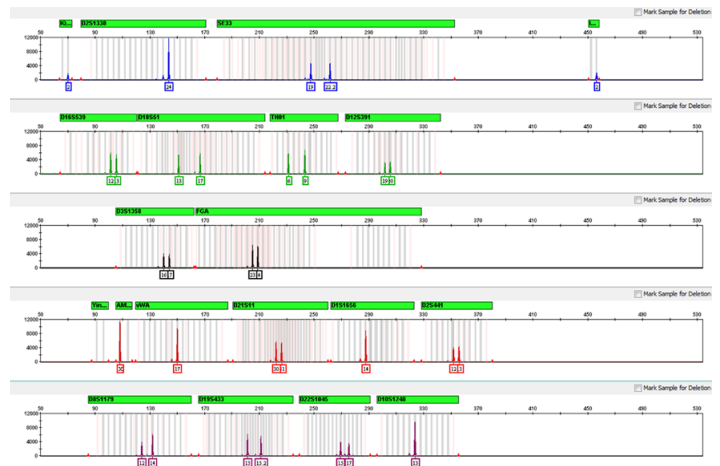
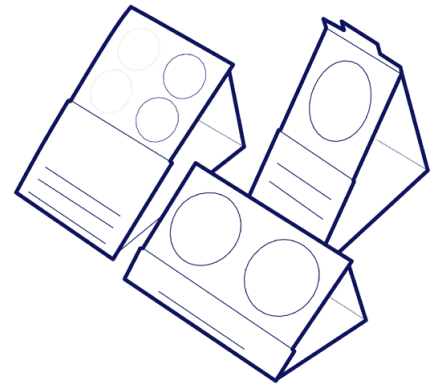


Figure 2. An example of a profile generated through a casework amplification workflow. A buccal sample was collected with the 4N6FLOQSwabs device, and extracted and quantitated using the Applied Biosystems™ PrepFiler Express™ Forensic DNA Extraction Kit and Quantifiler™ Trio DNA Quantification Kit, respectively. It was also amplified with the Applied Biosystems™ AmpFLSTR™ NGM Select™ PCR Amplification Kit.

NUCLEIC-CARD product family

Easy-to-use devices for collection, preservation, and long-term storage, Thermo Scientific™ NUCLEIC-CARD™ matrices are chemically treated to enable cell lysis and protein denaturation. Nucleic acids are immobilized and preserved for long-term storage at room temperature. Figure 3 (next page) shows the integrated workflow from sample to result.



NUCLEIC-CARD matrices

NUCLEIC-CARD matrices are available in a variety of configurations: one, two, or four sample collection areas per card with individual barcodes. Plain white is suitable for blood. Meanwhile, indicating, colored cards change color upon sample application, which facilitates processing for buccal samples. The framed card includes an area for cleaning strikes while punching with manual or automated systems; it is compatible with the Applied Biosystems™ Card Processing Automation 200 (CPA200) instrument.



