

**PURDUE UNIVERSITY
GRADUATE SCHOOL
Thesis/Dissertation Acceptance**

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By Lisa R. Beach

Entitled

EVALUATION OF STORAGE CONDITIONS ON DNA USED FOR FORENSIC STR ANALYSIS

For the degree of Master of Science

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EVALUATION OF STORAGE CONDITIONS ON DNA USED FOR FORENSIC STR ANALYSIS

A Thesis
Submitted to the Faculty
of
Purdue University
by
Lisa Renae Beach

In Partial Fulfillment of the
Requirements for the Degree
of
Master of Science

August 2014
Purdue University
Indianapolis, Indiana

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	iv
LIST OF FIGURES.....	v
LIST OF ABBREVIATIONS.....	vi
ABSTRACT.....	vii
INTRODUCTION.....	1
History of DNA Profiling.....	1
DNA Storage Concerns.....	4
Background.....	5
Research Objectives.....	7
MATERIALS AND METHODS.....	10
Sample Collection.....	10
DNA Extraction.....	10
DNA Quantification.....	11
Sample Preparation.....	12
PCR Amplification.....	13
STR Separation and Detection.....	14
STR Analysis.....	14
Data Analysis.....	15
Statistical Analysis.....	16
RESULTS.....	17
DNA Quantity.....	17
Buffer Type.....	17
Stock Tubes vs. Single Use Aliquots.....	20
Temperature.....	22
Concentration.....	24
DNA Quality.....	25
Buffer Type.....	25
Stock Tubes vs. Single Use Aliquots.....	27
Temperature.....	28
Concentration.....	33
DISCUSSION.....	35
FUTURE CONSIDERATIONS.....	38
REFERENCES.....	40

	Page
APPENDICES	
Appendix A. Quantifiler® Duo Real-Time Data.....	44
Appendix B. PowerPlex® 16 HS STR Data.....	61

LIST OF TABLES

Table	Page
Table 1: Storage variables include buffer, DNA concentration, temperature and multiple freeze-thaw cycles	13
Table 2: Expected genotype for all extracts in this study.....	16
Table 3: DNA concentrations at day 349 lower than baseline values	19
Table 4: Average percent loss of DNA calculated for stock tubes and single use aliquots	21
Table 5: A significant difference between stock tubes and single use aliquots was indicated by the p-value when TE was the storage buffer	22
Table 6: Samples in water lost more DNA at room temperature than TE	24
Table 7: Average peak height in all water samples declined after storage for 1 year	26
Table 8: Samples with alleles below the interpretation threshold of 150 rfu.....	34

LIST OF FIGURES

Figure	Page
Figure 1: All samples exhibit reduced DNA concentrations after storage for 1 year	18
Figure 2: Water samples lost more DNA than TE	19
Figure 3: The percent loss of DNA concentration in stock tubes and single use aliquots separated by buffer.....	20
Figure 4: TE was less affected by temperature than water.....	23
Figure 5: Average percent loss of DNA across concentration groups	25
Figure 6: TE maintained DNA integrity better than water	26
Figure 7: TE and water stock tubes differ in the ability to maintain DNA integrity	28
Figure 8: Samples stored in water at room temperature were mostly degraded after 1 year in storage	29
Figure 9: Partial STR data of the 0.01 ng/ μ L sample stored in water at room temperature indicate degradation after 1 year	30

LIST OF ABBREVIATIONS

-	negative
#	number
%	percent
%Δ	percent change
+	positive
μL	microliter
°C	Degrees Celsius
CAP	College of American Pathologists
CODIS	Combined DNA Index System
DNA	deoxyribonucleic acid
dsDNA	double stranded DNA
g	grams
x g	gravitational force
ISP	Indiana State Police
kV	Kilovolt
mg	milligram
mL	milliliter
mm	millimeter
M	molarity
NFH ₂ O	Nuclease free water
ng	nanogram
pg	picogram
PCR	polymerase chain reaction
rfu	relative fluorescence units
RFLP	restriction fragment length polymorphism
RT	room temperature
STR	short tandem repeat
TE	Tris-EDTA
US	United States
UV	ultraviolet
Y-STR	Y chromosome STR

ABSTRACT

Beach, Lisa Renae M.S., Purdue University, August 2014. Evaluation of storage conditions on DNA used for forensic STR analysis. Major Professor: Christine J. Picard.

Short tandem repeat (STR) analysis is currently the most common method for processing biological forensic evidence. STRs are highly polymorphic and allow for a strong statistical power of discrimination when comparing deoxyribonucleic acid (DNA) samples. Since sample testing and court proceedings occur months, if not years apart, samples must be stored appropriately in the event additional testing is needed. There are generally accepted methods to store DNA extracts long-term; however, one universally recognized method does not exist. The goal of this project was to examine various methods of storage and make recommendations for a universal storage method that maintained DNA integrity over time. Four variables were evaluated: storage buffer, storage temperature, initial storage concentration and the effects of repeated freeze-thaw cycles. DNA quantity was assessed using real-time polymerase chain reaction and DNA quality was evaluated using STR genotyping. Overall, the Tris-EDTA (TE) buffer outperformed nuclease free water as a long-term storage buffer for DNA extracts. Stock tubes stabilized concentration better than single use aliquots when eluted with TE while tube type was not significant when water was the buffer. For samples stored in TE, temperature had no effect on DNA integrity over time, but samples stored in water were largely affected at room temperature. Additionally, the greater the initial DNA concentration, the less likely it was to degrade in water. As a result of this research, DNA extracts from forensic samples should be stored long-term in TE buffer with a minimum concentration of 0.1 ng/ μ L. When water is the buffer, frozen storage is recommended.

INTRODUCTION

History of DNA Profiling

Deoxyribonucleic acid (DNA) is the genetic blueprint of life, and every individual receives half of their DNA from each parent. Aside from identical siblings, every person has a unique DNA sequence. The determination that a particular section of DNA, or locus, varied among individuals was a chance event discovered through genetics research (1). That finding led to the breakthrough of DNA fingerprinting, or DNA profiling, which is the process of examining an individual's specific DNA sequence. Since the discovery of DNA profiling in 1985 (2), it has become a valuable tool for diagnostic testing, medical research and forensic identifications (1, 2).

Perhaps the most common applied use of DNA profiling is in the field of forensic science. It has become the gold standard in which evidentiary samples from crime scenes may become associated to a suspect through DNA, thus providing information about who may have perpetrated the crime. Cold cases, unsolved cases not currently being investigated, have renewed hope of being solved since DNA profiles, the genetic composition of select areas of the genome, are now stored in databases. Databases can be searched nationally and previously unknown suspects can be connected to unsolved cases through the use of their DNA profile. Profiling also aids in the search for missing persons and unidentified remains. As of 2010, forensic profiling was still in use to identify victims that perished in the 2001 World Trade Center attack (3).

Early techniques of DNA profiling involved the use of restriction fragment length polymorphisms (RFLPs) (4). This method involved cutting the DNA at restriction sites

with restriction enzymes. DNA fragments were separated according to size by gel electrophoresis. Fragments in the gel were transferred to a membrane and probed with a complementary sequence of DNA in order to visualize the fragments. The genetic material situated between the restriction sites varied in size between individuals, which in turn, made it possible to use a person's DNA to identify them. RFLP analysis was once widely used because it was an inexpensive and simple methodology that any lab could adopt. Its high discriminatory power made it a useful tool for DNA profiling. Although useful, RFLP analysis was also very time consuming, and the use of radioactivity made it undesirable. The need for large quantities of high molecular weight DNA made this technique increasingly difficult to use for forensic analysis of very small samples. Forensic DNA samples tend to be limited in quantity, degraded, low quality or would need to be concentrated for use in RFLP analysis; consequently, it has since become an outdated technique for forensic use.

Technology has driven the field toward polymerase chain reaction (PCR), which uses less DNA for analysis (5). PCR exponentially amplifies targeted sequences of DNA, resulting in millions of copies of a specific section of DNA made in a fairly short timeframe. Due to its high sensitivity, PCR requires minimal amounts of DNA. It also allows results to be obtained within a day or two as compared to RFLP analysis, which took several weeks. PCR exploits the use of the conserved regions of DNA; whereas, RFLP analysis utilized restriction sites found in the DNA. Although the conserved regions are identical across all individuals, variable DNA regions, which determine genetic disparities between individuals, are situated among these conserved regions. This application is more efficient for processing the limited sample sizes that are often present in forensic evidence.

Modern day DNA analysis utilizes PCR to amplify short tandem repeat (STR) regions. STRs are repeated sequences of nucleotides, between 2-6 base pairs, flanked by conserved regions necessary for primer annealing. There are many STR locations, or loci, used for analysis, and they are located on several different chromosomes. Each locus has several variants, or alleles, that occur at different frequencies throughout the

human population. When a particular locus has more than one allele, it is polymorphic. These polymorphic sites are the cornerstone for forensic identifications. Since the loci are inherited through independent assortment, a statistical probability of having a certain genotype at a locus can be calculated and then multiplied together across all loci to produce a combined probability. The combined probability, referred to as the random match probability, can be used to determine the likelihood that a person's genetic profile would be randomly found in the population (6).

In pristine condition, DNA is intact in the double helix formation (double stranded or dsDNA) and can produce reliable STR profiles. Reference samples, typically buccal swabs or blood collected from a known source, consistently give reproducible DNA profiles because they are properly handled and stored upon collection. Once DNA is subjected to suboptimal conditions, such as elevated temperatures or environmental factors, DNA analysis using PCR may return only partial STR profiles or no interpretable data at all.

Structural and molecular DNA damage is caused through several mechanisms. Ultraviolet light (UV) can cause adjacent thymine nucleotides to covalently bind, making replication during PCR impossible (7). Once extracted and even during the extraction process, DNA is susceptible to oxidation (8). Oxidation causes base modifications, which can create problems during amplification since the base changes could exist in primer binding sites (9). *In vivo*, DNA has built-in repair mechanisms, but, once extracted, oxidative damage may not be reversible (7). Soil contaminants also contribute to DNA damage. In the presence of pesticide contaminated soil, DNA has an increased risk of strand breakage (10). Ionizing radiation can also damage DNA via strand breaks. On exposure to radioactive decay, dsDNA breaks can randomly occur (11). Exposure to extreme heat can cause reactive oxygen-containing chemicals to form and disrupt DNA on the level of bases mostly targeting guanine residues (12). Such chemicals also play a role in oxidation (12). Nucleases, enzymes that are sometimes left behind during the extraction process capable of degrading nucleic acids, cleave phosphate groups present

in nucleic acids, essentially shearing DNA (13). Formalin-fixed, paraffin-embedded tissues are not an ideal source if quality DNA is required, as DNA can be irreversibly damaged by fixatives (14).

While most of these factors are minimized in a laboratory setting, it is important to prevent further damage from occurring once DNA has been extracted and put into long-term storage. Complete degradation of a sample may not be entirely preventable, but slowing that process is an idea worth pursuing. Assuming there is an optimal method to prevent or slow down DNA degradation, samples can be used for future testing as technology evolves.

DNA Storage Concerns

Research laboratories and sample repositories often require long-term DNA storage for their current or future research needs (15). The National Cell Repository for Alzheimer's disease is a biological repository that collects samples on an international level and stores them so they can be redistributed to laboratories interested in Alzheimer's research (16). These researchers often need to perform genome-wide association studies that require DNA from several individuals. Proper DNA storage is critical since so many samples reside in one location. Improper storage may result in damaged DNA that would be useless for research aiming to locate new disease genes; thus, slowing the progress of medical advancements.

Medical fields use DNA for diagnostic purposes. Simple DNA tests can be performed to confirm the diagnosis for genetic diseases such as Fragile X syndrome (17) and Prader-Willi syndrome (18). The College of American Pathologists (CAP) is an accreditation agency that often oversees diagnostic laboratories that are CAP accredited and ensures that they follow the minimum guidelines required in their field. If DNA re-testing is necessary, CAP, as do other accrediting bodies, offer recommendations pertaining to the length of time samples should be kept. To ensure that re-testing is a viable option for the future, DNA needs to be stored so as to protect structural integrity.

Much of the evidence processed in a forensic laboratory yields DNA that must be stored for an indefinite period of time as outlined by the laboratory's quality assurance manual, accreditation guidelines or governmental laws and court rulings (19). As technology evolves, appropriately storing DNA becomes more important as smaller quantities of DNA are capable of generating usable DNA profiles. Secondary DNA testing by the defense or prosecution or re-testing during the appeal process make it pertinent that any DNA retrieved from evidence be stored in a manner that will allow for additional testing, especially since the appeals process could take several years. Forensic DNA samples are not always of good quality; therefore, it is important to minimize or prevent further degradation with proper storage.

Background

DNA storage has compelled scientists of all fields to debate what the ideal storage condition should be for DNA. Laboratories store samples under various conditions including +4 degrees Celsius ($^{\circ}\text{C}$) (20) or room temperature (RT) (21) while others choose frozen storage varying from -20°C to -80°C (20). DNA samples may also be stored in a liquid or dry state (22). Forensic laboratories often opt for frozen storage from -20°C to -80°C (13). While acceptable, -80°C is nowhere near equivalent to liquid nitrogen storage of -196°C . Such low temperatures cause samples to actually freeze on the molecular level to the point that a proton may take 200 years to move 1 atomic diameter (13). Liquid nitrogen appears to be the best way to store DNA, but it is not a feasible or cost effective choice. Several studies have evaluated DNA storage, but they often conflict with one another or focus on specific sample types. Since one universally accepted method of storage for DNA does not exist, it is important to examine and weigh the benefits of a variety of methods for long-term DNA storage.

Madisen et al. (20) determined that storage temperature had no effect on the hybridization patterns of DNA indicating DNA integrity was not affected by temperature, thus allowing DNA extracts to yield replicate patterns when probed with specific DNA

fragments following gel electrophoresis. Fresh DNA extracts stored for 6 months at temperatures ranging from -70°C to $+37^{\circ}\text{C}$ showed no significant change in their hybridization patterns after digestion with *EcoRI*, *HindIII* or *XbaI* and probing with human pancreatic cDNA pcHPA. Cell lysates also proved stable up to 8 weeks in storage. A long-term study showed DNA could maintain structural integrity to undergo digestion when stored in solution for 11 years at -20°C or when stored dry for 13 years then hydrated and stored in solution for another 7 years at -20°C (20).

Smith et al. evaluated DNA preserving agents and their impact on human placental DNA and gorilla fecal DNA (23). These two sample types were chosen to represent the wide variety of sample types with which researchers and forensics may encounter. After 1 year in storage, DNA concentrations were highest in all samples stored dry with trehalose, a preserving agent for DNA, or frozen. Fecal DNA samples were least impacted when stored for 1 year with trehalose dry or at -80°C . For human DNA, a higher amplification yield resulted from samples stored frozen, at $+4^{\circ}\text{C}$ with trehalose and dried with trehalose as compared to dry without trehalose. Taking all results into account, Smith and Morin showed that -80°C storage is equivalent to dry sample storage with 0.2 M trehalose added (23).

More recent studies by Wan et al. (24) explored dry DNA storage at room temperature. Two commercial DNA storage kits were evaluated to determine the effect of their storage medium on DNA when compared to -20°C storage. DNASTable® Plus, formerly DNA SampleMatrix®, uses a glass polymer that works to “shrink wrap” DNA to protect it from heat and UV light. Genvault’s GenTegra™ technology uses an inorganic mineral matrix to provide protection to DNA from oxidation and antimicrobial activity. After 3 weeks, a Nanodrop 1000 showed 100% DNA recovery after storage. Sequencing also corroborated the results. Useful information was obtained with this study, but it lacked in providing long-term data beyond the 3 week time frame (24).

Frippiat et al. (25) assessed commercial kits for dry, room temperature DNA storage. Extracts were hydrated with MilliQ water or buffer and air dried overnight. This process was performed 3 times and compared to 3 rounds of thawing a second set of

extracts stored at -20°C . Their study showed that DNA extracted from blood and buccal swabs had no significant sample loss. All samples yielded STR profiles above a fixed relative fluorescence units (rfu) threshold. After 6 months of storage, saliva samples, extracted with magnetic beads, showed an overall decrease in rfu intensity; whereas, blood, extracted using phenol chloroform, had signal intensity that was comparable to the control samples stored at -20°C . Dry storage using the commercial kit is an optimal method for DNA storage; current kits do not allow entire samples to be stored but merely an aliquot since they are optimized to work for certain volumes (25).

