

# Confident answers in challenging cases

## Additional discriminatory power when you need it

The Applied Biosystems™ VeriFiler™ Plus PCR Amplification Kit has been developed to meet today's forensic casework needs globally. Powered by a six-dye short tandem repeat (STR) chemistry and a next-generation master mix formulation, this kit is specifically designed for challenging sample types—touch, degraded, or inhibited—with improved sensitivity and enhanced robustness against inhibition. With a total of 25 loci, including 23 autosomal STRs and 2 gender discrimination markers, the VeriFiler Plus kit also includes an internal quality control (IQC) system. The IQC system verifies PCR amplification and identifies the presence of inhibitors in the sample to enable distinction between degraded and inhibited samples. Although optimized for casework samples, the VeriFiler Plus kit also supports direct amplification of single-source reference samples, enabling laboratories to process all sample types with one amplification kit.

The VeriFiler Plus kit is approved for use by laboratories generating DNA profiles for inclusion in the US National DNA Index System (NDIS) CODIS database.



### Key features

#### Highly discriminative marker set

- Includes all expanded CODIS markers as well as Penta D, Penta E, and D6S1043 (Figure 1)
- Increased probability of identity (PI) in Caucasian, African-American, Hispanic, and Asian populations reduces the chance of adventitious matches with excellent discrimination power

#### Optimized for use with touch, degraded, and inhibited samples

- Accommodates a higher sample input volume, and optimized at a target DNA input of 500 pg
- Superior primer design with 11 miniSTRs for degraded samples
- Improved tolerance to commonly found forensic inhibitors
- Validated according to SWGDAM guidelines and by multiple labs to confirm specificity across a wide range of forensic samples

### Excellent operational efficiency

- High first-pass success rate with improved performance from challenging samples
- Fast time-to-results with a PCR amplification time of 76 min
- IQC system for sample quality assessment
- Improved data interpretation with reduced pull-up edits when combined with Applied Biosystems™ 3500 Series Data Collection Software v4.0.1 and Applied Biosystems™ GeneMapper™ ID-X Software v1.6
- Direct amplification of single-source reference samples

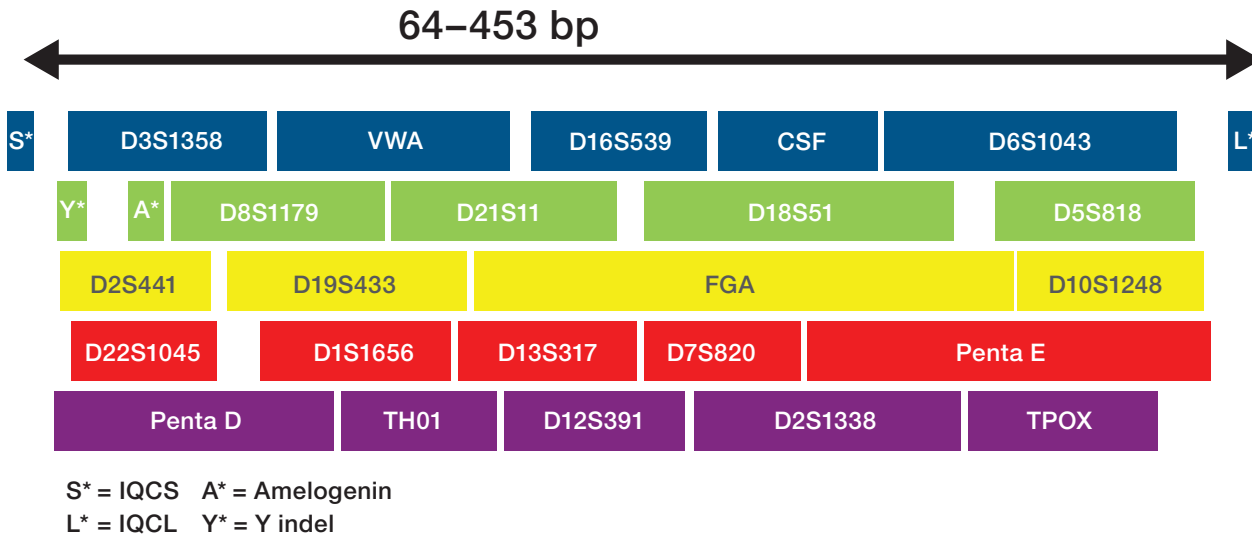


Figure 1. Marker positioning in the VeriFiler Plus PCR Amplification Kit.

The IQC system contained in the VeriFiler Plus kit consists of two synthetic sequences with specific primers for each of the targets. This system provides positive confirmation that all assay components are functioning as expected. This system is particularly useful to confirm the validity of negative results and distinguish samples that are degraded from those that contain PCR inhibitors (Figure 2). When the IQC system indicates degraded DNA, forensic analysts

may reamplify a forensic sample with a higher amount of input DNA or choose a complementary STR amplification kit that has an alternative marker set configuration to maximize information recovery. If the IQC system indicates inhibitors are present, the analyst may opt for an additional purification step or a dilution of the original sample before repeating sample amplification.

