



PowerPlex[®] ESX & ESI Fast Systems

More Options › More Results › Less Time

PowerPlex® ESX & ESI Fast Systems

The PowerPlex® ESX and ESI Fast Systems meet recommendations of the European Network of Forensic Science Institutes (ENFSI) for DNA profile sharing across Europe. Using rapid cycling technology, amplification can be done in less than 50 minutes. The systems are compatible with the Applied Biosystems® 3130, 3130xl and 3500 Genetic Analyzers and ABI PRISM® 3100, 3100-Avant and 310 Genetic Analyzers.

The PowerPlex® ESI and ESX Fast Systems were the first commercially developed kits to apply the novel concept of dual amplification to two partner STR kits. While an identical set of STR loci is used in both kits, the primer pairs were designed to achieve a complementary arrangement of the loci with each kit. Thus, loci occurring in one kit with long alleles are represented in the partner kit with short alleles and vice versa (see Figure 1 following page).

By doing secondary analysis with the partner kit, laboratories can obtain additional allelic data from compromised and even degraded DNA, confirm results or detect null alleles.

- Rapid thermal cycling (<50 minutes) saves hours per run
- One kit for casework and database samples simplifies laboratory quality control and inventory management
- Amplification of common loci allows simplified data sharing across borders
- Superior inhibitor tolerance and amplification of loci as mini-STRs ensure a high success rate with challenging casework samples

The PowerPlex® ESX and ESI Fast Systems allow co-amplification and detection of D3S1358, D8S1179, D18S51, D21S11, FGA, TH01, vWA, D2S441, D10S1248, D22S1045, D1S1656, D12S391, D2S1338, D16S539, D19S433, SE33 (optional) and Amelogenin.

More Options. More Results. Less Time.

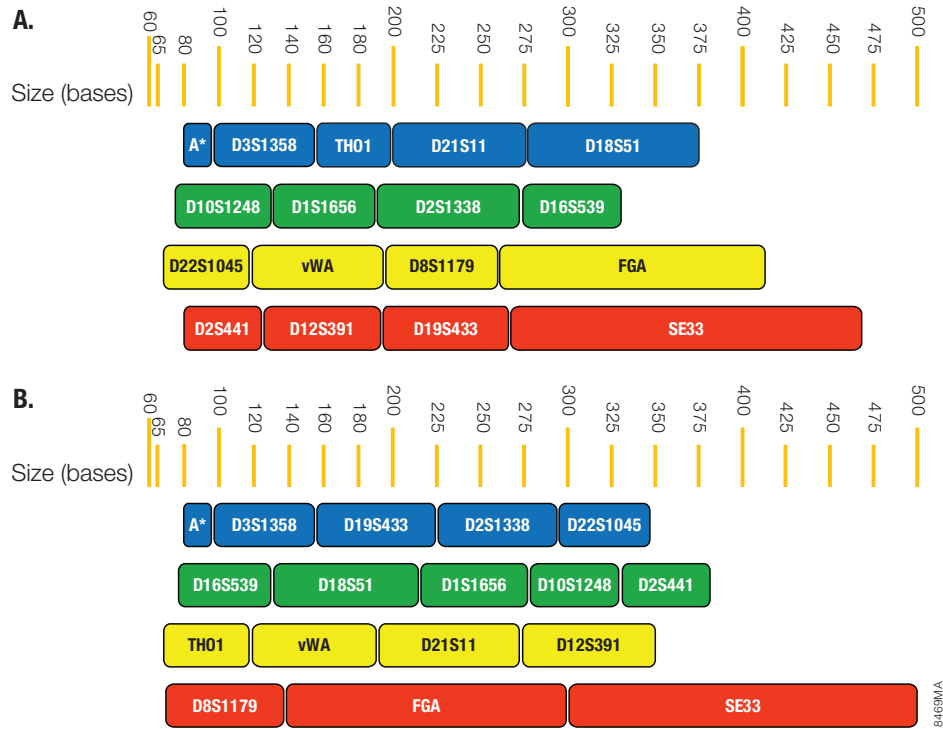


Figure 1. Relative positioning of loci in the PowerPlex® ESX Fast and ESI Fast Systems. Loci occurring in PowerPlex® ESX Fast System with very short alleles are represented in PowerPlex® ESI Fast System with long alleles and vice versa. **Panel A.** PowerPlex® ESX Fast System configuration. **Panel B.** PowerPlex® ESI Fast System configuration.