It is accepted practice to use accelerated aging methods to collect more data in a shorter timeframe. Lee et al. (27) stored $10\ \mu\text{L}$ of DNA at a concentration of $20\ \text{ng}/\mu\text{L}$ in SampleMatrix[®] at $+50^{\circ}\text{C}$ for 1 month and at room temperature for 5 months. A reference sample used for comparison was stored at -20°C . Agarose gel electrophoresis showed DNA was protected from degradation in both instances. Based on the accelerated aging theory described by Hemmerich (26), Lee concluded that DNA storage for 1 month at $+50^{\circ}\text{C}$ is equivalent to 6 months of storage at room temperature (27).

Commercial companies have also used accelerated aging methods to generate new products. DNASTable[®] Plus and GenTegra[™] DNA have shown that DNA can be stored for up to 30 years and 10 years, respectively (24). Those specifications were made, in part, because the samples they used for their study were stored at elevated temperatures for a known amount of time.

Research Objectives

Previous studies have provided useful information regarding DNA integrity under various storage conditions, but the study outlined here takes a modified approach. Research is often conducted under time constraints; accelerated aging studies allow data to be gathered more quickly but do not account for laboratory processing issues that could be a contributing factor to the outcome of the data. Varying reagent lots, day-to-day instrument fluctuations or the possibility of inhibitors being introduced to

samples over time are factors that usually do not affect accelerated aging studies. While those problems are additional variables that can impact the data, they also reflect what happens in a real laboratory environment. This study monitored sample integrity over the span of a year rather than using an accelerated aging process. Four different variables were considered when designing this experiment: storage buffer, storage temperature, initial concentration and if single use aliquots are better than stock tubes. By examining these common parameters, a recommendation can be made regarding the proper way to store DNA for forensic purposes.

Laboratories have historically used a Tris-EDTA (TE) buffer for DNA hydration and storage. Tris maintains the pH of a sample to reduce depurination (28). EDTA chelates magnesium and other metal ions to prevent the nuclease activity that can degrade DNA (29). While many laboratories use TE for DNA storage, literature reviews have not shown that TE is the optimal buffer choice. This study evaluated DNA stored in nuclease free water (NFW) and a TE elution buffer from the Promega DNA IQ™ extraction kit.

To evaluate storage temperatures, samples were stored at room temperature, +4 °C, -20 °C and -60 °C. All the studies previously described some sort of temperature evaluation and the effect of those temperatures on DNA hybridization patterns, UV absorbance measurements or the molecular weight and band intensity as analyzed by agarose gel electrophoresis. The study presented here evaluated the effect that various temperatures had on the samples' amplifiable DNA concentrations and STR genotypes to determine if DNA integrity was affected. DNA degradation can be dependent on the length of time samples are stored. It is not currently clear if there is a threshold to the amount of time samples can be stored at the various temperatures without the DNA quality becoming so affected that STR analysis is unreliable or uninterpretable.

In addition to studying temperature, an evaluation of frozen samples was performed to determine how repeatedly freezing and thawing samples impacted the DNA. Stock tubes were repeatedly thawed and re-frozen throughout the experiment and compared to single use aliquots, which were only thawed once for each time point. DNA is fairly hearty, as compared to proteins or ribonucleic acid, when it comes to

repeated freezing and thawing, but it is unknown if there is a maximum number of times DNA can be thawed and still produce acceptable results for STR analysis.

DNA concentration was the last factor studied. Forensic evidence often yields samples with very low DNA concentrations, and, if those samples are not initially consumed for analysis, they will need to be stored. It is already known that eventually DNA degrades (23) but how fast that happens is dependent on how it is stored. Concentration might be a contributing factor to the rate of degradation; however, a review of the scientific literature revealed no research investigating DNA concentration as a factor in the rate of degradation. It might be possible to determine an approximate rate by using the sample's starting DNA concentration and monitoring sample loss, if any, over 1 year.

MATERIALS AND METHODS

Sample Collection

Blood, from a single individual, was collected in BD Vacutainer® EDTA tubes (BD Diagnostics, Franklin Lake, NJ), spotted on Whatman™ FTA™ stain cards (GE Healthcare Life Sciences, Piscataway, NJ) and allowed to air dry prior to extraction. Buccal swabs (n = 46) were collected from the same individual, air dried and stored at room temperature until they were extracted.

DNA Extraction

Thirty-four standard size (3x3 mm) cuttings of the Whatman™ FTA™ cards (GE Healthcare Life Sciences) were extracted, in duplicate, with a standard organic extraction followed by concentration with Microcon® centrifugal filters (EMD Millipore, Billerica, MA). Cuttings were incubated in 1.5 mL tubes overnight at +56 °C in 300 µL of stain extraction buffer with DTT pH 8.0 [0.01168 g/mL NaCl (EMD Millipore), 1 M Tris-HCl pH 8.0 (Fisher Scientific, Pittsburgh, PA), 0.5 M EDTA (EMD Millipore), 20% SDS (Promega Corporation, Madison, WI), 0.04 M DTT (Promega Corp.)] and 7.5 µL 10 mg/mL Proteinase K solution (Promega Corp.). Following incubation, cuttings were transferred to spin-x insert baskets (Corning Incorporated, Corning, NY), returned to the original tubes and centrifuged for 5 minutes. Baskets and cuttings were discarded and 300 µL 25:24:1 phenol/chloroform/isoamyl alcohol (Fisher Scientific) was added. Tubes were vortexed then centrifuged at 14,000 x g for 3 minutes. The aqueous layer was transferred to a Microcon® centrifugal filter (EMD Millipore) pre-moistened with 100 µL

TE [1 M Tris-HCl pH 8.0 (Fisher Scientific), 0.5 M EDTA (EMD Millipore)] and centrifuged at 500 x g for 10 minutes. Next, 200 μ L of NFH₂O was applied to the Microcon[®] membrane (EMD Millipore) and centrifuged again at 500 x g for 10 minutes. Then, 40 μ L of NFH₂O was added to the Microcon[®] membrane (EMD Millipore), and the filter was inverted and placed into a new 1.5 mL tube. The tube was centrifuged at 1200 x g for 5 minutes. All blood extracts were combined into one tube, prior to quantification, to measure total amplifiable human DNA and ensure enough was recovered from the extraction to evaluate all study parameters at multiple time points for at least 1 year.

Forty-six buccal swabs were extracted with the automated Maxwell[®] 16 System (Promega Corp.). Swabs were incubated in 1.5 mL tubes for 1 hour at +56 °C in 200 μ L incubation buffer/Proteinase K master mix [200 μ L incubation buffer (Promega Corp.), 10 μ L 18 mg/mL Proteinase K (Promega Corp.)]. After incubation, 400 μ L of lysis buffer/DTT master mix [400 μ L lysis buffer (Promega Corp.), 4 μ L 1.0 M DTT (Promega Corp.)] was added, samples vortexed and briefly centrifuged. Swab cuttings were transferred to spin-x insert baskets (Corning Inc.), returned to the original tubes and centrifuged at maximum speed for 2 minutes. Cuttings and baskets were discarded, and the entire sample was added to well #1 of the Maxwell[®] 16 System (Promega Corp.) extraction cartridge. The Maxwell[®] 16 System (Promega Corp.) automatically extracted the sample and eluted the DNA in 50 μ L elution buffer (Promega Corp.). All buccal swab extracts were combined into one tube, prior to quantification, to measure total amplifiable human DNA and ensure enough was recovered from the extraction to evaluate all study parameters at multiple time points for at least 1 year. Reagent blanks were extracted with both methods, stored at +4 °C for the duration of the project and processed alongside the samples at each time point.

DNA Quantification

At each time point, samples were quantified using real-time PCR to obtain the amount of amplifiable human DNA present. Quantification was performed according to

manufacturer's specifications using the Quantifiler® Duo DNA Quantification Kit (Life Technologies Corporation, Carlsbad, CA) (30). Amplification was performed on a 7500 Real-Time PCR System (Life Technologies Corp.). Standards of known concentration were included with each plate. A standard curve had to meet the following criteria: the slope must be between -3.0 and -3.6 to ensure amplification efficiency, the y-intercept must be between 28 and 31 to estimate the number of cycles it would take a sample to reach 1 ng/ μ L of amplified product and the R^2 value must be ≥ 0.98 to confirm the closeness of the data points for the standards to the standard curve (31). A non-template control was included on every plate to ensure reagents were free of contaminants. An internal PCR control was included in each sample to ensure amplification occurred. Samples were analyzed using 7500 System Sequence Detection Software v 1.2.3 (Life Technologies Corp.). For the duration of the project, both sample sets stored in water were evaluated; however, only one set was used for data analysis since samples in TE were not replicated.

Sample Preparation

Samples were kept at +4 °C for 3 days preceding storage preparation. Quantification was performed on the combined blood extract and combined buccal swab extract to determine initial concentration prior to dilution. The combined blood extract and combined buccal swab extract were each diluted to six approximate concentrations: 8.0, 4.0, 1.0, 0.2, 0.1 and 0.01 ng/ μ L. Concentrations were confirmed following dilution. Each dilution was aliquoted into stock tubes that were stored at room temperature (~22-25 °C), +4 °C, -20 °C, -60 °C and into single use aliquots that were stored at -20 °C and -60 °C. Table 1 has a summary of storage parameters.

Sample quantification was completed 1 week following storage, monthly for 6 months and at 3 month intervals for an additional 6 months. At each time point, samples were measured to check volume levels, and, if evaporation had occurred,

adjusted to the previously stored sample volume to remove the evaporation variable. In addition to normal processing at the 12 month time point, samples were also heated for approximately 2 hours at +65 °C prior to processing to explore the possibility of DNA adsorption to the interior of the storage tube.

Table 1: Storage variables include buffer, DNA concentration, temperature and multiple freeze-thaw cycles. All samples were tested in the same manner at each time point.

Extraction Method	Buffer Type	Concentration (ng/μL)	Temperature (°C)	Testing Time Points (Days)
Maxwell®	DNA IQ™ elution buffer	8.0, 4.0, 1.0, 0.2, 0.1, 0.01	RT, +4, -20 stock tube, -20 su*, -60 stock tube, -60 su*	0, 6, 34, 62, 90, 117, 149, 174, 256, 342, 349
Organic (2 replicates)	Nuclease free H ₂ O	8.0, 4.0, 1.0, 0.2, 0.1, 0.01	RT, +4, -20 stock tube, -20 su*, -60 stock tube, -60 su*	0, 6, 34, 62, 90, 117, 149, 174, 256, 342, 349

*Samples were single use aliquots.

PCR Amplification

All PCRs used the initial sample quantification values to determine the amount of input DNA per reaction. Previous theory accepts that storing DNA frozen, below 0 °C, is the “standard” and that freezing does not affect concentration. Using the baseline quantification values showed if sample integrity or concentration was affected by the storage criteria associated with each sample. The PowerPlex® 16 HS System (Promega Corp.) was used for this project. All DNA samples, except those with the lowest concentration, were diluted to 0.10 ng/μL. Each amplification tube contained 12.5 μL of amplification grade water (Promega Corp.), 5 μL of PCR master mix (Promega Corp.), 2.5 μL of primer mix (Promega Corp.) and 5 μL of the diluted DNA for a total of 0.5 ng DNA. Water was omitted from PCR for samples of the lowest concentration, 0.01 ng/μL. Those samples contained 17.5 μL of each sample equating to approximately 0.175 ng of DNA per reaction. A positive and negative control consisting of 9947A DNA (Promega

Corp.) and amplification grade water (Promega Corp.), respectively, were included with each PCR set-up. PCR was performed on a GeneAmp® 9700 Thermal Cycler (Life Technologies Corp.). All reactions required 32 cycles following the PowerPlex® 16 HS System's (Promega Corp.) protocol for a GeneAmp® 9700 Thermal Cycler (Life Technologies Corp.) (32). Samples not immediately set up for electrophoresis remained in the thermal cycler at +4 °C overnight. All PCR products were stored at -20 °C for up to 1 week until electrophoretic data was obtained for all samples.

STR Separation and Detection

A 4 capillary 3130 Genetic Analyzer (Life Technologies Corp.) was used for fragment separation and detection. Data Collection Software v 3.0 (Life Technologies Corp.) was used for data collection. Each sample contained 9 µL of Hi-Di™ formamide (Life Technologies Corp.), 1 µL ILS 600 (Life Technologies Corp.) and 1 µL PCR product. Samples were denatured at +95 °C for 3 minutes and snap cooled on an ice block for 3 minutes. Injection parameters for the 3130 Genetic Analyzer (Life Technologies Corp.) were 3 kilovolts (kV) for 3 seconds. Samples with alleles below the interpretation threshold of 150 rfu were re-injected for 8 seconds. The PowerPlex® 16 HS Allelic Ladder Mix (Promega Corp.) was run with each sample set.

STR Analysis

GeneMapper® *ID* v 3.2 (Life Technologies Corp.) was used for interpretation. The interpretation threshold for this project was 150 rfu. Stutter was not determined to be at an elevated level; therefore, it was not used for any comparisons. Each sample was compared to the allelic ladder (Promega Corp.) to verify proper sample typing. For the duration of the project, both sample sets stored in water were evaluated; however, only one set was used for data analysis since samples in TE were not replicated.

Data Analysis

DNA quantity was evaluated using the concentration data obtained from the Quantifiler® Duo DNA Quantification Kit (Life Technologies Corp.). For every plate of samples analyzed, the standard curve was plated in duplicate. Serial dilutions were used to make the eight standards from a 200 ng/μL DNA stock. Concentrations of the standards in ng/μL were: 50.0, 16.7, 5.56, 1.85, 0.620, 0.210, 0.068 and 0.023. Standard curve parameters are outlined in the DNA Quantification section of the Materials and Methods. Concentrations were plotted for each time point to visualize any change over after one year. The loss of DNA was calculated as a percentage of the initial sample concentration. Samples were grouped by buffer, temperature or concentration to aid in comparison.

DNA quality was evaluated through PCR amplification and STR analysis. Under the general assumption that the DNA concentration of a sample remained constant over time, the initial quantification data was used to target 0.5 ng of DNA per sample for PCR at each time point. Each sample contained an internal size standard, which consisted of several DNA fragments of known sizes and allowed each peak in the sample to be sized according to its migration through the capillary. GeneMapper® *ID* v 3.2 (Life Technologies Corp.) used specific algorithms to assign the appropriate allele designations to the peaks in the samples by comparing those peaks to the known alleles in the allelic ladder. If each sample contained a full or partial genotype, as listed in Table 2, the alleles in each sample were assessed to determine if they exceeded the interpretation threshold of 150 rfu and if not, they were re-injected for 8 seconds. RFUs for each allele present at all markers were combined to calculate an average peak height per sample based on the total number of expected alleles. Sample integrity was evaluated by comparing the change in average peak height after 1 year in storage. Allelic dropout was also used to determine if storage conditions affected sample integrity. At the end the 12 months, interpretation of electrophoretic data indicated degradation or the possible presence of PCR inhibitors in some samples. These samples

were put through Centri-Sep columns (Princeton Separations, Aldelphia, NJ) to aid in removing salts or impurities that may have contributed to partial or complete sample inhibition. Centri-Sep samples were re-amplified and re-injected for 3 and 8 seconds. Samples with several alleles below the interpretation threshold for this project were processed in this manner.

Table 2: Expected genotype for all extracts in this study. Identifiers in the marker column describe the location of the DNA segment being evaluated. The numerical values in the allele columns represent the DNA variant(s) the individual has at the specified marker.

Marker	Allele 1	Allele 2
D3S1358	15	16
TH01	6	9.3
D21S11	28	29
D18S51	10	13
PentaE	7	11
D5S818	11	-
D13S317	12	13
D7S820	10	12
D16S539	12	-
CSF1PO	11	-
PentaD	9	11
AMEL	X	-
vWA	17	19
D8S1179	12	13
TPOX	8	11
FGA	21	25

Statistical Analysis

The t-Test: Two-Sample Assuming Equal Variances from Microsoft Excel 2010 was used to determine if concentration averages and combined average peak heights were significant. T-tests were calculated with a 95% confidence interval. When averages were used for drawing a conclusion, standard deviations were calculated to show the amount of variance in the data.

RESULTS

DNA Quantity

Buffer Type

To determine if buffer type was a factor in the amount of amplifiable DNA that remained in each sample after 1 year of storage, scatter plots were created to visualize the trend in the quantification data. For every time point, Figure 1 displays the measured concentration for all 8 ng/ μ L samples stored at each temperature. Plots for additional concentrations constructed from the data in Appendix A were not shown since they displayed the same result. After 1 year, all samples showed a decrease in the amount of amplifiable DNA remaining when compared to the initial measurement, regardless of the buffer. Table 3 displays the final concentration for all samples confirming that amplifiable DNA in every sample declined.