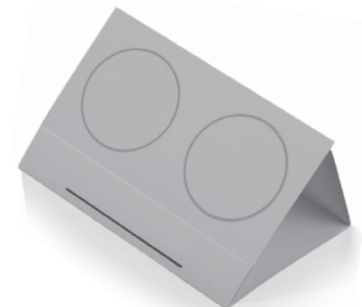
Indicating, colored, 1 spot



Indicating, colored, framed



4 spots



2 spots

NUCLEIC-CARD Collection Device System

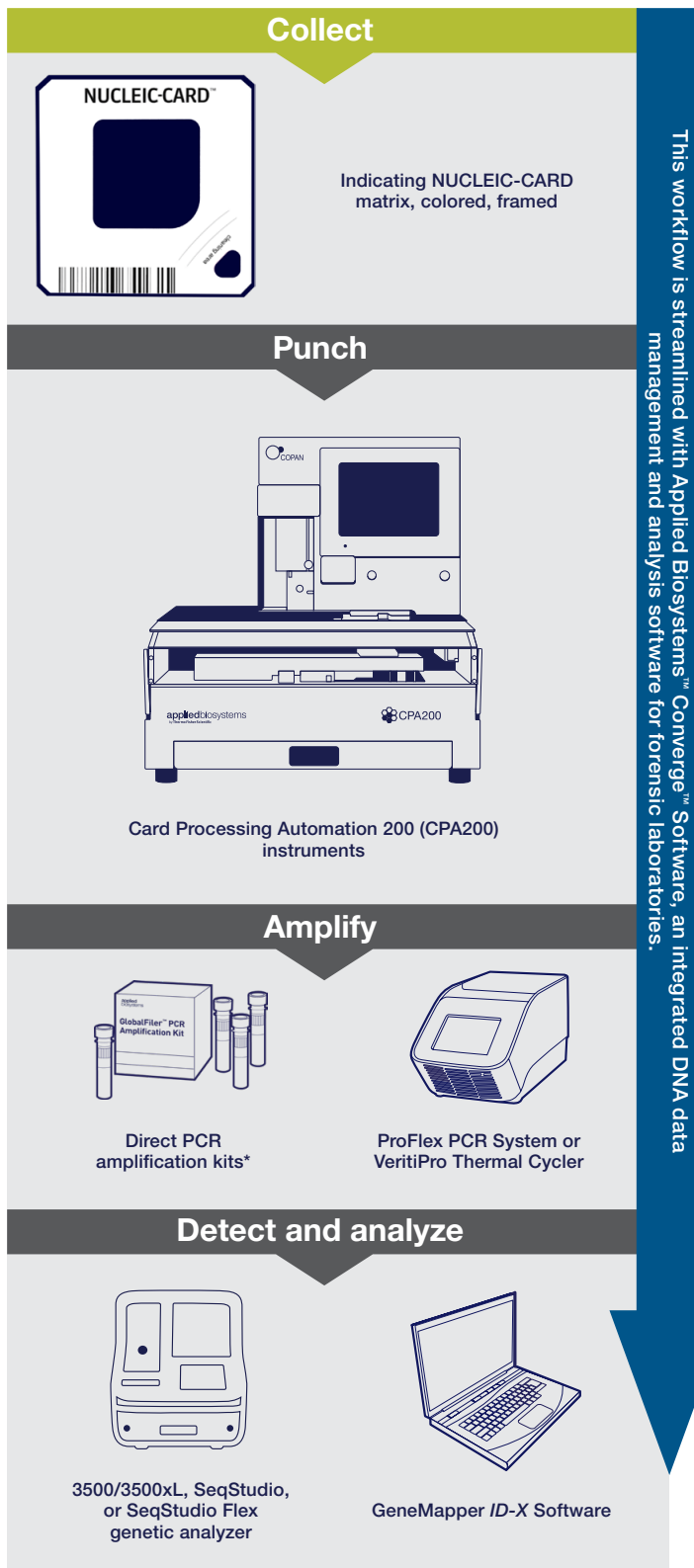
This integrated collection device system comprises a NUCLEIC-CARD matrix, a one-sided padded and cuttable foam swab, and a protective plastic holder. This system helps ensure that samples are more easily transferred to the central area of the NUCLEIC-CARD matrix with increased uniformity and reproducibility. It is also ideal for collecting, transporting, and archiving DNA buccal samples. Enhanced usability and performance affords forensic laboratories the ability to achieve a high first-pass success rate for reference samples and helps decrease laboratory costs.



NUCLEIC-CARD Collection Device System

NUCLEIC-CARD Collection Device System (cont.)

Reference workflow



Key features

- Enables direct PCR amplification from a card punch, eliminating time-consuming extraction and quantification steps
- Facilitates high-quality short tandem repeat (STR) profiles (Figure 4) with Applied Biosystems™ direct PCR amplification kits
- Enables sample tracking with individual bar codes
- ISO 18385–compliant: free of amplifiable human DNA, certified as DNase- and RNase-free, and ethylene oxide–treated
- Available in a variety of configurations:
 - Framed card options to maximize sample integrity with commercially available punching systems; integrated swab and/or card collection device to improve buccal cell collection
 - Indicator card that changes color from pink to white upon sample addition for easy visualization and punching

High-quality STR profiles

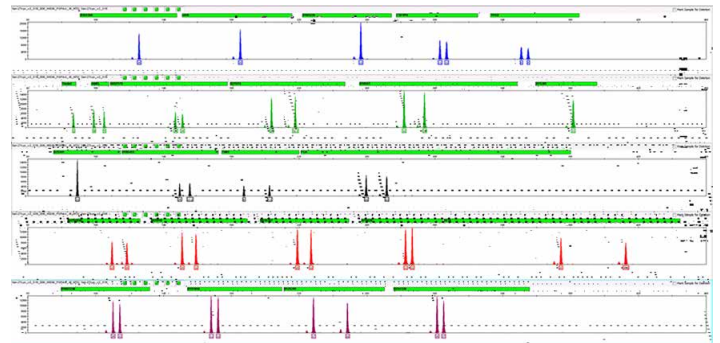


Figure 4. An example of a profile generated from a buccal sample deposited on a NUCLEIC-CARD Collection Device System using the Applied Biosystems™ GlobalFiler™ Express PCR Amplification Kit.

* Applied Biosystems™ GlobalFiler™ Express, VeriFiler™ Express, Yfiler™ Plus, and Identifier™ Direct PCR amplification kits.

Figure 3. Our complete, integrated workflow for single-source samples using the NUCLEIC-CARD Collection Device System.