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PowerPlex® ESX & ESI Fast Systems



Achieve Superior Results Using the Two Fastest STR Systems Available for European Databases

Recognizing that laboratories are being asked to do more in less time, we've designed the PowerPlex® ESI and ESX Fast Systems to enable amplification to be completed in less than 50 minutes. The shortened cycling times free up laboratory personnel to work on more value-added activities such as DNA analysis and interpretation of results.

POWERPLEX® SYSTEM		ESI Fast	ESX Fast
Optimal DNA amount in 25µl reaction		0.5ng	0.5ng
Maximum volume of sample in 25µl reaction		17.5µl	17.5µl
Direct amplification compatible		Yes	Yes
Approximate amplification time	Direct Amp	45 minutes	45 minutes
	Casework	50 minutes	50 minutes
Ramp speed given in "Mode"		Max Mode	Max Mode
Ramp speed in "°C" per second		5	5

KEY FEATURES AND BENEFITS OF POWERPLEX® ESI 17 FAST AND ESX 17 FAST SYSTEMS

Dual amplification compatibility	Facilitates confirmatory testing for null alleles
One kit for casework and database samples	Simplifies sample processing, quality control and inventory management
Rapid thermal cycling (<50 minutes)	Enables faster turnaround times
17 Total number of markers (16 autosomal STRs plus Amelogenin)	Meets recommendations of the European Network of Forensic Science Institutes
Mini-STR configuration: Number of mini-STRs <150 bp per system = 4	Higher success rate with challenging samples
Dual amplification: Number of independent mini STRs <150bp = 7	Higher success rate with challenging samples

Obtain More Complete Profiles Even With Challenging Samples

Low template and degraded DNA samples are often seen with casework samples and can contribute to poor results. The primers in the PowerPlex® ESI and ESX Fast Systems amplify loci as mini-STRs to generate complete profiles from the most challenging samples. Additionally, the robust buffer minimizes the need to re-amplify problematic samples.

The PowerPlex® ESI and ESX Fast Systems reliably produce complete STR profiles from as little as 60pg of human DNA, and the majority of alleles can be called with as little as 30pg of DNA.

Gain Superior Sensitivity

DNA Amount	PowerPlex® ESI 17 Fast System	PowerPlex® ESI 17 Pro System	PowerPlex® ESX 17 Fast System	PowerPlex® ESX 17 System
500pg	100%	100%	100%	100%
100pg	100%	100%	100%	100%
60pg	100%	99%	100%	100%
30pg	85%	76%	98%	90%

The PowerPlex® ESI and ESX Fast Systems demonstrate superior sensitivity, reliably generating full profiles with as little as 60pg of DNA. Varying amounts of DNA amounts were amplified in 25µl reactions with PowerPlex® ESI and ESX 17 Fast Systems and PowerPlex® ESI 17 Pro and ESX Systems (n = 3). Amplified products were separated using an Applied Biosystems® 3130 Genetic Analyzer (3kV, 5-second injection). The percentage of total alleles called is indicated for each DNA amount.

Produce complete profiles under the most difficult conditions.

PowerPlex® ESX & ESI Fast Systems

Obtain More Information From Degraded Samples

Dual amplification of PowerPlex® ESI 17 Fast System in combination with PowerPlex® ESX 17 Fast System results in 7 independent mini-STR loci (below 150 bp) or 12 midi-STR loci (below 230bp) to enable the recovery of additional searchable information from degraded samples. The complementary marker position across the two kits allows the preservation of the complete genotype even in compromised samples.

The examples below are profiles that were generated from DNA samples that were exposed to different levels of UV-C radiation (no UV-C, 100mJ and 200mJ) in order to induce varying degrees of degradation in DNA (Figure 2).

As shown in Figure 2C and 2D, two loci that had dropped out in a profile generated by PowerPlex® ESI 17 Fast System after 100mJ of UV-C exposure, were recovered using PowerPlex® ESX 17 Fast System through complementary marker positioning.

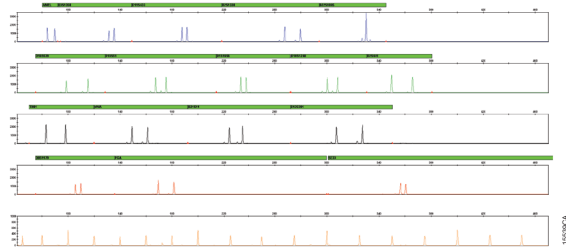
As shown in Figure 2E and 2F, four loci dropped out or showed very low peaks with PowerPlex® ESI 17 Fast after exposure of the DNA to 200mJ of UV-C. All these loci were detected with PowerPlex® ESX 17 Fast System, enabled by dual amplification.