The loss of DNA concentration was calculated from the quantification values at day 349 as a percentage of the initial measurement prior to storage. Samples were grouped according to their percent loss and plotted as a histogram in Figure 2. All samples exhibited at least a 20% loss of DNA after 1 year. The majority of samples from either buffer lost between 20-40% of their amplifiable DNA. Storage in TE could not entirely prevent DNA loss; however, the difference between the loss of DNA after 1 year for samples stored in TE (33 ± 11 , $n = 36$) versus water (46 ± 25 , $n = 36$) were statistically significant ($p = 0.006$) indicating water and TE were not equivalent in maintaining DNA concentration.

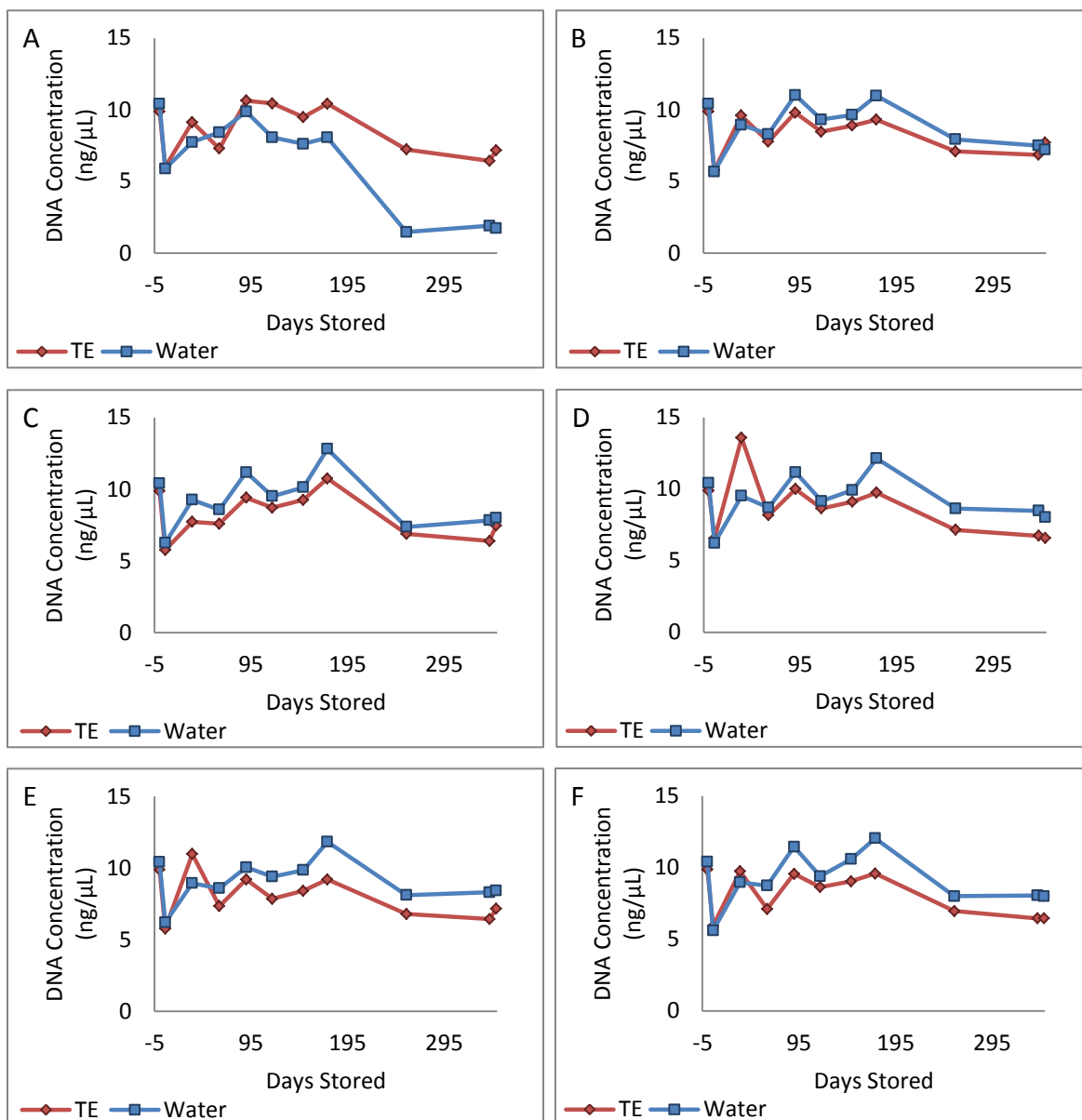


Figure 1: All samples exhibit reduced DNA concentrations after storage for 1 year. Data shown represents samples at 8 ng/μL stored at (A) room temperature, (B) +4 °C, (C) -20 °C stock, (D) -20 °C single use, (E) -60 °C stock, (F) -60 °C single use. Additional concentration plots displayed the same trend and were not shown.

Table 3: DNA concentrations at day 349 lower than baseline values. Initial concentration is represented in the baseline column. Subsequent columns show the concentration at day 349 for each temperature after 1 year in storage. DNA concentration is reported in ng/ μ L. Temperature units are $^{\circ}$ C. Data for all time points are in Appendix A.

Buffer	Concentration	Baseline	RT	+4	-20	-20 su*	-60	-60 su*
TE	0.01	0.020	0.013	0.011	0.012	0.011	0.011	0.003
	0.1	0.13	0.09	0.09	0.10	0.07	0.08	0.08
	0.2	0.24	0.19	0.17	0.16	0.15	0.20	0.13
	1	1.21	0.86	0.81	0.76	0.79	0.96	0.77
	4	4.93	3.71	3.81	3.76	3.50	3.80	3.36
	8	9.87	7.16	7.70	7.46	6.56	7.14	6.46
Water	0.01	0.029	0.002	0.011	0.005	0.006	0.011	0.011
	0.1	0.18	0.05	0.09	0.09	0.10	0.07	0.10
	0.2	0.24	0.05	0.15	0.15	0.18	0.16	0.19
	1	1.35	0.31	0.96	0.99	1.01	1.04	1.02
	4	5.13	0.00	1.37	3.89	3.84	4.20	4.16
	8	10.41	1.73	7.22	7.99	8.02	8.41	7.99

*Samples were single use aliquots.

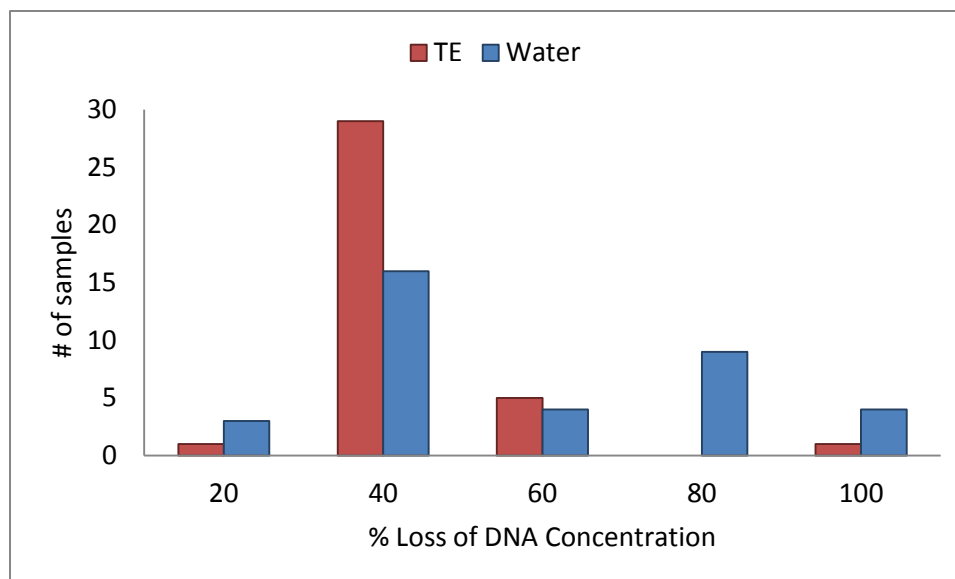


Figure 2: Water samples lost more DNA than TE. The loss of DNA concentration was calculated from the quantification values at day 349 as a percentage of the initial measurement prior to storage. Samples grouped by the percent loss of DNA concentration after 1 year in storage. Thirty-six samples were stored in each buffer for 1 year.

Stock Tubes vs. Single Use Aliquots

The second comparison assessed if single use aliquots (i.e., DNA thawed only once) would preserve DNA better than stock tubes (i.e., DNA thawed multiple times). The percent loss in concentration, as calculated previously, was plotted for stock tubes and single use aliquots in Figure 3. In ten of twelve comparisons of extracts stored in TE, single use aliquots lost more DNA than stock tubes. Samples in water were equally split: half the time stock tubes lost more DNA than single use aliquots and vice versa.

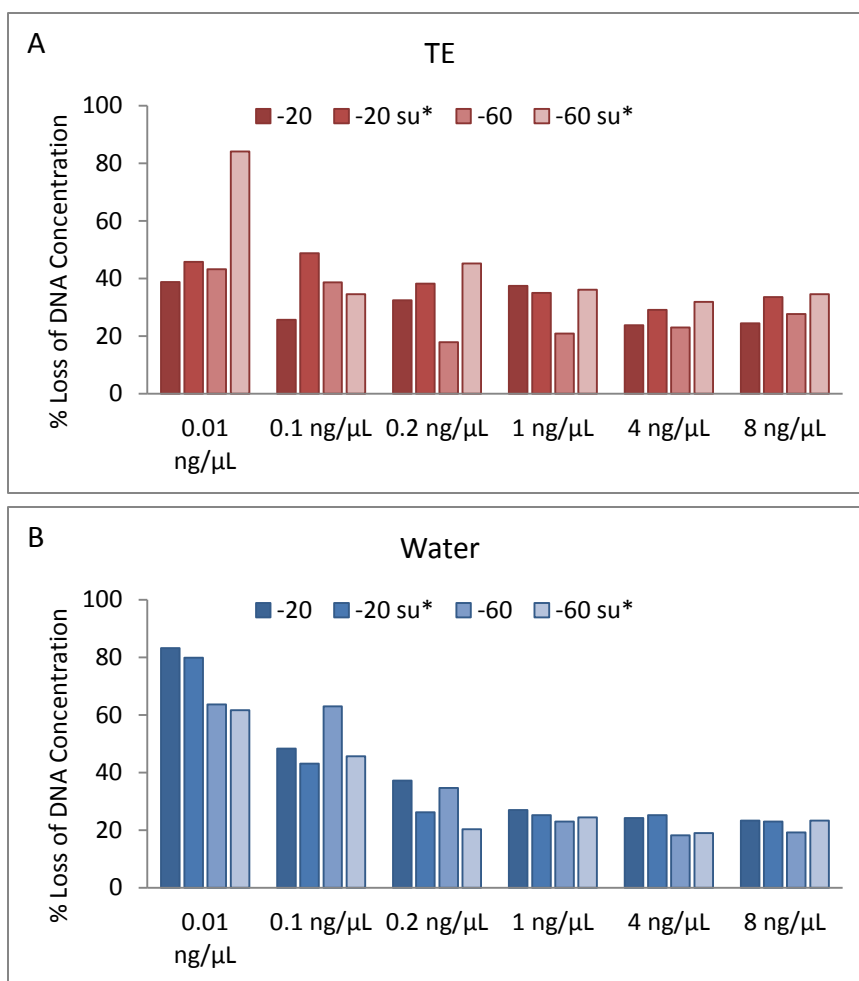


Figure 3: The percent loss of DNA concentration in stock tubes and single use aliquots separated by buffer. Each panel displays samples stored under conditions (A) TE at -20 °C and -60 °C and (B) water at -20 °C and -60 °C. *Samples were single use aliquots.

The percent loss for each tube type was organized in a table by buffer and frozen temperature (-20 °C or -60 °C). Concentration variables were disregarded to calculate the average loss of DNA for stock tubes and single use aliquots as shown in Table 4. An average loss was determined for each tube type at -20 °C and -60 °C. Temperature variables were then ignored and an average loss was calculated for tube types between buffers. In TE buffer, the difference in the mean loss of DNA concentration after 1 year for single use aliquots (41 ± 14 , $n = 12$) versus stock tubes (29 ± 8 , $n = 12$) was found to be statistically significant ($p = 0.023$) indicating tube type affected DNA concentration. Water samples were less variable, but stock tubes lost 4% more than single use aliquots. Table 5 displays the p-values for all t-test comparisons made to evaluate tube type and its effect on DNA concentration.

Table 4: Average percent loss of DNA calculated for stock tubes and single use aliquots. Within each buffer, an average for all samples grouped by stock tubes or single use aliquots was calculated to determine the percent loss per tube type. Error values represent standard deviation.

Temperature (°C)	Concentration (ng/μL)	TE (%)		Water (%)	
		stock	single use	stock	single use
-20	0.01	39	46	83	80
	0.1	26	49	48	43
	0.2	32	38	37	26
	1	37	35	27	25
	4	24	29	24	25
	8	24	34	23	23
-20 Average (n = 6):		30±6	38±7	41±21	37±20
-60	0.01	43	84	64	62
	0.1	39	34	63	46
	0.2	18	45	35	20
	1	21	36	23	24
	4	23	32	18	19
	8	28	35	19	23
-60 Average (n = 6):		29±9	44±18	37±19	32±16
Total Average (n = 12):		29±8	41±14	39±20	35±18

Table 5: A significant difference between stock tubes and single use aliquots was indicated by the p-value when TE was the storage buffer. T-tests were performed to make the comparisons below. Individual p-values represent a comparison made between a set of storage conditions: one from the top of the table and one from the left side of the table. The value in bold indicates the only significant result. Temperature units are °C.

Buffer	Tube Type	Temperature	TE						Water			
			Stock			Single Use			Single Use			
			-20	-60	All*	-20	-60	All*	-60	-20	-60	All*
TE	Stock	-20	0.72			0.08 0.13						
		-60				0.11						
All*					0.02							
	Single Use	-20	0.09			0.51						
Water	Stock	-20	0.32	0.27		0.83	0.76		0.78	0.80	0.50	
		-60	0.49	0.40		0.88	0.55				0.69	
		All*			0.17			0.72			0.63	
	Single Use	-20	0.50	0.41		0.90	0.56		0.99		0.69	
		-60	0.80	0.65		0.45	0.29					
		All*			0.39			0.35				

*Both temperatures (-20 °C and -60 °C) were combined for the specified tube type.

Temperature

Four temperatures were assessed to determine if DNA concentration was maintained equally: room temperature, +4 °C, -20 °C and -60 °C. As expected, higher temperatures exhibited a greater loss of DNA in water samples. Separated by buffer in Figure 4, initial and final sample concentrations at day 349 were plotted across temperature. Samples in water differed more in final concentration across temperature than TE. All extracts stored in water at room temperature lost more DNA when compared to any other temperature. Table 6 shows an average loss of DNA concentration across temperature. DNA concentration was impacted when buffer type was also a factor. In TE, minor fluctuations occurred between temperatures, but samples in water varied more. At room temperature, the difference between the loss of DNA concentration in TE (29 ± 5 , $n = 6$) compared to water (84 ± 10 , $n = 6$) was

statistically significant ($p = 5.32E-07$). Thus, buffers were confirmed to be significantly different in maintaining DNA concentration at room temperature.