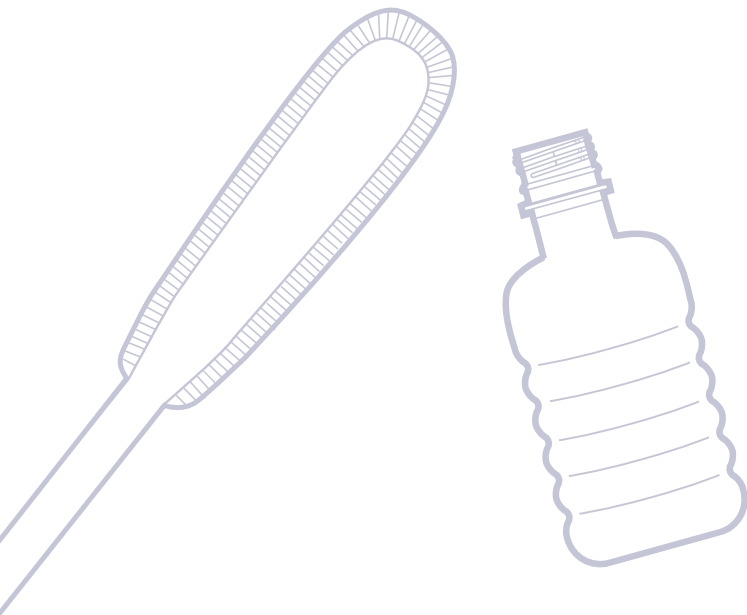
microFLOQ swabs

Applied Biosystems™ microFLOQ™ swabs are innovative DNA collection tools that enable users to obtain a profile of 24 DNA markers in less than two hours. These swabs were codeveloped* by the French Gendarmerie Forensic Research Institute (IRCGN) and Copan.



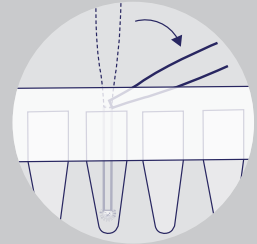
- Desiccant in the cap for efficient sample drying
- Peel-off barcode label for better chain of custody
- Patented technology for higher sample collection and release
- Lysing treatment applied on the fibers for direct DNA amplification
- Breaking point for increased ease when processing samples in standard 0.2 mL PCR tubes or 96-well PCR microplates
- Increased sensitivity to help amplify collected DNA
- Cost-effective because it eliminates the extraction step and thus the need for an automated liquid handling robotic platform
- Forensic DNA grade that is free of amplifiable human DNA, free of detectable DNase and RNase, and ethylene oxide-treated

* Patent pending deposited by the IRCGN.



Direct workflow

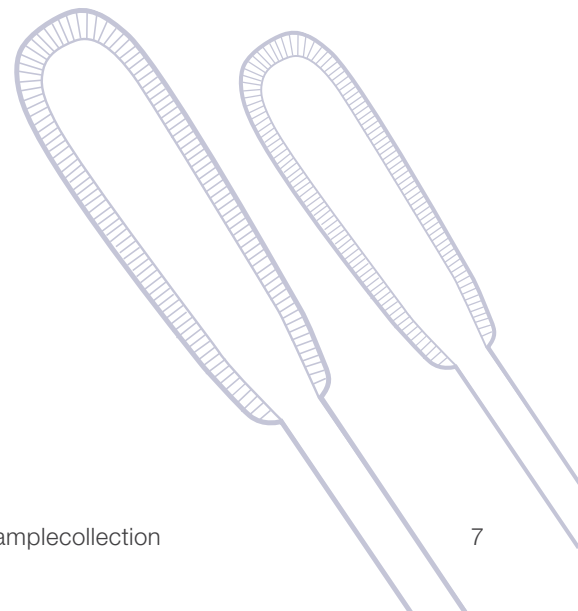
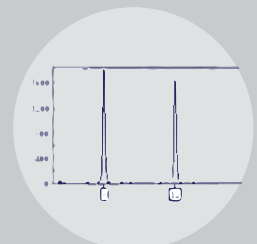
Sample preparation



















STR amplification



STR analysis



Ordering information

Product		Quantity	Cat. No.
NUCLEIC-CARD collection system			
NUCLEIC-CARD Collection Device System		Case of 50	A32607
NUCLEIC-CARD color matrix, 1 spot framed with cleaning area		Case of 50	A43636C
NUCLEIC-CARD matrix, 1 spot framed		Case of 50	4486610C
NUCLEIC-CARD matrix, 1 spot		Case of 50	4474001
		Case of 100	4473973
NUCLEIC-CARD color matrix, 1 spot		Case of 50	4473974
NUCLEIC-CARD matrix, 2 spots		Case of 100	4473975
NUCLEIC-CARD color matrix, 2 spots		Case of 50	4473976
NUCLEIC-CARD matrix, 4 spots		Case of 100	4473977
NUCLEIC-CARD color matrix, 4 spots		Case of 50	4473978
4N6FLOQSwabs collection devices			
4N6FLOQSwabs device, regular-size tip in peel pouch		Case of 100	4473979
4N6FLOQSwabs device, regular-size tip in active-drying tube		Case of 50	4479439
4N6FLOQSwabs device, regular-size tip plus 2 mL Eppendorf cuvette		Case of 100	4479431
microFLOQ swab		Case of 50	A38724
4N6FLOQSwabs device, regular-size tip in plastic tube		Case of 100	4479433
FLOQSwabs device, flexible minitip head tip in plain tube (Not ISO 18385-compliant or certified)		Case of 100	A40001720
NAO Basket + 2 mL cuvette, in peel pouch		Case of 100	4483798



Learn more about DNA collection solutions for human identification at thermofisher.com/samplecollection

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