Also, worth mentioning is the fact that SE33, despite being one of the markers in the medium to long allelic size range, did not show allelic drop-out (pink border) in any of the degraded DNA samples. SE33 in PowerPlex® ESI 17 Fast and ESX 17 Fast Systems rather proved to be more robust than markers with alleles at similar or even shorter size ranges in the neighboring channels.

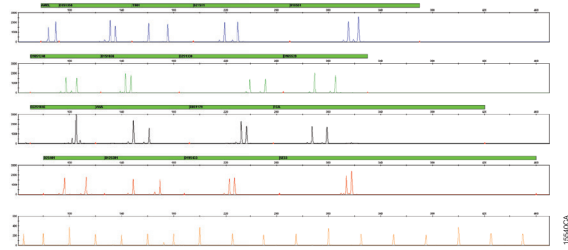
PowerPlex® ESI 17 Fast System

PowerPlex® ESX 17 Fast System

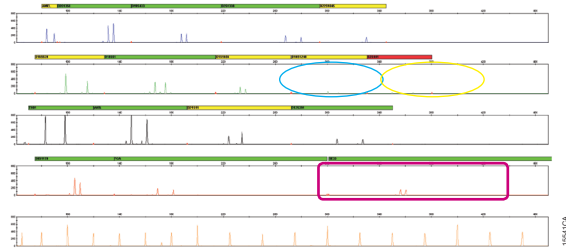
A. No UV-C



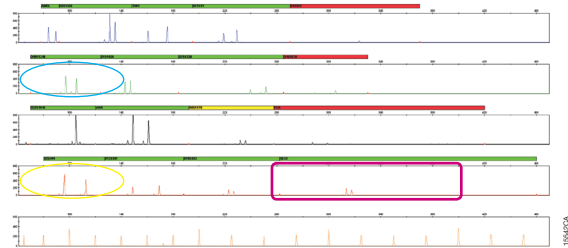
B. No UV-C



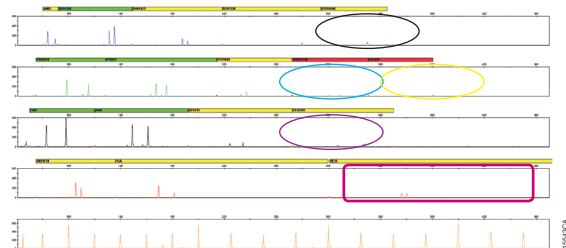
C. 100mJ



D. 100mJ



E. 200mJ



F. 200mJ

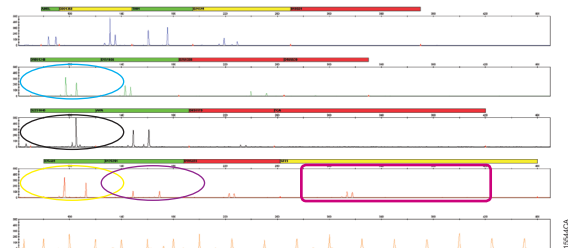
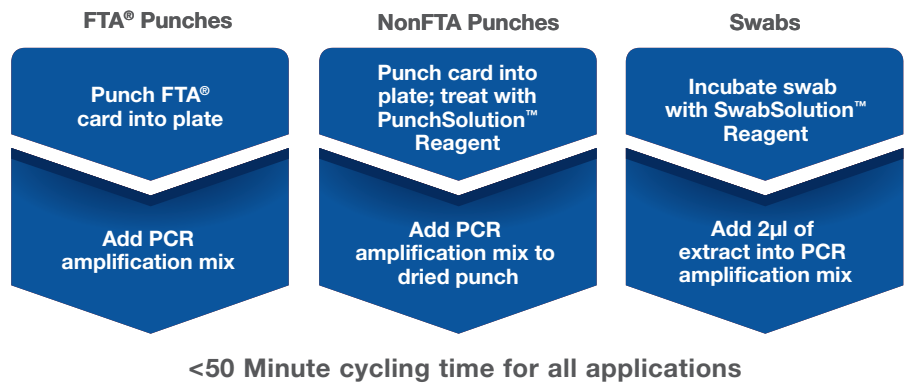


Figure 2. Dual amplification of degraded DNA samples that were exposed to different amounts of UV-C. The dual amplification approach using PowerPlex® ESI 17 Fast (Panels A, C, E) and PowerPlex® ESX 17 Fast (Panels B, D, F) recovered dropped-out alleles thereby preserving the complete genotype.