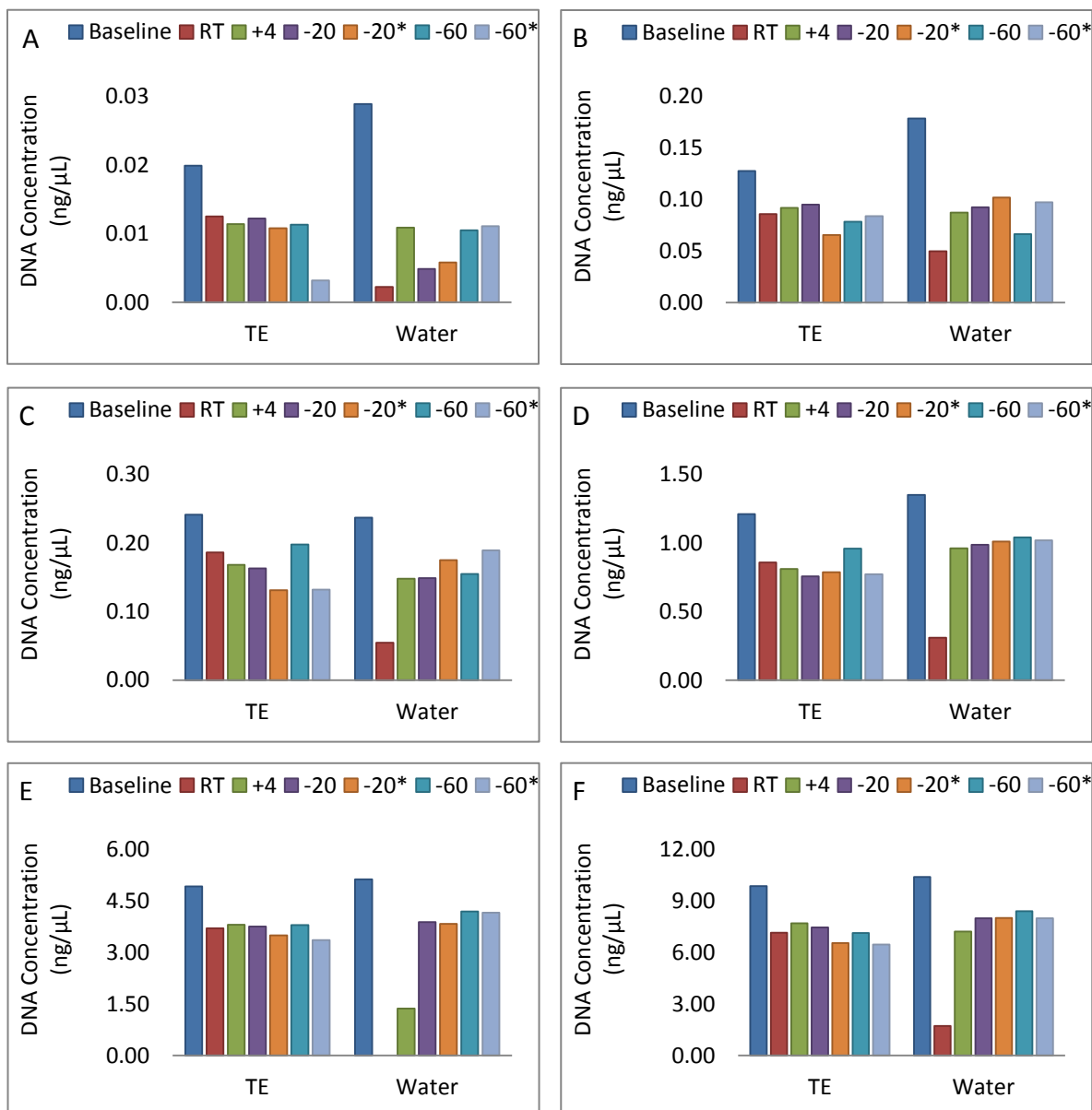


Figure 4: TE was less affected by temperature than water. Initial and final concentrations at day 349 were plotted separately per buffer. Concentrations are (A) 0.01 ng/μL, (B) 0.1 ng/μL, (C) 0.2 ng/μL, (D) 1 ng/μL, (E) 4 ng/μL, (F) 8 ng/μL. Temperature units are °C. *Samples were single use aliquots.

Table 6: Samples in water lost more DNA at room temperature than TE. The average percent loss of DNA concentration was calculated across temperature (n = 6). T-tests evaluated DNA concentration between buffers by temperature. P-values show the significance of the comparisons. The value in bold indicates the only significant result. Error values represent standard deviation.

Temperature (°C)	TE (%)	p-value	Water (%)
RT	29±5	5.32E-07	84±10
+4	30±7	0.0535	47±16
-20	30±6	0.324	41±21
-20 single use aliquots	38±7	0.895	37±20
-60	29±9	0.403	37±19
-60 single use aliquots	44±18	0.291	32±16

Concentration

Six concentrations were evaluated to determine if the amount of sample lost correlated to the starting concentration. Figure 5 depicts the average percent loss of DNA as grouped by starting concentration. The lowest concentration, 0.01 ng/μL, showed the largest decrease in concentration. When stored in water, there was a 74% loss of DNA concentration as compared to a 49% loss in TE. It was confirmed that all samples stored in TE, regardless of their starting concentration, minimized DNA loss better than when using water as a buffer.

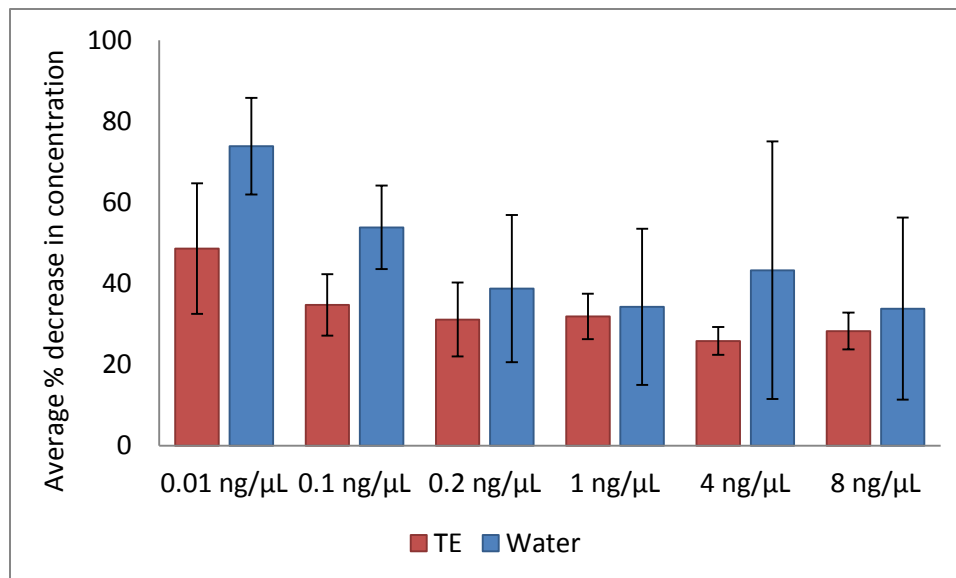


Figure 5: Average percent loss of DNA across concentration groups. Buffers were plotted separately. The percent loss of DNA per sample was calculated, averaged within each concentration group and plotted. Error bars represent standard deviation (n = 6).

DNA Quality

Buffer Type

To illustrate, sample-by-sample, that storage in water had a larger impact on sample integrity than TE, Table 7 shows the percent change in each sample's average peak height after 1 year in storage. All samples stored in water displayed reduced average peak heights. Of samples in water, 83% declined more in average peak height than samples in TE. Data for eight second injections exhibited the same result.

Samples were grouped by buffer according to the percent change in average peak height and plotted in Figure 6. The data trend indicated water did not maintain DNA integrity as well as TE. Ignoring all variables besides buffer, the difference between the percent change in average peak height for samples in TE (-10 ± 29 , n = 36) versus water (-46 ± 27 , n = 36) was determined to be statistically significant ($p = 7.88E-07$) confirming buffers were significantly different in their ability to maintain DNA integrity.

Table 7: Average peak height in all water samples declined after storage for 1 year. The percent change (% Δ) in peak height was calculated as a percentage of the initial average peak height from the average peak height of a sample at day 349. Negative values indicate a decrease in average peak height. Values represent a 3 second injection and the 8 second injection is represented as the second value. Temperature units are $^{\circ}\text{C}$.

% Δ in average peak height	Concentration (ng/ μL)	RT (%)	+4 (%)	-20 (%)	-20 su* (%)	-60 (%)	-60 su* (%)
TE	0.01	-3	42	-92/59 [†]	-27	0/107	6
	0.1	-40	-41	-51	-59	-54	-57
	0.2	13	4	-20	-44	9	-25
	1	13	8	22	8	-1	-6
	4	2	13	-12	-21	-6	-7
	8	-8	26	20	30	-6	-2
Water	0.01	-99/-97 [†]	-54	-77/-44	-70/-38	-71/-30	-77/-53
	0.1	-85/-66	-66	-73	-41	-61	-55
	0.2	-89/-60 [†]	-24	-36	-23	-29	-7
	1	-75/-6	-6	-8	-22	-22	-5
	4	-88/-61	-39	-40	-24	-23	-24
	8	-86/-61	-43	-27	-23	-41	-35

*Samples were single use aliquots. [†]Samples put through Centri-Sep columns and re-amplified as described in the Data Analysis section of the Materials and Methods.

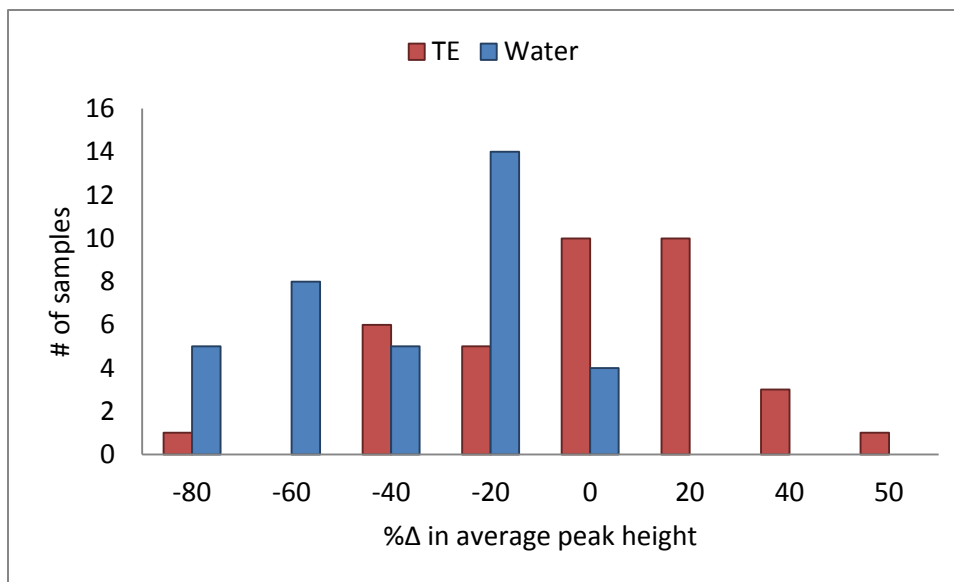


Figure 6: TE maintained DNA integrity better than water. Samples grouped by the percent change in average peak height after 1 year in storage. Thirty-six samples were stored in each buffer.

Stock Tubes vs. Single Use Aliquots

Values from Table 7 were plotted in Figure 7 for the 3 second injections for stock tubes and single use aliquots. The data trend in panel B is nearly identical to the trending of the quantification results in panel B of Figure 3. Based on the change in average peak height after 1 year, it appeared that stock tubes in TE outperformed single use aliquots by either maintaining a higher average peak height per sample or declining by a smaller percentage in seven of twelve comparisons. The opposite was true for samples stored in water. As indicated in panel B, nine of twelve stock tubes declined in average peak height by a larger percentage than single use aliquots. To evaluate any significance of these results, t-test comparisons were conducted in a similar manner as those displayed in Table 5. Of all comparisons, the difference between the decrease in average peak heights over time in water (-42 ± 22 ; $n = 12$) versus TE (-16 ± 32 , $n = 12$) was found to be statistically significant ($p = 0.035$). Therefore, the buffers were significantly different in their ability to maintain the integrity of DNA samples stored as stock tubes.

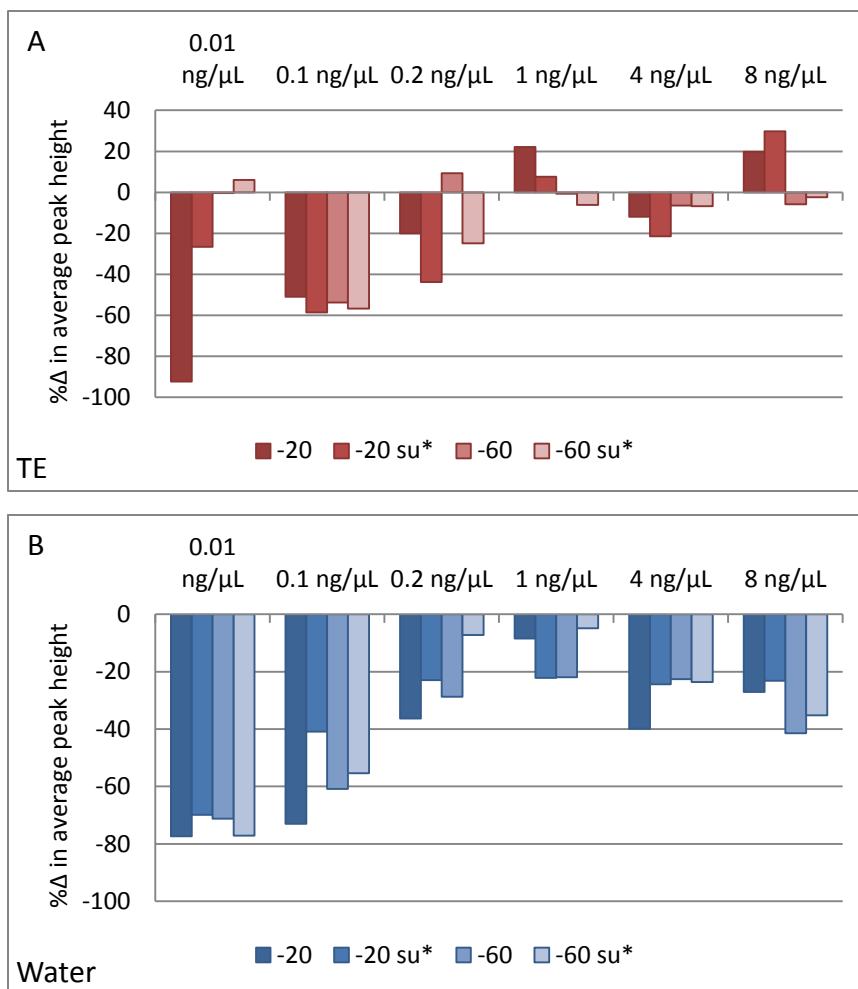


Figure 7: TE and water stock tubes differ in the ability to maintain DNA integrity. The percent change in average peak height was calculated for DNA samples after storage for 1 year in stock tubes and single use aliquots. Samples are displayed by buffer in panels (A) TE and (B) water. Negative values represent a loss in average peak height. *Samples were single use aliquots.

Temperature

The average peak heights for all samples stored at a designated temperature were averaged together and plotted in Figure 8 to see the effect of temperature on DNA after storage for 1 year. Samples in TE were well maintained despite temperature. Refrigerated and frozen temperatures maintained samples in water equivalently; however, the average peak height for samples stored at room temperature (255 ± 131 ,

n = 6) significantly ($p = 7.63E-06$) declined after 1 year as compared to the baseline (1869 ± 409 , n = 6). Interestingly, the only temperatures for samples stored in water that did not yield significant differences in peak height after 1 year were $-20\text{ }^{\circ}\text{C}$ single use aliquots (1274 ± 469 , n = 6, $p = 0.058$) and $-60\text{ }^{\circ}\text{C}$ single use aliquots (1254 ± 511 , n = 6, $p = 0.062$). Figure 9 displays partial electrophoretic data for the $0.01\text{ ng}/\mu\text{L}$ sample that was stored at room temperature in water for 1 year. DNA integrity was affected after storage for only 3 months as shown in Panel B. Panel F shows data for the sample after it was put through a Centri-Sep column.

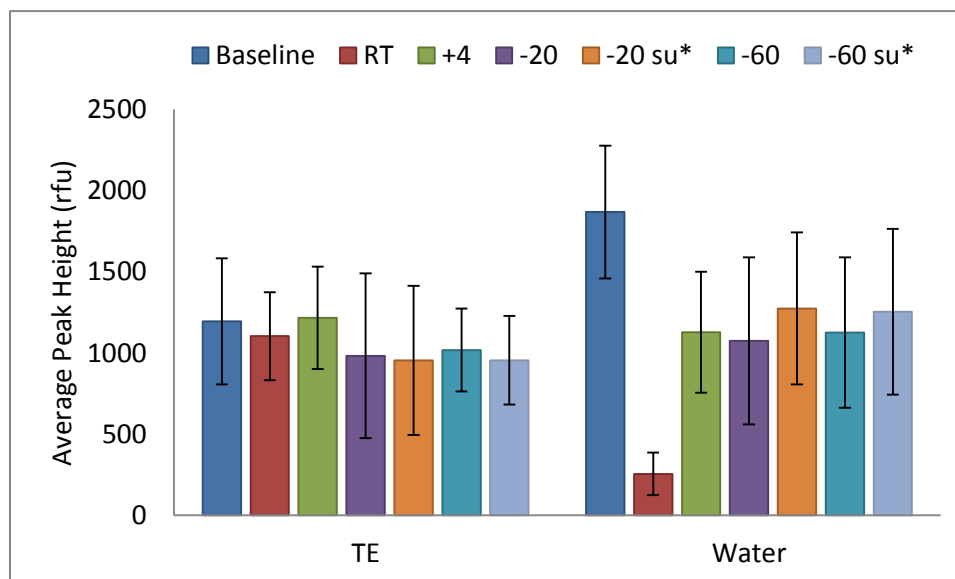


Figure 8: Samples stored in water at room temperature were mostly degraded after 1 year in storage. Average peak heights for samples were averaged within each temperature. Error bars represent standard deviation (n = 6). Temperature units are $^{\circ}\text{C}$. *Samples were single use aliquots.