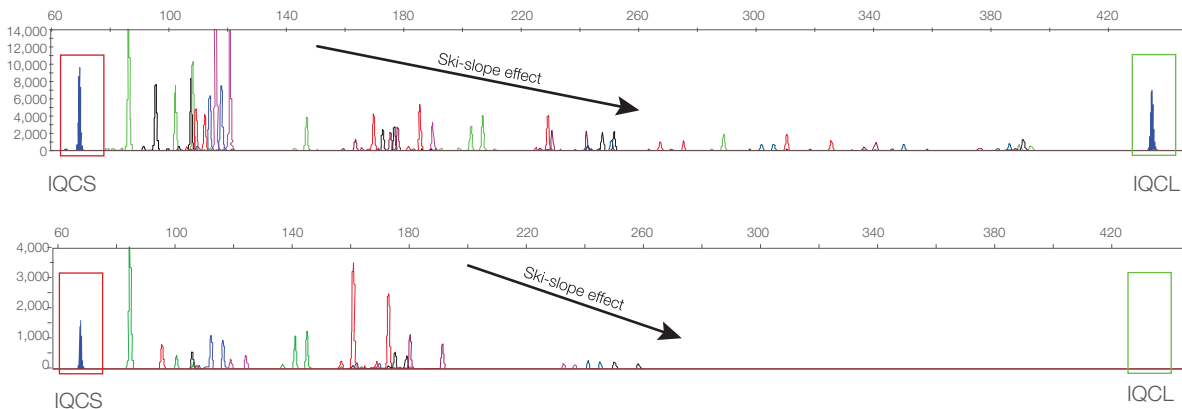


Figure 2. Electropherograms demonstrate the utility of the IQC system. Top panel: The IQCS and IQCL peaks are both efficiently detected, and a sample ski-slope effect is visible, indicating a degraded sample. Bottom panel: The IQCS peak is detected, but the IQCL peak is absent, and a sample ski-slope effect is visible, indicating an inhibited sample.

### Minimal cross-reactivity with nonhuman DNA in environmental samples

Forensic casework samples from environmental sources may be useful for linking suspects and victims to crime scene locations. These samples may be contaminated with impurities from soil, water, or other sources containing nonhuman DNA. The VeriFiler Plus kit has been redesigned and field-tested to confirm it minimizes background noise, off-ladder peaks, and cross-reactivity from nonhuman species from these challenging sample types (Figure 3).

### Increased workflow efficiency

The kit can also process single-source reference samples using direct PCR amplification from blood samples collected on untreated paper substrates (Figure 4), buccal cells and blood samples on treated paper substrates without the need for sample purification, and buccal samples collected on swab substrates and treated with Applied Biosystems™ Prep-n-Go™ Buffer (data not shown).

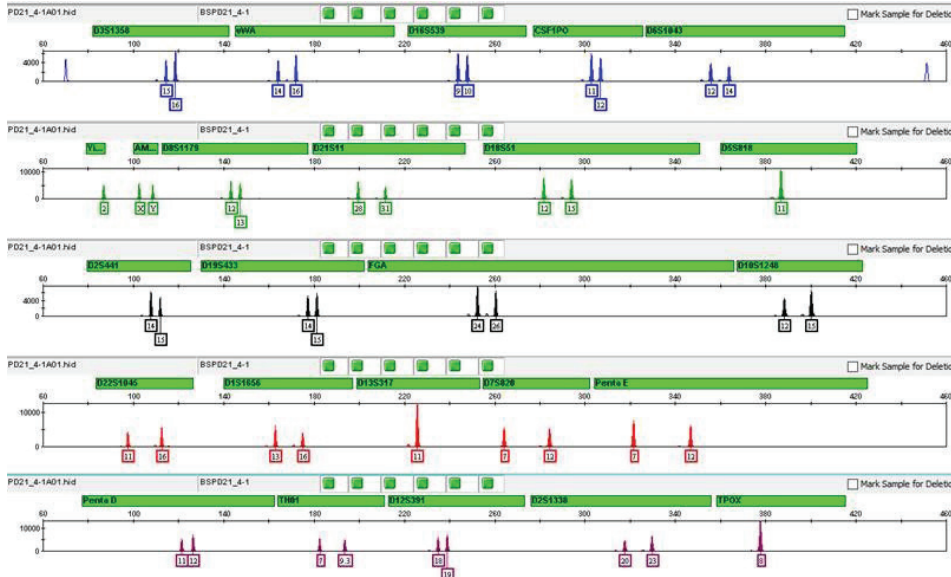


Figure 3. Results from a mock casework sample (0.5 ng of M7 DNA mixed with bacterial DNA) using the VeriFiler Plus kit. A 25  $\mu$ L reaction was amplified using 29 cycles and analyzed on an Applied Biosystems™ 3500 Series Genetic Analyzer.