PowerPlex® ESX & ESI Fast Systems

Implement Direct Amplification from Numerous Sample Types

The PowerPlex® ESI and ESX Fast Systems allow direct amplification from FTA® card punches as well as pretreated nonFTA cards and commonly used swabs to streamline workflows and expand sample throughput. Laboratories can achieve significant time savings and heightened efficiency due to the minimal number of steps involved in sample preparation.



FTA® Punches

The PowerPlex® ESI and ESX Fast Systems facilitate direct amplification of DNA from unwashed FTA® card punches, improving laboratories' workflows and saving more than two hours per plate.

Blood Sample on an FTA® Punch, PowerPlex® ESI 17 Fast System

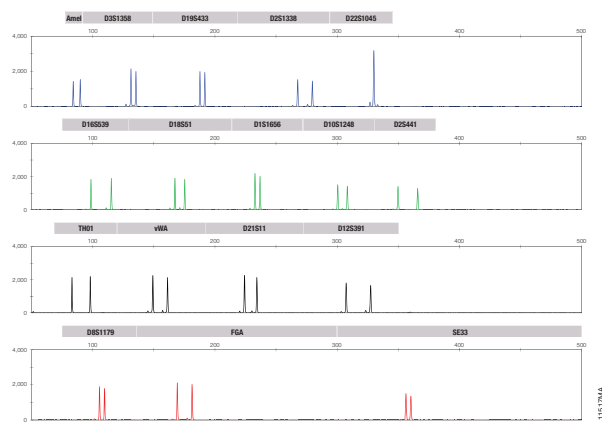


Figure 3. Direct amplification of one 1.2mm punch from a blood sample on an FTA® card using the recommended protocol. Amplified products were separated using an Applied Biosystems® 3130x/ Genetic Analyzer (3kV, 5-second injection).

Buccal Sample on an FTA® Punch, PowerPlex® ESI 17 Fast System

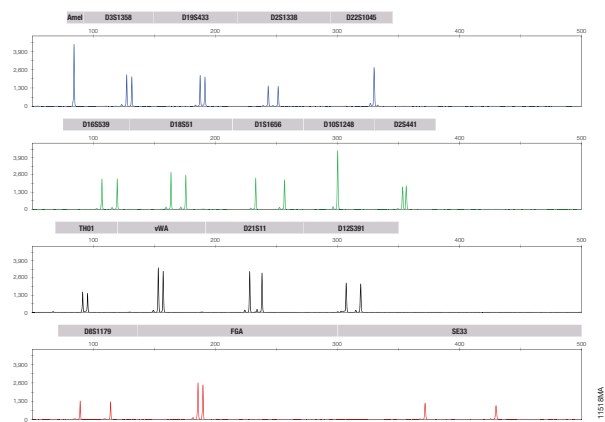


Figure 4. Direct amplification of two 1.2mm punches from a buccal sample on an FTA® card using the recommended protocol. Amplified products were separated using an Applied Biosystems® 3130x/ Genetic Analyzer (3kV, 5-second injection).

Swabs

Working in combination with the SwabSolution™ Kit, the PowerPlex® ESI and ESX Fast Systems allow you to reproducibly obtain high-quality STR profiles from swab samples. Minimizing the number of steps involved in sample preparation enhances throughput capabilities, leading to faster turnaround times and shortened time to results.

Buccal Sample on Cotton Swab, PowerPlex® ESI 17 Fast System

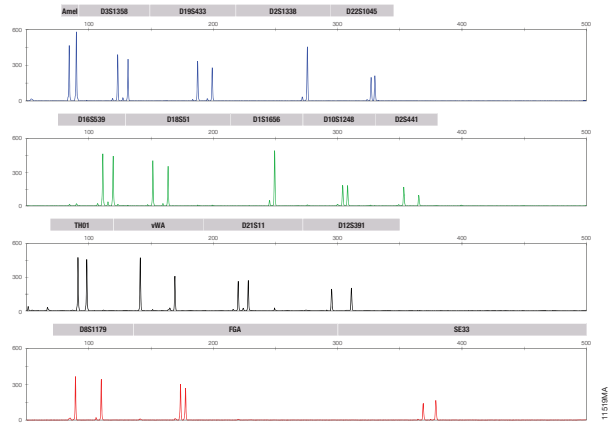


Figure 5. A buccal swab was pretreated with SwabSolution™ Reagent. Following incubation, 2µl of extract was added to the PCR amplification mix and amplified using the recommended protocol. Amplified products were separated using an Applied Biosystems® 3130x Genetic Analyzer (3kV, 5-second injection).