Figure 9: Partial STR data of the 0.01 ng/ μ L sample stored in water at room temperature indicate degradation after 1 year. The sample was put through a Centri-Sep column at the end of the study since all alleles were below the interpretation threshold of 150 rfu. Centri-Sep columns are used to removed inhibitors that may cause a sample to appear degraded. Panels represent time points (A) baseline, (B) Day 90, (C) Day 174, (D) Day 256, (E) Day 349, (F) post day 349 Centri-Sep column.

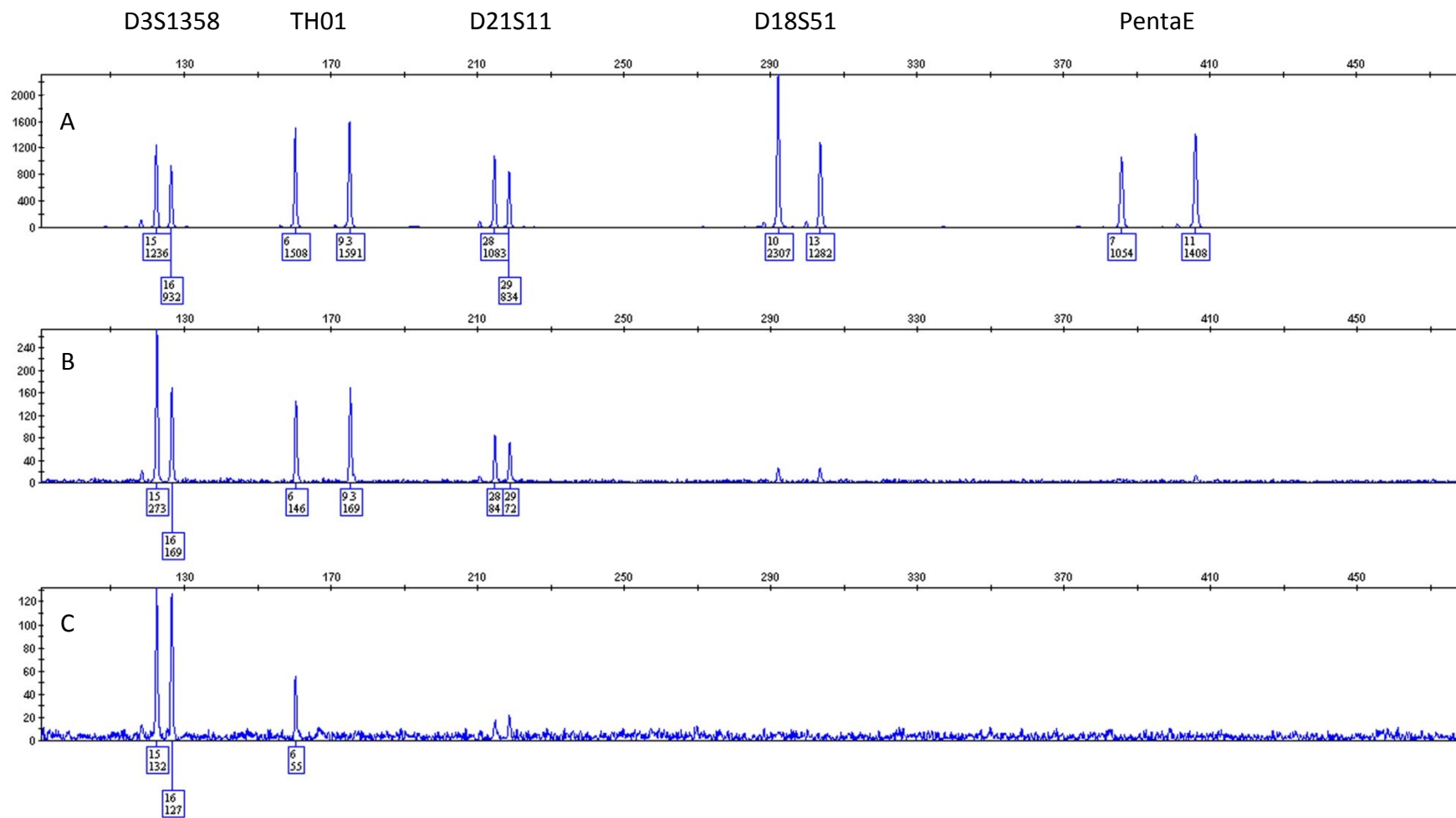


Figure 9

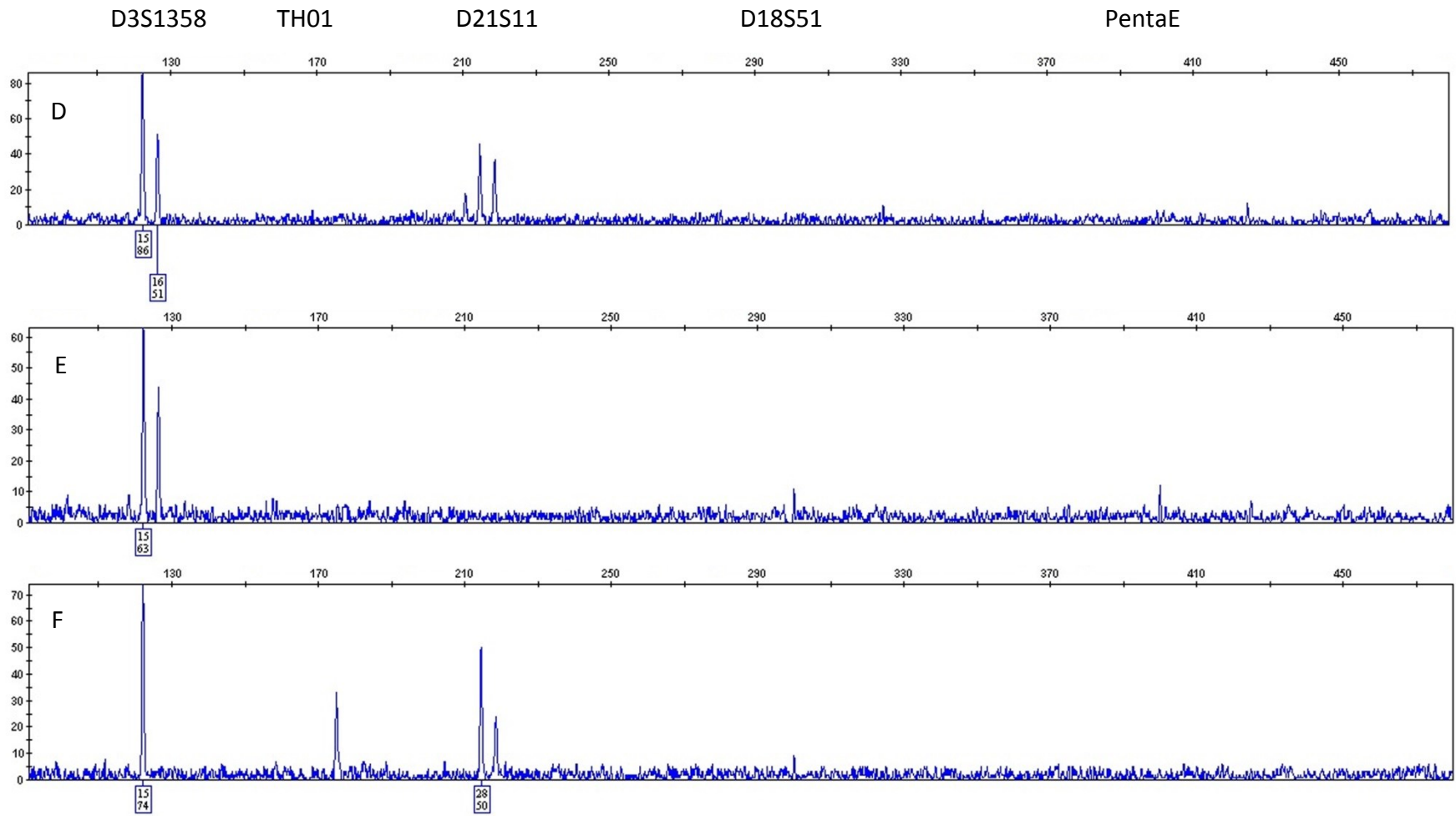


Figure 9 continued

Concentration

Allelic dropout was used to evaluate if concentration had any impact on the loss of DNA in the stored samples. As depicted in Table 8, only 2 of the 36 samples stored in TE had peak heights below the threshold of 150 rfu and that dropped to only 1 sample when 8 second data was used. For TE, concentration does not appear to correlate with loss of DNA. For water, all concentrations have alleles below threshold; however, these low alleles are only consistently found in the samples at room temperature. The lowest concentration was impacted at all temperatures, except +4 °C, suggesting that DNA with a concentration less than 0.1 ng/μL should not be stored long-term in water.

Table 8: Samples with alleles below the interpretation threshold of 150 rfu. Dark blue boxes indicate loci at which the alleles completely dropped out or were below interpretation threshold. Light blue boxes with a numerical value indicate heterozygous loci in which one allele dropped out or was below threshold. The numerical value is the peak height (rfu) of the remaining allele. White boxes indicate all alleles were above threshold. Homozygous loci are in bold. Samples in red used the 8 second data after the samples were run through Centri-Sep columns and re-amplified.

Injection Parameters	Buffer	Concentration (ng/μL)	Temperature (°C)	AMEL	CSF	D13	D16	D18	D21	D3	D5	D7	D8	FGA	PentaD	PentaE	TH01	TPOX	vWA		
3 kV 3 s	Water	0.01	RT																		
			-20											266	177						
			-20 su*			197								185		193					
			-60														405				
			-60 su*													183	161				
		0.1	RT													156	176				
		0.2	RT							168									233		
		1	RT																		
		4	RT												182						
		8	RT												231						
TE	0.01	-20																159	222		
		-60														513					
3 kV 8 s	Water	0.01	RT							165											
			-20											422							
			-20 su*												383	162					
		0.2	RT														241				
		4	RT												211						
		8	RT												398						
TE	0.01	-20															709				

*Samples were single use aliquots.

DISCUSSION

Real-time PCR was used to measure the quantity of amplifiable DNA in each sample at each time point. This method was chosen over other quantification methods for many reasons. Spectrophotometric methods utilize the UV absorbance wavelength of DNA to measure concentration fairly accurately; however, it fails to account for non-human DNA and cannot differentiate highly degraded DNA from intact DNA. Yield gels can easily determine the quality of the DNA but are not very sensitive, do not have the ability to indicate the presence of inhibitors and are also not human specific. Quantifiler® Duo, the commercial kit used in this study to measure DNA by real-time PCR analysis, is specific to only human DNA. It is very sensitive and measures as low as 10 pg/ μ L, as validated by the Indiana State Police (ISP) laboratory. DNA quantity is assessed by monitoring the accumulation of PCR amplicons, which allows the concentration of amplifiable DNA to be calculated per sample.

Several storage factors were evaluated to determine if they had any detrimental effects on DNA. NFH_2O and TE elution buffer from the DNA IQ™ kit were compared for DNA storage longevity and it was confirmed that water and TE were significantly different in their abilities to maintain DNA integrity. All samples had at least a 20% loss of their original DNA concentration. Most samples fell in the range of 20-40% for sample loss indicating that, regardless, some DNA loss will occur in stored extracts over time. Even though all samples exhibited reduced concentrations after 1 year, STR data does not reflect that exact trend. All water samples had reduced peak heights and 83% had a larger decline than samples in TE. This suggested that TE stabilized samples better than water and reduced the loss of DNA. Since water lacks preserving agents, it was not unexpected to see that it was less efficient than TE for long-term DNA storage.

Before this study, the general assumption was that storing DNA frozen and thawing it only once would be better than storing it as a stock tube. The data presented here does not strengthen this notion. Stock tubes in TE were actually significantly different than single use aliquots at maintaining DNA concentration. STR analysis did not confirm that result. In fact, the conclusion from evaluating average peak heights was that stock tubes were significantly different based on the buffer utilized for storage with TE being the more stable buffer. This seems somewhat logical since DNA naturally degrades over time and water does not contain any stabilizers to prevent DNA degradation if it is repeatedly thawed. One explanation to account for reduced sample integrity in TE single use aliquots could be a result of some of the salts falling out of solution and disrupting the DNA structure because the samples were not mixed at time intervals like the stock tubes.

Colder is better has been the guideline for many laboratories for the long-term storage of DNA extracts. While TE maintained sample concentration and integrity similarly across all temperatures, room temperature storage of water samples proved to be damaging after 1 year. Even +4 °C was not as good at stabilizing water samples as the frozen temperatures were. Again, it is not surprising that samples in water lost less DNA when frozen considering water has no mechanism to prevent DNA strand breaks so the only way to overcome this was to freeze samples. Complete degradation occurred in one sample stored in water at room temperature as determined by running it through a Centri-Sep column. Centri-Sep columns are designed to remove inhibitors, salts or other impurities that can interfere with PCR and use of the columns often resolves impure samples from degraded samples. Even though the sample was stored in water free of nucleases, it is possible that inhibitors or contaminants were introduced to the sample after storage that caused the degradation.

Five of the six concentrations evaluated did not adversely affect sample integrity after 1 year in storage using water as a buffer. The lowest sample concentration, 0.01 ng/μL, was almost entirely degraded when stored in water at room temperature for 1 year. Common sense could have suggested that the lower the concentration, the more

likely a sample is to become unreliable for STR analysis after 1 year in storage. It is advised that samples, approximately 0.01 ng/ μ L, should not be stored for longer than 3 months since data suggests degradation has already affected samples by that time.

At the last time point, day 349, samples were heated for 2 hours prior to being processed in the normal manner. This was done to explore the possibility of DNA adsorption to the storage tube wall. In samples with extremely low concentrations, 0.01 ng/ μ L, for example, the small amount of DNA present in the sample could easily adhere to the tube and not be present in the portion removed for testing. Heating has been explored as a way to release the DNA back into solution; however, in this study, it did not have the expected effect which would have resulted in a large increase in concentration or average peak height when compared to quantities at day 342.

FUTURE CONSIDERATIONS

Although the research discussed here can help establish a baseline for storage conditions of extracted DNA that can benefit forensic science, as well as other fields, it seems pertinent to mention that additional research should be performed in this area. Limited sample sizes of this project did not allow for multiple statistical evaluations. Further exploration into stock tube storage and single use aliquots among both water and TE would be very informative. To refine the project, initial DNA concentrations should be reduced to two, one on the lower end for forensic samples and one on the higher end. The same extraction methods as described here should be used in addition to eluting DNA from an organic extraction in TE buffer to confirm the results in this study were related to buffer and not an effect of beads carried over from the Maxwell® extraction. Each sample should be stored in triplicate to allow for data to be averaged and provide multiple data points for statistical analysis. Time points and analysis parameters from this study should be kept the same. Reducing variables and adding replicates will put more weight behind the data to determine if single use aliquots provide a significantly different storage environment than stock tubes.

Properly stored samples will aid technological growth and promote new assay development that may allow more samples to be analyzed or allow previously tested samples to be evaluated in a new way. For example, the ISP Laboratory used their stored DNA samples to validate STRs for the Y-chromosome (Y-STR) (C. Sobieralski, personal communication). Y-STRs are useful in paternity analysis, distinguishing patrilineal lineages and confirming the presence of male DNA on evidence. The ISP laboratory was fortunate their storage conditions were suitable for DNA storage since their stored samples were used to validate new test methods. Having minimum storage

standards that maximize DNA stability would help laboratories be more confident that sample degradation was kept to a minimum.

Another benefit to defining minimum storage guidelines is that it will aid the development of international data sharing of forensic samples. Currently, the United States (US) maintains the Combined DNA Index System (CODIS) (33). In 1995, the United Kingdom created their DNA database, called the National DNA Database (34). Other countries across Europe have followed suit and also have their own DNA databases. For samples to be entered into the database in the US, they have to undergo genotyping of the CODIS “core” loci (33), while most of Europe utilizes the AmpFLSTR® SGM Plus® PCR Amplification Kit for their STR typing (34). A comparison of the required loci for these two databases shows that there are only eight overlapping loci. If international data sharing is to become reality, laboratories worldwide will need to move toward using the same kits or at least a combination of kits that allow for more than eight overlapping loci. Optimal DNA storage conditions need to be determined so current samples can be stored properly to allow for additional testing of new loci, in case worldwide data sharing becomes more than just an idea.