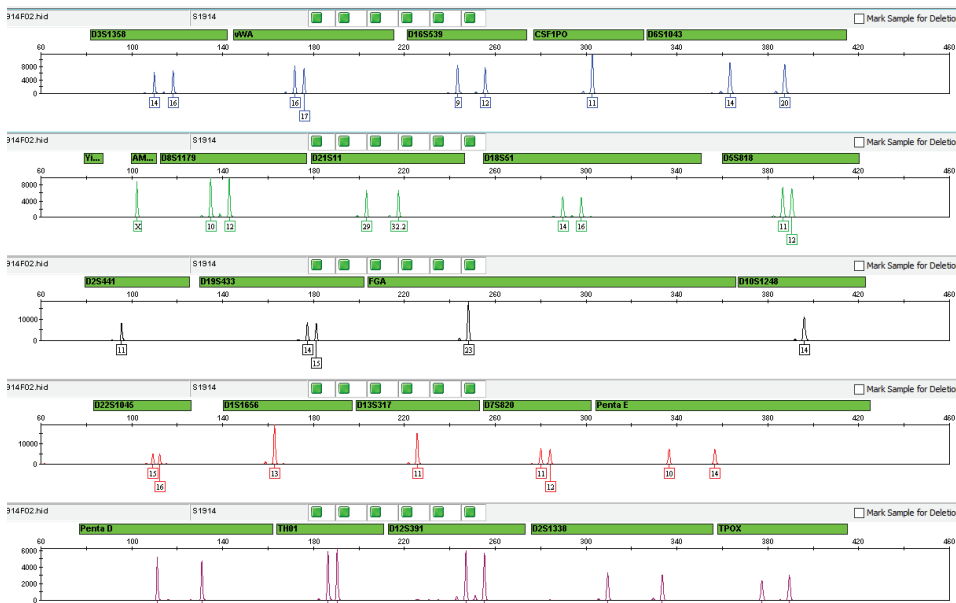
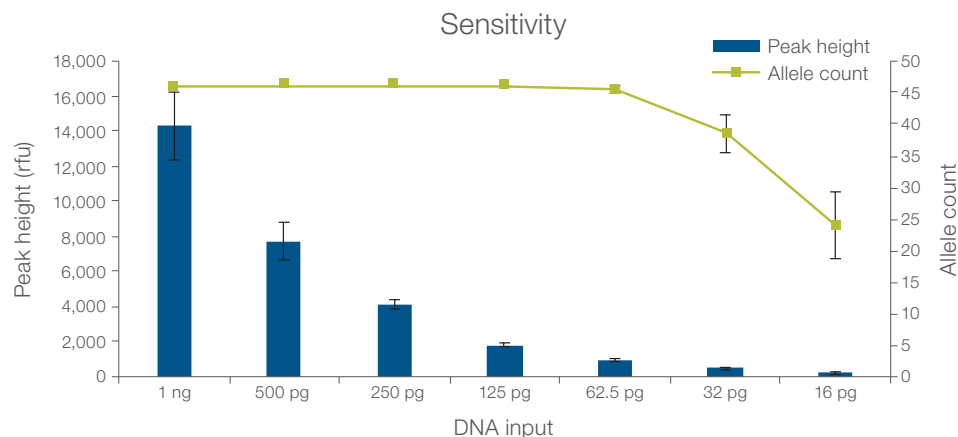


Figure 4. Direct amplification using the VeriFiler Plus PCR Amplification Kit on a 1.2 mm filter paper punch of blood. A 25  $\mu$ L reaction was amplified using 24 cycles and analyzed on an Applied Biosystems™ 3500xL Genetic Analyzer.

## High sensitivity

The VeriFiler Plus kit produces comprehensive STR profiles from as little as 125 pg of human DNA and useful partial profiles from DNA amounts of less than 125 pg.



**Figure 5. The average peak heights (vertical bars) and number of alleles called (squares) at varying amounts of M7 control DNA.** Error bars represent the standard deviation of the mean from 4 replicate amplification reactions. 25 µL reactions were amplified using 29 cycles and analyzed on a 3500 Series Genetic Analyzer.

## Need help bringing this new solution online?

Look no further than our Human Identification Professional Services (HPS) team. Since 2007, we have completed over 700 validation and integration projects in more than 30 countries worldwide. With a dedicated team of validation specialists, each with forensic experience, we provide customers with unparalleled workflow support on our chemistries, instruments, and software. Please contact your local representative for more information on validation options.

VeriFiler Plus kits are manufactured at our location in Warrington, UK, in a facility that meets the guidelines for ISO 18385 certification. We have made significant investments across all aspects of production to minimize human DNA contamination.



**The result:** Powerful forensic DNA-grade solutions that enable you to provide answers with certainty and confidence.

## Ordering information

Product	Quantity	Cat. No.
VeriFiler Plus PCR Amplification Kit	200 reactions	A35495

Find out more at [thermofisher.com/verifiler](https://thermofisher.com/verifiler)