NonFTA Punches

The PowerPlex® ESI and ESX Fast Systems work in conjunction with the PunchSolution™ Kit to provide robust profiles from nonFTA card punches, including Bode Buccal DNA Collector™ devices and S&S 903 paper.

Buccal Sample on Bode Buccal DNA Collector™ Device, PowerPlex® ESI 17 Fast System

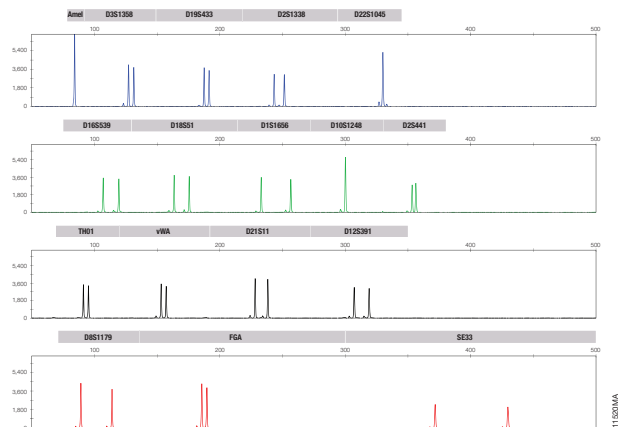


Figure 6. A single 1.2mm punch from a buccal sample collected using a Bode Buccal DNA Collector™ device was pretreated with PunchSolution™ reagent, then amplified using the recommended protocol. Amplified products were separated using an Applied Biosystems® 3130x Genetic Analyzer (3kV, 5-second injection).

PowerPlex® ESX & ESI Fast Systems

Comparison of Kits from Different Suppliers

Kit	PROMEGA		THERMO FISHER SCIENTIFIC	
	PowerPlex® ESI 17 Fast	PowerPlex® ESX 17 Fast	NGM Detect™ PCR Amplification Kit	NGM SElect™ PCR Amplification Kit
PCR cycling time	<50 minutes	<50 minutes	<60 minutes	>120 minutes
Dual amplification compatibility	Optimized to partner with ESX 17 Fast	Optimized to partner with ESI 17 Fast	Can partner with NGM SElect kit	Can partner with NGM Detect
Dual amplification: Number of independent mini STRs <150bp	7		5	
Dual amplification: PI values* of independent mini STRs <150bp	African-American: 2.23×10^{-8}		African-American: 1.95×10^{-6}	
	Caucasian: 4.63×10^{-8}		Caucasian: 6.56×10^{-6}	
	Hispanic: 7.29×10^{-8}		Hispanic: 9.51×10^{-6}	
One protocol for both partner kits	Yes		No	
One protocol for both casework and database use	Yes		No	
One CE instrument protocol for both partner kits	Yes		No	
Sample input volume	17.5µl	17.5µl	15µl	10µl
Balanced at	0.5ng	0.5ng	0.5ng	1ng
ILS included in the kit	Yes	Yes	No	No
Allelic ladder per 100 reactions	50µl	50µl	25µl	25µl
Bundle package available	Yes		No	

*PI values were calculated from population data from a developmental validation study using the PowerPlex® ESX 17 Fast and ESI 17 Fast Systems. Sample sizes were N = 342 (African-American); N = 361 (Caucasian); N = 236 (Hispanic).

Easier Exchange of National and International Data

- More shared loci result in higher power of discrimination and a better hit rate

More Choices

- Complementary kit configurations
- Options with and without SE33

More Complete Profiles

- Robust buffer for superior inhibitor tolerance
- Mini-STR configurations for a higher success rate with challenging samples

Confidence in Your Results

- Ability to test with multiple primer pairs
- Confirmatory testing for null alleles

Time Savings

- 50-minute cycling time
- Reduced need for repeat testing
- Simple processing of a variety of sample types

Ordering Information

	PRODUCT	SIZE	CAT.#
FG	PowerPlex® ESX 17 Fast System	400 reactions	DC1710
		100 reactions	DC1711
FG	PowerPlex® ESI 17 Fast System	400 reactions	DC1720
		100 reactions	DC1721
FG	PowerPlex® ESX/ESI 17 Fast System Bundle	400 reactions	DC1730
		100 reactions	DC1731
FG	PowerPlex® ESX 16 Fast System	400 reactions	DC1610
		100 reactions	DC1611
FG	PowerPlex® ESI 16 Fast System	400 reactions	DC1620
		100 reactions	DC1621
FG	PowerPlex® ESX/ESI 16 Fast System Bundle	400 reactions	DC1630
		100 reactions	DC1631

200µl WEN ILS 500 and 50µl Allelic Ladder per 100 reactions are included in the kits.