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APPENDICES

Appendix A. Quantifiler® Duo Real-Time Data

Table A.1: Concentration and Ct measurements for each sample at each time point.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
Baseline	Water	0.01	N/A	LB 0.01 ng/μL	34.16	0.029
Baseline	Water	0.1	N/A	LB 0.1 ng/μL	31.64	0.179
Baseline	Water	0.2	N/A	LB 0.2 ng/μL	31.25	0.237
Baseline	Water	1	N/A	LB 1 ng/μL	28.85	1.350
Baseline	Water	4	N/A	LB 4 ng/μL	27	5.130
Baseline	Water	8	N/A	LB 8 ng/μL	26.03	10.410
Baseline	TE	0.01	N/A	M 0.01 ng/μL	34.67	0.020
Baseline	TE	0.1	N/A	M 0.1 ng/μL	32.11	0.128
Baseline	TE	0.2	N/A	M 0.2 ng/μL	31.23	0.241
Baseline	TE	1	N/A	M 1 ng/μL	29.01	1.210
Baseline	TE	4	N/A	M 4 ng/μL	27.06	4.930
Baseline	TE	8	N/A	M 8 ng/μL	26.1	9.870
6	TE	0.01	RT	1.1	34.86	0.010
6	TE	0.01	+4	2.1	38.41	0.001
6	TE	0.01	-20 su*	3.1	35.03	0.009
6	TE	0.01	-20	4.1	35.64	0.006
6	TE	0.01	-60 su*	5.1	35.28	0.008
6	TE	0.01	-60	6.1	36.32	0.004
6	TE	0.1	RT	7.1	32.38	0.062
6	TE	0.1	+4	8.1	32.54	0.055
6	TE	0.1	-20 su*	9.1	32.15	0.072
6	TE	0.1	-20	10.1	32.91	0.042
6	TE	0.1	-60 su*	11.1	32.91	0.042
6	TE	0.1	-60	12.1	32.69	0.049
6	TE	0.2	RT	13.1	31.51	0.115
6	TE	0.2	+4	14.1	31.36	0.128
6	TE	0.2	-20 su*	15.1	31.81	0.092
6	TE	0.2	-20	16.1	31.6	0.108
6	TE	0.2	-60 su*	17.1	32.02	0.080
6	TE	0.2	-60	18.1	31.91	0.086
6	TE	1	RT	19.1	29.28	0.579
6	TE	1	+4	20.1	29.26	0.586
6	TE	1	-20 su*	21.1	29.4	0.532
6	TE	1	-20	22.1	29.13	0.643
6	TE	1	-60 su*	23.1	29.26	0.586
6	TE	1	-60	24.1	29.23	0.598
6	TE	4	RT	25.1	27.2	2.600
6	TE	4	+4	26.1	27.04	2.920
6	TE	4	-20 su*	27.1	27.06	2.890

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
6	TE	4	-20	28.1	27.1	2.800
6	TE	4	-60 su*	29.1	27.05	2.910
6	TE	4	-60	30.1	26.98	3.050
6	TE	8	RT	31.1	26.05	6.020
6	TE	8	+4	32.1	26.1	5.770
6	TE	8	-20 su*	33.1	25.93	6.540
6	TE	8	-20	34.1	26.11	5.760
6	TE	8	-60 su*	35.1	26.06	5.930
6	TE	8	-60	36.1	26.11	5.760
6	Water	0.01	RT	73.1	34.62	0.011
6	Water	0.01	+4	74.1	35.22	0.007
6	Water	0.01	-20 su*	75.1	34.89	0.009
6	Water	0.01	-20	76.1	36.03	0.004
6	Water	0.01	-60 su*	77.1	35.63	0.005
6	Water	0.01	-60	78.1	35.08	0.008
6	Water	0.1	RT	79.1	32.24	0.064
6	Water	0.1	+4	80.1	32.2	0.066
6	Water	0.1	-20 su*	81.1	32.2	0.066
6	Water	0.1	-20	82.1	32.36	0.059
6	Water	0.1	-60 su*	83.1	32.64	0.048
6	Water	0.1	-60	84.1	31.89	0.083
6	Water	0.2	RT	85.1	31.76	0.091
6	Water	0.2	+4	86.1	31.66	0.098
6	Water	0.2	-20 su*	87.1	31.72	0.094
6	Water	0.2	-20	88.1	31.87	0.084
6	Water	0.2	-60 su*	89.1	31.53	0.108
6	Water	0.2	-60	90.1	31.7	0.095
6	Water	1	RT	91.1	29.11	0.644
6	Water	1	+4	92.1	29.05	0.675
6	Water	1	-20 su*	93.1	29.15	0.628
6	Water	1	-20	94.1	29.13	0.639
6	Water	1	-60 su*	95.1	29.06	0.669
6	Water	1	-60	96.1	29.08	0.663
6	Water	4	RT	97.1	27.1	2.840
6	Water	4	+4	98.1	27.12	2.800
6	Water	4	-20 su*	99.1	27.07	2.910
6	Water	4	-20	100.1	27.06	2.950
6	Water	4	-60 su*	101.1	27.07	2.920
6	Water	4	-60	102.1	27.03	3.020
6	Water	8	RT	103.1	26.12	5.890
6	Water	8	+4	104.1	26.17	5.680
6	Water	8	-20 su*	105.1	26.05	6.220
6	Water	8	-20	106.1	26.04	6.250
6	Water	8	-60 su*	107.1	26.19	5.600

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
6	Water	8	-60	108.1	26.05	6.190
34	TE	0.01	RT	1.2	35.03	0.025
34	TE	0.01	+4	2.2	36.18	0.012
34	TE	0.01	-20 su*	3.2	36.65	0.008
34	TE	0.01	-20	4.2	36.07	0.013
34	TE	0.01	-60 su*	5.2	36.2	0.012
34	TE	0.01	-60	6.2	35.76	0.015
34	TE	0.1	RT	7.2	32.37	0.152
34	TE	0.1	+4	8.2	32.33	0.156
34	TE	0.1	-20 su*	9.2	32.51	0.138
34	TE	0.1	-20	10.2	33.07	0.095
34	TE	0.1	-60 su*	11.2	32.74	0.118
34	TE	0.1	-60	12.2	33.08	0.094
34	TE	0.2	RT	13.2	31.86	0.214
34	TE	0.2	+4	14.2	31.57	0.260
34	TE	0.2	-20 su*	15.2	32.27	0.162
34	TE	0.2	-20	16.2	31.78	0.226
34	TE	0.2	-60 su*	17.2	31.62	0.252
34	TE	0.2	-60	18.2	32.2	0.170
34	TE	1	RT	19.2	29.23	1.260
34	TE	1	+4	20.2	29.31	1.200
34	TE	1	-20 su*	21.2	29.45	1.090
34	TE	1	-20	22.2	29.67	0.937
34	TE	1	-60 su*	23.2	29.46	1.080
34	TE	1	-60	24.2	29.48	1.070
34	TE	4	RT	25.2	27.35	4.490
34	TE	4	+4	26.2	27.19	5.020
34	TE	4	-20 su*	27.2	27.31	4.610
34	TE	4	-20	28.2	27.22	4.900
34	TE	4	-60 su*	29.2	27.36	4.460
34	TE	4	-60	30.2	27.3	4.650
34	TE	8	RT	31.2	26.3	9.130
34	TE	8	+4	32.2	26.23	9.590
34	TE	8	-20 su*	33.2	25.71	13.560
34	TE	8	-20	34.2	26.55	7.720
34	TE	8	-60 su*	35.2	26.2	9.740
34	TE	8	-60	36.2	26.03	10.970
34	Water	0.01	RT	73.2	35.29	0.018
34	Water	0.01	+4	74.2	35.14	0.020
34	Water	0.01	-20 su*	75.2	36.09	0.011
34	Water	0.01	-20	76.2	35.01	0.022
34	Water	0.01	-60 su*	77.2	34.83	0.025
34	Water	0.01	-60	78.2	34.47	0.032
34	Water	0.1	RT	79.2	32.39	0.128

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
34	Water	0.1	+4	80.2	32.44	0.124
34	Water	0.1	-20 su*	81.2	32.39	0.128
34	Water	0.1	-20	82.2	32.26	0.140
34	Water	0.1	-60 su*	83.2	32.23	0.143
34	Water	0.1	-60	84.2	32.18	0.148
34	Water	0.2	RT	85.2	31.87	0.182
34	Water	0.2	+4	86.2	31.67	0.208
34	Water	0.2	-20 su*	87.2	31.66	0.210
34	Water	0.2	-20	88.2	31.42	0.248
34	Water	0.2	-60 su*	89.2	31.35	0.259
34	Water	0.2	-60	90.2	31.49	0.236
34	Water	1	RT	91.2	29.18	1.120
34	Water	1	+4	92.2	29.2	1.100
34	Water	1	-20 su*	93.2	29.09	1.190
34	Water	1	-20	94.2	29.05	1.220
34	Water	1	-60 su*	95.2	29.09	1.190
34	Water	1	-60	96.2	29.05	1.220
34	Water	4	RT	97.2	27.37	3.810
34	Water	4	+4	98.2	27.19	4.280
34	Water	4	-20 su*	99.2	27.16	4.380
34	Water	4	-20	100.2	27.13	4.480
34	Water	4	-60 su*	101.2	27.1	4.560
34	Water	4	-60	102.2	27.02	4.820
34	Water	8	RT	103.2	26.32	7.730
34	Water	8	+4	104.2	26.1	8.940
34	Water	8	-20 su*	105.2	26.01	9.510
34	Water	8	-20	106.2	26.05	9.260
34	Water	8	-60 su*	107.2	26.1	8.970
34	Water	8	-60	108.2	26.11	8.930
62	TE	0.01	RT	1.3	35.27	0.015
62	TE	0.01	+4	2.3	36.26	0.008
62	TE	0.01	-20 su*	3.3	34.48	0.026
62	TE	0.01	-20	4.3	36.91	0.005
62	TE	0.01	-60 su*	5.3	36.26	0.008
62	TE	0.01	-60	6.3	36.12	0.008
62	TE	0.1	RT	7.3	32.36	0.110
62	TE	0.1	+4	8.3	32.44	0.105
62	TE	0.1	-20 su*	9.3	32.69	0.088
62	TE	0.1	-20	10.3	33.15	0.064
62	TE	0.1	-60 su*	11.3	32.68	0.088
62	TE	0.1	-60	12.3	32.82	0.080
62	TE	0.2	RT	13.3	31.15	0.254
62	TE	0.2	+4	14.3	31.31	0.227
62	TE	0.2	-20 su*	15.3	31.58	0.189

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
62	TE	0.2	-20	16.3	31.91	0.150
62	TE	0.2	-60 su*	17.3	31.75	0.168
62	TE	0.2	-60	18.3	31.75	0.168
62	TE	1	RT	19.3	29.26	0.936
62	TE	1	+4	20.3	29.28	0.921
62	TE	1	-20 su*	21.3	29.31	0.903
62	TE	1	-20	22.3	29.38	0.857
62	TE	1	-60 su*	23.3	29.27	0.924
62	TE	1	-60	24.3	29.33	0.886
62	TE	4	RT	25.3	27.16	3.970
62	TE	4	+4	26.3	27.19	3.880
62	TE	4	-20 su*	27.3	27.2	3.860
62	TE	4	-20	28.3	27.31	3.570
62	TE	4	-60 su*	29.3	27.21	3.830
62	TE	4	-60	30.3	27.27	3.680
62	TE	8	RT	31.3	26.27	7.290
62	TE	8	+4	32.3	26.18	7.770
62	TE	8	-20 su*	33.3	26.11	8.160
62	TE	8	-20	34.3	26.21	7.590
62	TE	8	-60 su*	35.3	26.31	7.110
62	TE	8	-60	36.3	26.27	7.330
62	Water	0.01	RT	73.3	36.15	0.008
62	Water	0.01	+4	74.3	35.3	0.015
62	Water	0.01	-20 su*	75.3	34.37	0.028
62	Water	0.01	-20	76.3	35.38	0.014
62	Water	0.01	-60 su*	77.3	35.25	0.015
62	Water	0.01	-60	78.3	35.03	0.018
62	Water	0.1	RT	79.3	32.78	0.084
62	Water	0.1	+4	80.3	32.42	0.107
62	Water	0.1	-20 su*	81.3	32.66	0.090
62	Water	0.1	-20	82.3	32.37	0.111
62	Water	0.1	-60 su*	83.3	32.48	0.103
62	Water	0.1	-60	84.3	32.36	0.112
62	Water	0.2	RT	85.3	31.59	0.190
62	Water	0.2	+4	86.3	32.21	0.124
62	Water	0.2	-20 su*	87.3	31.5	0.202
62	Water	0.2	-20	88.3	31.89	0.155
62	Water	0.2	-60 su*	89.3	31.49	0.204
62	Water	0.2	-60	90.3	31.66	0.182
62	Water	1	RT	91.3	29.18	1.010
62	Water	1	+4	92.3	29.11	1.060
62	Water	1	-20 su*	93.3	29.11	1.060
62	Water	1	-20	94.3	29.08	1.090
62	Water	1	-60 su*	95.3	29.06	1.100

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
62	Water	1	-60	96.3	29.02	1.140
62	Water	4	RT	97.3	27.27	3.810
62	Water	4	+4	98.3	27.1	4.300
62	Water	4	-20 su*	99.3	27.05	4.450
62	Water	4	-20	100.3	27.05	4.440
62	Water	4	-60 su*	101.3	26.95	4.760
62	Water	4	-60	102.3	27.09	4.330
62	Water	8	RT	103.3	26.13	8.420
62	Water	8	+4	104.3	26.15	8.300
62	Water	8	-20 su*	105.3	26.08	8.690
62	Water	8	-20	106.3	26.1	8.580
62	Water	8	-60 su*	107.3	26.07	8.740
62	Water	8	-60	108.3	26.1	8.580
90	TE	0.01	RT	1.4	36.13	0.012
90	TE	0.01	+4	2.4	34.77	0.029
90	TE	0.01	-20 su*	3.4	38.67	0.002
90	TE	0.01	-20	4.4	36.23	0.011
90	TE	0.01	-60 su*	5.4	35.23	0.021
90	TE	0.01	-60	6.4	35.73	0.015
90	TE	0.1	RT	7.4	32.35	0.151
90	TE	0.1	+4	8.4	32.44	0.142
90	TE	0.1	-20 su*	9.4	33.21	0.084
90	TE	0.1	-20	10.4	34.03	0.048
90	TE	0.1	-60 su*	11.4	32.57	0.130
90	TE	0.1	-60	12.4	32.58	0.129
90	TE	0.2	RT	13.4	31.39	0.290
90	TE	0.2	+4	14.4	31.6	0.251
90	TE	0.2	-20 su*	15.4	31.88	0.207
90	TE	0.2	-20	16.4	32.14	0.173
90	TE	0.2	-60 su*	17.4	31.64	0.244
90	TE	0.2	-60	18.4	31.86	0.211
90	TE	1	RT	19.4	29.36	1.150
90	TE	1	+4	20.4	29.26	1.230
90	TE	1	-20 su*	21.4	29.41	1.110
90	TE	1	-20	22.4	29.37	1.140
90	TE	1	-60 su*	23.4	29.35	1.160
90	TE	1	-60	24.4	29.55	1.010
90	TE	4	RT	25.4	27.24	4.870
90	TE	4	+4	26.4	27.27	4.770
90	TE	4	-20 su*	27.4	27.24	4.880
90	TE	4	-20	28.4	27.24	4.870
90	TE	4	-60 su*	29.4	27.33	4.570
90	TE	4	-60	30.4	27.31	4.630
90	TE	8	RT	31.4	26.09	10.630

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
90	TE	8	+4	32.4	26.21	9.790
90	TE	8	-20 su*	33.4	26.18	9.990
90	TE	8	-20	34.4	26.27	9.410
90	TE	8	-60 su*	35.4	26.25	9.560
90	TE	8	-60	36.4	26.31	9.190
90	Water	0.01	RT	73.4	36.54	0.007
90	Water	0.01	+4	74.4	34.63	0.028
90	Water	0.01	-20 su*	75.4	36.01	0.011
90	Water	0.01	-20	76.4	36.04	0.010
90	Water	0.01	-60 su*	77.4	35.22	0.018
90	Water	0.01	-60	78.4	35.19	0.019
90	Water	0.1	RT	79.4	32.46	0.128
90	Water	0.1	+4	80.4	32.47	0.127
90	Water	0.1	-20 su*	81.4	32.08	0.167
90	Water	0.1	-20	82.4	32.44	0.130
90	Water	0.1	-60 su*	83.4	32	0.177
90	Water	0.1	-60	84.4	32.01	0.175
90	Water	0.2	RT	85.4	32.47	0.127
90	Water	0.2	+4	86.4	31.4	0.269
90	Water	0.2	-20 su*	87.4	31.88	0.191
90	Water	0.2	-20	88.4	31.54	0.243
90	Water	0.2	-60 su*	89.4	31.54	0.243
90	Water	0.2	-60	90.4	32.03	0.172
90	Water	1	RT	91.4	29.29	1.180
90	Water	1	+4	92.4	29.08	1.370
90	Water	1	-20 su*	93.4	29.06	1.380
90	Water	1	-20	94.4	29.16	1.290
90	Water	1	-60 su*	95.4	29.08	1.360
90	Water	1	-60	96.4	28.98	1.470
90	Water	4	RT	97.4	27.39	4.450
90	Water	4	+4	98.4	27.09	5.490
90	Water	4	-20 su*	99.4	27.09	5.500
90	Water	4	-20	100.4	27.14	5.330
90	Water	4	-60 su*	101.4	27.07	5.580
90	Water	4	-60	102.4	27.09	5.500
90	Water	8	RT	103.4	26.26	9.860
90	Water	8	+4	104.4	26.1	11.020
90	Water	8	-20 su*	105.4	26.08	11.160
90	Water	8	-20	106.4	26.08	11.180
90	Water	8	-60 su*	107.4	26.04	11.450
90	Water	8	-60	108.4	26.23	10.040
117	TE	0.01	RT	1.5	34.71	0.024
117	TE	0.01	+4	2.5	36.03	0.009
117	TE	0.01	-20 su*	3.5	35.56	0.013

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/ μ L)	Temperature ($^{\circ}$ C)	Sample Name	Ct	Concentration (ng/ μ L)
117	TE	0.01	-20	4.5	36.05	0.009
117	TE	0.01	-60 su*	5.5	36.49	0.007
117	TE	0.01	-60	6.5	35.48	0.014
117	TE	0.1	RT	7.5	32.4	0.116
117	TE	0.1	+4	8.5	32.29	0.125
117	TE	0.1	-20 su*	9.5	32.66	0.097
117	TE	0.1	-20	10.5	33.02	0.075
117	TE	0.1	-60 su*	11.5	32.76	0.090
117	TE	0.1	-60	12.5	33.34	0.061
117	TE	0.2	RT	13.5	31.2	0.266
117	TE	0.2	+4	14.5	31.82	0.173
117	TE	0.2	-20 su*	15.5	31.46	0.222
117	TE	0.2	-20	16.5	32.1	0.143
117	TE	0.2	-60 su*	17.5	31.43	0.227
117	TE	0.2	-60	18.5	32.02	0.151
117	TE	1	RT	19.5	29.32	0.977
117	TE	1	+4	20.5	29.11	1.130
117	TE	1	-20 su*	21.5	29.47	0.883
117	TE	1	-20	22.5	29.39	0.932
117	TE	1	-60 su*	23.5	29.25	1.030
117	TE	1	-60	24.5	29.31	0.981
117	TE	4	RT	25.5	27.17	4.330
117	TE	4	+4	26.5	27.2	4.250
117	TE	4	-20 su*	27.5	27.28	4.020
117	TE	4	-20	28.5	27.18	4.300
117	TE	4	-60 su*	29.5	27.17	4.320
117	TE	4	-60	30.5	27.23	4.160
117	TE	8	RT	31.5	25.9	10.430
117	TE	8	+4	32.5	26.2	8.460
117	TE	8	-20 su*	33.5	26.17	8.640
117	TE	8	-20	34.5	26.16	8.710
117	TE	8	-60 su*	35.5	26.17	8.640
117	TE	8	-60	36.5	26.31	7.840
117	Water	0.01	RT	73.5	38.37	0.002
117	Water	0.01	+4	74.5	35.63	0.011
117	Water	0.01	-20 su*	75.5	35.34	0.013
117	Water	0.01	-20	76.5	35.54	0.011
117	Water	0.01	-60 su*	77.5	35.13	0.015
117	Water	0.01	-60	78.5	36.64	0.005
117	Water	0.1	RT	79.5	32.59	0.092
117	Water	0.1	+4	80.5	32.19	0.122
117	Water	0.1	-20 su*	81.5	32.42	0.104
117	Water	0.1	-20	82.5	32.26	0.117
117	Water	0.1	-60 su*	83.5	32.08	0.132

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
117	Water	0.1	-60	84.5	32.3	0.113
117	Water	0.2	RT	85.5	32.17	0.124
117	Water	0.2	+4	86.5	31.58	0.189
117	Water	0.2	-20 su*	87.5	31.39	0.216
117	Water	0.2	-20	88.5	31.7	0.174
117	Water	0.2	-60 su*	89.5	31.91	0.150
117	Water	0.2	-60	90.5	31.69	0.175
117	Water	1	RT	91.5	29.31	0.939
117	Water	1	+4	92.5	29.02	1.160
117	Water	1	-20 su*	93.5	29.02	1.160
117	Water	1	-20	94.5	29.09	1.100
117	Water	1	-60 su*	95.5	29.08	1.110
117	Water	1	-60	96.5	28.99	1.180
117	Water	4	RT	97.5	27.9	2.560
117	Water	4	+4	98.5	27.05	4.680
117	Water	4	-20 su*	99.5	27.08	4.580
117	Water	4	-20	100.5	27.09	4.530
117	Water	4	-60 su*	101.5	26.98	4.920
117	Water	4	-60	102.5	27.07	4.600
117	Water	8	RT	103.5	26.28	8.070
117	Water	8	+4	104.5	26.08	9.310
117	Water	8	-20 su*	105.5	26.1	9.150
117	Water	8	-20	106.5	26.05	9.510
117	Water	8	-60 su*	107.5	26.06	9.400
117	Water	8	-60	108.5	26.06	9.390
149	TE	0.01	RT	1.6	36.39	0.008
149	TE	0.01	+4	2.6	34.91	0.021
149	TE	0.01	-20 su*	3.6	36.65	0.006
149	TE	0.01	-20	4.6	34.86	0.022
149	TE	0.01	-60 su*	5.6	36.45	0.007
149	TE	0.01	-60	6.6	34.49	0.028
149	TE	0.1	RT	7.6	32.4	0.120
149	TE	0.1	+4	8.6	32.45	0.116
149	TE	0.1	-20 su*	9.6	32.61	0.104
149	TE	0.1	-20	10.6	32.67	0.100
149	TE	0.1	-60 su*	11.6	32.91	0.084
149	TE	0.1	-60	12.6	33.1	0.074
149	TE	0.2	RT	13.6	31.5	0.224
149	TE	0.2	+4	14.6	31.59	0.211
149	TE	0.2	-20 su*	15.6	31.75	0.188
149	TE	0.2	-20	16.6	32.12	0.146
149	TE	0.2	-60 su*	17.6	31.75	0.189
149	TE	0.2	-60	18.6	32.05	0.153
149	TE	1	RT	19.6	29.14	1.150

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
149	TE	1	+4	20.6	29.08	1.200
149	TE	1	-20 su*	21.6	29.47	0.912
149	TE	1	-20	22.6	29.25	1.060
149	TE	1	-60 su*	23.6	29.37	0.976
149	TE	1	-60	24.6	29.45	0.925
149	TE	4	RT	25.6	27.16	4.530
149	TE	4	+4	26.6	27.17	4.490
149	TE	4	-20 su*	27.6	27.17	4.480
149	TE	4	-20	28.6	27.19	4.430
149	TE	4	-60 su*	29.6	27.19	4.410
149	TE	4	-60	30.6	27.19	4.420
149	TE	8	RT	31.6	26.09	9.480
149	TE	8	+4	32.6	26.18	8.890
149	TE	8	-20 su*	33.6	26.14	9.110
149	TE	8	-20	34.6	26.12	9.250
149	TE	8	-60 su*	35.6	26.16	9.040
149	TE	8	-60	36.6	26.26	8.400
149	Water	0.01	RT	73.6	36.72	0.004
149	Water	0.01	+4	74.6	34.74	0.016
149	Water	0.01	-20 su*	75.6	33.97	0.028
149	Water	0.01	-20	76.6	34.47	0.020
149	Water	0.01	-60 su*	77.6	35.07	0.013
149	Water	0.01	-60	78.6	35.12	0.013
149	Water	0.1	RT	79.6	32.37	0.088
149	Water	0.1	+4	80.6	31.97	0.116
149	Water	0.1	-20 su*	81.6	31.56	0.156
149	Water	0.1	-20	82.6	32.21	0.098
149	Water	0.1	-60 su*	83.6	31.71	0.140
149	Water	0.1	-60	84.6	31.89	0.123
149	Water	0.2	RT	85.6	31.92	0.120
149	Water	0.2	+4	86.6	31.18	0.204
149	Water	0.2	-20 su*	87.6	31.27	0.191
149	Water	0.2	-20	88.6	31.51	0.161
149	Water	0.2	-60 su*	89.6	30.94	0.240
149	Water	0.2	-60	90.6	31.06	0.220
149	Water	1	RT	91.6	28.99	0.956
149	Water	1	+4	92.6	28.64	1.230
149	Water	1	-20 su*	93.6	28.62	1.240
149	Water	1	-20	94.6	28.65	1.210
149	Water	1	-60 su*	95.6	28.49	1.350
149	Water	1	-60	96.6	28.64	1.220
149	Water	4	RT	97.6	30.06	0.447
149	Water	4	+4	98.6	26.62	5.090
149	Water	4	-20 su*	99.6	26.72	4.740

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
149	Water	4	-20	100.6	26.75	4.660
149	Water	4	-60 su*	101.6	26.59	5.210
149	Water	4	-60	102.6	26.56	5.320
149	Water	8	RT	103.6	26.05	7.610
149	Water	8	+4	104.6	25.72	9.630
149	Water	8	-20 su*	105.6	25.68	9.920
149	Water	8	-20	106.6	25.65	10.130
149	Water	8	-60 su*	107.6	25.59	10.590
149	Water	8	-60	108.6	25.69	9.840
174	TE	0.01	RT	1.7	35.03	0.018
174	TE	0.01	+4	2.7	34.99	0.019
174	TE	0.01	-20 su*	3.7	37.07	0.004
174	TE	0.01	-20	4.7	36.41	0.007
174	TE	0.01	-60 su*	5.7	35.62	0.012
174	TE	0.01	-60	6.7	35	0.019
174	TE	0.1	RT	7.7	31.53	0.205
174	TE	0.1	+4	8.7	32.02	0.146
174	TE	0.1	-20 su*	9.7	32.17	0.131
174	TE	0.1	-20	10.7	32.88	0.081
174	TE	0.1	-60 su*	11.7	32.52	0.103
174	TE	0.1	-60	12.7	32.26	0.124
174	TE	0.2	RT	13.7	31.04	0.288
174	TE	0.2	+4	14.7	31.07	0.281
174	TE	0.2	-20 su*	15.7	31.6	0.195
174	TE	0.2	-20	16.7	31.45	0.217
174	TE	0.2	-60 su*	17.7	31.59	0.196
174	TE	0.2	-60	18.7	31.09	0.277
174	TE	1	RT	19.7	28.99	1.180
174	TE	1	+4	20.7	28.86	1.290
174	TE	1	-20 su*	21.7	29.13	1.070
174	TE	1	-20	22.7	29.1	1.090
174	TE	1	-60 su*	23.7	29.09	1.100
174	TE	1	-60	24.7	29.11	1.090
174	TE	4	RT	25.7	26.84	5.180
174	TE	4	+4	26.7	27.03	4.570
174	TE	4	-20 su*	27.7	26.95	4.820
174	TE	4	-20	28.7	27	4.670
174	TE	4	-60 su*	29.7	27.03	4.550
174	TE	4	-60	30.7	27.07	4.450
174	TE	8	RT	31.7	25.83	10.410
174	TE	8	+4	32.7	26	9.300
174	TE	8	-20 su*	33.7	25.93	9.740
174	TE	8	-20	34.7	25.79	10.750
174	TE	8	-60 su*	35.7	25.95	9.580

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
174	TE	8	-60	36.7	26.01	9.190
174	Water	0.01	RT	73.7	---	---
174	Water	0.01	+4	74.7	37.15	0.005
174	Water	0.01	-20 su*	75.7	34.06	0.040
174	Water	0.01	-20	76.7	35.74	0.013
174	Water	0.01	-60 su*	77.7	35.1	0.020
174	Water	0.01	-60	78.7	35.05	0.020
174	Water	0.1	RT	79.7	32.39	0.129
174	Water	0.1	+4	80.7	32.12	0.156
174	Water	0.1	-20 su*	81.7	31.82	0.191
174	Water	0.1	-20	82.7	33.03	0.083
174	Water	0.1	-60 su*	83.7	31.96	0.174
174	Water	0.1	-60	84.7	32.5	0.120
174	Water	0.2	RT	85.7	32.02	0.167
174	Water	0.2	+4	86.7	31.87	0.185
174	Water	0.2	-20 su*	87.7	31.38	0.262
174	Water	0.2	-20	88.7	31.97	0.173
174	Water	0.2	-60 su*	89.7	31.25	0.285
174	Water	0.2	-60	90.7	31.55	0.231
174	Water	1	RT	91.7	29.4	1.040
174	Water	1	+4	92.7	29.07	1.300
174	Water	1	-20 su*	93.7	28.99	1.380
174	Water	1	-20	94.7	28.97	1.400
174	Water	1	-60 su*	95.7	28.93	1.440
174	Water	1	-60	96.7	28.91	1.470
174	Water	4	RT	97.7	---	---
174	Water	4	+4	98.7	26.96	5.680
174	Water	4	-20 su*	99.7	27	5.550
174	Water	4	-20	100.7	26.8	6.340
174	Water	4	-60 su*	101.7	26.82	6.260
174	Water	4	-60	102.7	26.93	5.810
174	Water	8	RT	103.7	26.46	8.060
174	Water	8	+4	104.7	26.02	10.980
174	Water	8	-20 su*	105.7	25.88	12.130
174	Water	8	-20	106.7	25.8	12.810
174	Water	8	-60 su*	107.7	25.88	12.050
174	Water	8	-60	108.7	25.91	11.820
256	TE	0.01	RT	1.8	35.06	0.019
256	TE	0.01	+4	2.8	35.35	0.015
256	TE	0.01	-20 su*	3.8	36.84	0.006
256	TE	0.01	-20	4.8	36.17	0.009
256	TE	0.01	-60 su*	5.8	35.13	0.018
256	TE	0.01	-60	6.8	35.91	0.010
256	TE	0.1	RT	7.8	32.77	0.087

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
256	TE	0.1	+4	8.8	32.91	0.079
256	TE	0.1	-20 su*	9.8	32.67	0.093
256	TE	0.1	-20	10.8	32.95	0.077
256	TE	0.1	-60 su*	11.8	32.34	0.117
256	TE	0.1	-60	12.8	32.58	0.100
256	TE	0.2	RT	13.8	31.43	0.216
256	TE	0.2	+4	14.8	31.69	0.182
256	TE	0.2	-20 su*	15.8	32.29	0.121
256	TE	0.2	-20	16.8	32.06	0.142
256	TE	0.2	-60 su*	17.8	32.04	0.143
256	TE	0.2	-60	18.8	31.94	0.153
256	TE	1	RT	19.8	29.33	0.898
256	TE	1	+4	20.8	29.37	0.874
256	TE	1	-20 su*	21.8	29.41	0.850
256	TE	1	-20	22.8	29.65	0.725
256	TE	1	-60 su*	23.8	29.52	0.792
256	TE	1	-60	24.8	29.59	0.757
256	TE	4	RT	25.8	27.16	3.930
256	TE	4	+4	26.8	27.3	3.560
256	TE	4	-20 su*	27.8	27.29	3.590
256	TE	4	-20	28.8	27.37	3.410
256	TE	4	-60 su*	29.8	27.37	3.410
256	TE	4	-60	30.8	27.34	3.470
256	TE	8	RT	31.8	26.26	7.230
256	TE	8	+4	32.8	26.29	7.090
256	TE	8	-20 su*	33.8	26.28	7.140
256	TE	8	-20	34.8	26.33	6.880
256	TE	8	-60 su*	35.8	26.31	6.970
256	TE	8	-60	36.8	26.36	6.780
256	Water	0.01	RT	73.8	39.41	0.001
256	Water	0.01	+4	74.8	35.31	0.015
256	Water	0.01	-20 su*	75.8	36.06	0.009
256	Water	0.01	-20	76.8	37.09	0.004
256	Water	0.01	-60 su*	77.8	34.59	0.025
256	Water	0.01	-60	78.8	36.71	0.006
256	Water	0.1	RT	79.8	33.26	0.061
256	Water	0.1	+4	80.8	33.4	0.056
256	Water	0.1	-20 su*	81.8	32.18	0.129
256	Water	0.1	-20	82.8	32.77	0.086
256	Water	0.1	-60 su*	83.8	32.4	0.110
256	Water	0.1	-60	84.8	32.86	0.081
256	Water	0.2	RT	85.8	33.67	0.046
256	Water	0.2	+4	86.8	31.9	0.156
256	Water	0.2	-20 su*	87.8	31.6	0.191