FG = Forensic Grade

Related Products

	PRODUCT	SIZE	CAT.#
FG	SwabSolution™ Kit	100 preps	DC8271
FG	PunchSolution™ Kit	100 preps	DC9271
FG	5X AmpSolution™ Reagent	500µl	DM1231
	PowerPlex® 5C Matrix Standards, 310	50µl (each dye)	DG5640
	PowerPlex® 5C Matrix Standard	5 preps	DG4850
	WEN Internal Lane Standard 500 ESS	200µl	DG5101
FG	2800 Control DNA, 10ng/µl	25µl	DD7101

The PowerPlex® ESI and ESX Fast Systems are compatible with the Applied Biosystems® 3130, 3130xl and 3500 Genetic Analyzers, and ABI PRISM® 3100, 3100-Avant and 310 Genetic Analyzers.

The Power to Solve...from Sample to Analysis

DNA Isolation

Maxwell® FSC Instrument

A compact, plug-and-play instrument for automated DNA extraction

Maxwell® RSC 48 Instrument

Compact, automated nucleic acid purification platform that processes up to 48 samples simultaneously to yield high-quality nucleic acids

Maxwell® FSC DNA IQ™ Casework Kit

Optimal extraction of DNA from forensic casework samples

Casework Extraction Kit

Preprocessing reagents to assist in DNA IQ™ chemistry extraction of DNA from challenging samples

Differex™ System ID

Easy separation of sperm and epithelial fractions

DNA IQ™ System ID

Manual and large platform automatable purification of DNA free of PCR inhibitors

Casework Direct Kit, Custom

Rapid screening of sexual assault evidence and processing of Touch DNA samples prior to quantification of human DNA using the PowerQuant® System and amplification using PowerPlex® Systems

Bone DNA Extraction Kit, Custom

Preprocessing reagents to assist the DNA IQ™ System in extracting DNA from skeletal remains.

Quantification

Plexor® HY System ID

Quantitative PCR for both total human and male DNA in a single reaction

PowerQuant® System ID

A 5-dye, 4-target hydrolysis probe-based quantitative PCR assay for assessing total human and male DNA concentrations, degradation levels and the presence of inhibitors

STR Amplification

STR Amplification

PowerPlex® Fusion System ID DA

A rapid 24-plex suitable for casework, paternity and database testing and designed to meet the new CODIS recommendations

PowerPlex® Fusion 6C System ID DA

A rapid 27-plex, including SE33, suitable for casework and databasing testing and designed to meet the new CODIS recommendations

PowerPlex® Y23 System ID DA

Male-specific STR genotyping kit with 23 Y-STR loci; includes protocols for both casework and databasing

PowerPlex® ESX and ESI Fast Systems ID DA

Rapid human identification STR assays that meet ENFSI recommendations for use in casework, paternity and database testing

PowerPlex® 35GY 8C System* ID DA

An 8-color multiplex containing autosomal and Y-STR loci designed for use on the Spectrum CE System

Analysis

Spectrum CE System*

8- or 24-capillary electrophoresis instrument that combines state-of-the-art STR analysis with increased run flexibility and 4-plate capacity

Spectrum Compact CE System*

Benchtop, 4-capillary electrophoresis instrument capable of Sanger sequencing and fragment analysis

Massively Parallel Sequencing

Massively Parallel Sequencing

PowerSeq™ 46GY System* DA

Amplification of autosomal and Y-STR loci in a single multiplex for massively parallel sequencing on an Illumina MiSeq® platform

PowerSeq™ CRM Nested System, Custom

Amplification and library preparation of mitochondrial control region for massively parallel sequencing on an Illumina MiSeq® platform

MPS Library Quantification

PowerSeq™ Quant MS System

Quantification of prepared MPS libraries for Illumina platforms, enabling efficient pooling and flow cell representation

ID Identity Automation™: Fully developed and tested high-throughput solutions with Promega installation, training and support.

DA Direct Amp Compatible

*Product in development

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