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
256	Water	0.2	-20	88.8	32.32	0.117
256	Water	0.2	-60 su*	89.8	31.54	0.199
256	Water	0.2	-60	90.8	32.13	0.133
256	Water	1	RT	91.8	30.21	0.494
256	Water	1	+4	92.8	29.29	0.927
256	Water	1	-20 su*	93.8	29.16	1.010
256	Water	1	-20	94.8	29.42	0.851
256	Water	1	-60 su*	95.8	29.27	0.945
256	Water	1	-60	96.8	29.21	0.981
256	Water	4	RT	97.8	---	---
256	Water	4	+4	98.8	27.6	2.940
256	Water	4	-20 su*	99.8	27.2	3.880
256	Water	4	-20	100.8	27.27	3.710
256	Water	4	-60 su*	101.8	27.13	4.080
256	Water	4	-60	102.8	27.3	3.630
256	Water	8	RT	103.8	28.63	1.460
256	Water	8	+4	104.8	26.16	7.930
256	Water	8	-20 su*	105.8	26.03	8.630
256	Water	8	-20	106.8	26.26	7.370
256	Water	8	-60 su*	107.8	26.14	8.000
256	Water	8	-60	108.8	26.13	8.100
342	TE	0.01	RT	1.9	35.5	0.017
342	TE	0.01	+4	2.9	35.67	0.015
342	TE	0.01	-20 su*	3.9	36.28	0.010
342	TE	0.01	-20	4.9	36.86	0.007
342	TE	0.01	-60 su*	5.9	35.42	0.018
342	TE	0.01	-60	6.9	36.13	0.011
342	TE	0.1	RT	7.9	33.05	0.087
342	TE	0.1	+4	8.9	32.76	0.105
342	TE	0.1	-20 su*	9.9	33.21	0.078
342	TE	0.1	-20	10.9	33.23	0.077
342	TE	0.1	-60 su*	11.9	33.04	0.087
342	TE	0.1	-60	12.9	32.92	0.094
342	TE	0.2	RT	13.9	31.96	0.179
342	TE	0.2	+4	14.9	32.01	0.173
342	TE	0.2	-20 su*	15.9	32.02	0.172
342	TE	0.2	-20	16.9	32.07	0.165
342	TE	0.2	-60 su*	17.9	32	0.174
342	TE	0.2	-60	18.9	31.79	0.200
342	TE	1	RT	19.9	29.58	0.873
342	TE	1	+4	20.9	29.51	0.913
342	TE	1	-20 su*	21.9	29.61	0.854
342	TE	1	-20	22.9	29.51	0.912
342	TE	1	-60 su*	23.9	29.51	0.911

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
342	TE	1	-60	24.9	29.5	0.921
342	TE	4	RT	25.9	27.33	3.910
342	TE	4	+4	26.9	27.51	3.460
342	TE	4	-20 su*	27.9	27.74	2.980
342	TE	4	-20	28.9	27.69	3.080
342	TE	4	-60 su*	29.9	27.69	3.070
342	TE	4	-60	30.9	27.59	3.290
342	TE	8	RT	31.9	26.58	6.430
342	TE	8	+4	32.9	26.49	6.850
342	TE	8	-20 su*	33.9	26.51	6.730
342	TE	8	-20	34.9	26.6	6.380
342	TE	8	-60 su*	35.9	26.58	6.460
342	TE	8	-60	36.9	26.58	6.430
342	Water	0.01	RT	73.9	39.63	0.001
342	Water	0.01	+4	74.9	35.74	0.011
342	Water	0.01	-20 su*	75.9	35.21	0.016
342	Water	0.01	-20	76.9	36.08	0.009
342	Water	0.01	-60 su*	77.9	37.14	0.004
342	Water	0.01	-60	78.9	36.27	0.008
342	Water	0.1	RT	79.9	33.15	0.067
342	Water	0.1	+4	80.9	33.45	0.054
342	Water	0.1	-20 su*	81.9	32.14	0.134
342	Water	0.1	-20	82.9	31.66	0.187
342	Water	0.1	-60 su*	83.9	32.35	0.116
342	Water	0.1	-60	84.9	32.56	0.100
342	Water	0.2	RT	85.9	33.38	0.057
342	Water	0.2	+4	86.9	32.02	0.146
342	Water	0.2	-20 su*	87.9	32.04	0.144
342	Water	0.2	-20	88.9	32.39	0.113
342	Water	0.2	-60 su*	89.9	31.47	0.212
342	Water	0.2	-60	90.9	31.99	0.148
342	Water	1	RT	91.9	31.01	0.291
342	Water	1	+4	92.9	29.38	0.894
342	Water	1	-20 su*	93.9	29.28	0.954
342	Water	1	-20	94.9	29.28	0.955
342	Water	1	-60 su*	95.9	29.25	0.977
342	Water	1	-60	96.9	29.16	1.040
342	Water	4	RT	97.9	---	---
342	Water	4	+4	98.9	28.56	1.570
342	Water	4	-20 su*	99.9	27.26	3.810
342	Water	4	-20	100.9	27.57	3.090
342	Water	4	-60 su*	101.9	27.1	4.270
342	Water	4	-60	102.9	27.12	4.220
342	Water	8	RT	103.9	28.36	1.900

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
342	Water	8	+4	104.9	26.28	7.500
342	Water	8	-20 su*	105.9	26.1	8.470
342	Water	8	-20	106.9	26.22	7.830
342	Water	8	-60 su*	107.9	26.18	8.060
342	Water	8	-60	108.9	26.13	8.300
349	TE	0.01	RT	1.10	35.9	0.013
349	TE	0.01	+4	2.10	36.04	0.011
349	TE	0.01	-20 su*	3.10	36.12	0.011
349	TE	0.01	-20	4.10	35.94	0.012
349	TE	0.01	-60 su*	5.10	37.95	0.003
349	TE	0.01	-60	6.10	36.06	0.011
349	TE	0.1	RT	7.10	33.03	0.086
349	TE	0.1	+4	8.10	32.92	0.092
349	TE	0.1	-20 su*	9.10	33.43	0.066
349	TE	0.1	-20	10.10	32.87	0.095
349	TE	0.1	-60 su*	11.10	33.06	0.084
349	TE	0.1	-60	12.10	33.16	0.079
349	TE	0.2	RT	13.10	31.87	0.186
349	TE	0.2	+4	14.10	32.03	0.168
349	TE	0.2	-20 su*	15.10	32.4	0.131
349	TE	0.2	-20	16.10	32.07	0.163
349	TE	0.2	-60 su*	17.10	32.39	0.132
349	TE	0.2	-60	18.10	31.78	0.198
349	TE	1	RT	19.10	29.59	0.859
349	TE	1	+4	20.10	29.68	0.811
349	TE	1	-20 su*	21.10	29.72	0.787
349	TE	1	-20	22.10	29.78	0.758
349	TE	1	-60 su*	23.10	29.75	0.773
349	TE	1	-60	24.10	29.43	0.958
349	TE	4	RT	25.10	27.41	3.710
349	TE	4	+4	26.10	27.37	3.810
349	TE	4	-20 su*	27.10	27.5	3.500
349	TE	4	-20	28.10	27.39	3.760
349	TE	4	-60 su*	29.10	27.56	3.360
349	TE	4	-60	30.10	27.38	3.800
349	TE	8	RT	31.10	26.43	7.160
349	TE	8	+4	32.10	26.32	7.700
349	TE	8	-20 su*	33.10	26.56	6.560
349	TE	8	-20	34.10	26.37	7.460
349	TE	8	-60 su*	35.10	26.59	6.460
349	TE	8	-60	36.10	26.43	7.140
349	Water	0.01	RT	73.10	38.54	0.002
349	Water	0.01	+4	74.10	36.14	0.011
349	Water	0.01	-20 su*	75.10	37.09	0.006

*Represents single use aliquot.

Table A.1 Continued.

Days Stored	Buffer	Initial Concentration (ng/μL)	Temperature (°C)	Sample Name	Ct	Concentration (ng/μL)
349	Water	0.01	-20	76.10	37.36	0.005
349	Water	0.01	-60 su*	77.10	36.12	0.011
349	Water	0.01	-60	78.10	36.2	0.011
349	Water	0.1	RT	79.10	33.86	0.050
349	Water	0.1	+4	80.10	33.01	0.087
349	Water	0.1	-20 su*	81.10	32.78	0.102
349	Water	0.1	-20	82.10	32.93	0.093
349	Water	0.1	-60 su*	83.10	32.85	0.097
349	Water	0.1	-60	84.10	33.43	0.066
349	Water	0.2	RT	85.10	33.72	0.055
349	Water	0.2	+4	86.10	32.22	0.148
349	Water	0.2	-20 su*	87.10	31.97	0.175
349	Water	0.2	-20	88.10	32.21	0.149
349	Water	0.2	-60 su*	89.10	31.86	0.189
349	Water	0.2	-60	90.10	32.16	0.155
349	Water	1	RT	91.10	31.11	0.310
349	Water	1	+4	92.10	29.41	0.961
349	Water	1	-20 su*	93.10	29.33	1.010
349	Water	1	-20	94.10	29.37	0.986
349	Water	1	-60 su*	95.10	29.32	1.020
349	Water	1	-60	96.10	29.29	1.040
349	Water	4	RT	97.10	---	---
349	Water	4	+4	98.10	28.88	1.370
349	Water	4	-20 su*	99.10	27.33	3.840
349	Water	4	-20	100.10	27.31	3.890
349	Water	4	-60 su*	101.10	27.21	4.160
349	Water	4	-60	102.10	27.19	4.200
349	Water	8	RT	103.10	28.53	1.730
349	Water	8	+4	104.10	26.38	7.220
349	Water	8	-20 su*	105.10	26.22	8.020
349	Water	8	-20	106.10	26.22	7.990
349	Water	8	-60 su*	107.10	26.22	7.990
349	Water	8	-60	108.10	26.15	8.410
349+ Centri-Sep	TE	0.01	-20	4.11.	36.6	0.007
349+ Centri-Sep	Water	0.01	RT	73.11.	---	---
349+ Centri-Sep	Water	0.2	RT	85.11.	33.74	0.048
349+ Centri-Sep	Water	4	RT	97.11.	29.33	1.000

*Represents single use aliquot.

Appendix B. PowerPlex® 16 HS STR Data

Table B.1: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/ μ L RT 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	256	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1175	1938	1041	843	917	1486	1005	1019	637	893	1134
CSF1PO	11	543	2324	1050	630	456	1226	1318	422	214	1068	1024
D13S317	12	344	918	414	658	423	644	280	333	280	423	371
	13	213	733	510	351	303	810	593	464	343	456	320
D16S539	12	666	2267	933	849	969	1323	1446	806	375	909	873
D18S51	10	524	1079	692	624	491	695	580	227	76	790	464
	13	313	1871	616	671	464	459	485	163	65	611	776
D21S11	28	523	790	581	401	367	380	527	527	415	458	458
	29	640	509	460	334	356	569	532	491	513	310	414
D3S1358	15	476	774	675	645	407	733	787	716	357	503	578
	16	340	1032	605	539	230	620	873	511	311	415	369
D5S818	11	1110	1410	871	682	556	1865	1347	892	613	860	756
D7S820	10	382	743	427	264	503	570	521	577	269	456	420
	12	490	778	357	589	274	455	373	678	164	483	335
D8S1179	12	461	637	454	437	199	617	403	300	76	454	746
	13	297	911	664	756	353	532	356	358	108	340	360
FGA	21	549	606	598	295	446	502	385	647	238	418	299
	25	328	484	375	298	343	424	448	252	291	84	218
PentaD	9	369	933	427	439	311	750	869	580	204	331	733
	11	496	1409	573	305	365	1242	742	656	300	503	263
PentaE	7	545	1389	602	293	528	634	711	400	184	390	700
	11	468	856	567	255	266	573	580	311	153	640	363
TH01	6	1253	520	887	689	562	1582	737	1460	1109	710	564
	9.3	817	922	527	678	672	1384	1281	927	726	458	560
TPOX	8	603	1118	771	560	651	1222	739	1107	748	592	504
	11	578	847	541	795	313	532	821	1032	518	313	398
vWA	17	397	633	725	350	480	496	520	702	498	345	319
	19	393	421	502	363	360	611	686	477	376	289	464

Table B.2: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/ μ L RT 3 kV 8 s		Days Stored		
		0	256	342
Marker	Allele	Peak Height (rfu)		
AMEL	X	2490	1882	2347
CSF1PO	11	1111	607	2527
D13S317	12	713	753	986
	13	439	962	1023
D16S539	12	1366	1045	2178
D18S51	10	1108	224	1900
	13	644	192	1478
D21S11	28	1065	1159	1084
	29	1343	1444	747
D3S1358	15	999	973	1197
	16	705	833	1014
D5S818	11	2307	1647	2034
D7S820	10	804	769	1054
	12	997	440	1132
D8S1179	12	983	236	1226
	13	619	328	918
FGA	21	1142	745	1129
	25	696	914	225
PentaD	9	759	581	794
	11	1034	872	1186
PentaE	7	1124	544	944
	11	999	458	1574
TH01	6	2560	2949	1684
	9.3	1702	1970	1055
TPOX	8	1264	2385	1575
	11	1194	1632	829
vWA	17	836	1507	955
	19	845	1182	772

Table B.3: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/ μ L +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1175	1979	1090	927	1007	1401	1304	1560	872	1452	1886
CSF1PO	11	543	2838	579	653	631	782	966	1007	267	899	1573
D13S317	12	344	954	374	316	358	265	423	660	355	416	408
	13	213	634	361	324	298	568	533	691	466	287	253
D16S539	12	666	2021	1492	786	706	1358	1122	2085	868	1011	822
D18S51	10	524	1901	750	680	584	521	356	1000	113	414	742
	13	313	2646	932	656	430	359	881	1300	100	1079	1295
D21S11	28	523	924	517	346	382	540	614	649	832	526	570
	29	640	628	393	372	246	472	711	608	436	609	268
D3S1358	15	476	830	453	552	505	480	414	744	588	612	858
	16	340	575	360	383	534	823	578	605	576	405	569
D5S818	11	1110	1583	704	571	473	1245	1120	1739	770	941	692
D7S820	10	382	889	534	343	386	451	629	648	213	498	625
	12	490	704	523	263	222	390	402	721	532	297	724
D8S1179	12	461	904	460	324	331	309	603	398	176	311	778
	13	297	1002	335	456	348	476	410	982	159	660	637
FGA	21	549	462	524	560	280	479	296	638	425	434	564
	25	328	411	492	515	263	631	215	349	355	472	590
PentaD	9	369	701	584	447	473	824	617	1308	394	796	1100
	11	496	1386	538	483	294	238	689	773	229	769	666
PentaE	7	545	1420	591	435	406	430	549	850	190	715	979
	11	468	872	387	336	411	310	380	624	268	757	960
TH01	6	1253	886	1237	556	729	1318	756	1422	1761	442	697
	9.3	817	1078	625	649	370	1575	761	1278	865	555	599
TPOX	8	603	1387	705	606	793	745	755	1064	1006	865	933
	11	578	775	947	608	410	780	871	1236	1043	620	808
vWA	17	397	561	386	337	432	512	342	702	703	435	481
	19	393	635	354	336	424	537	534	717	495	653	608

Table B.4: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/ μ L +4 °C 3 kV 8 s		Days Stored	
		0	256
Marker	Allele	Peak Height (rfu)	
AMEL	X	2490	2729
CSF1PO	11	1111	719
D13S317	12	713	967
	13	439	1262
D16S539	12	1366	2403
D18S51	10	1108	313
	13	644	276
D21S11	28	1065	2304
	29	1343	1203
D3S1358	15	999	1617
	16	705	1596
D5S818	11	2307	2113
D7S820	10	804	595
	12	997	1466
D8S1179	12	983	592
	13	619	539
FGA	21	1142	1357
	25	696	1148
PentaD	9	759	1072
	11	1034	641
PentaE	7	1124	537
	11	999	759
TH01	6	2560	4690
	9.3	1702	2358
TPOX	8	1264	3226
	11	1194	3339
vWA	17	836	2249
	19	845	1602

Table B.5: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1175	1431	1005	805	959	1271	758	977	250	854	1118
CSF1PO	11	543	1061	217	203	224	845	623	418	110	510	517
D13S317	12	344	402	294	176	153	205	467	348	160	195	242
	13	213	431	260	267	211	377	193	371	144	243	191
D16S539	12	666	1454	637	580	252	688	636	803	454	232	781
D18S51	10	524	619	535	337	196	522	310	238		185	240
	13	313	1067	225	275	293	725	224	287		457	664
D21S11	28	523	249	220	170	300	297	331	705	153	295	260
	29	640	358	368	178	171	235	366	366	285	164	198
D3S1358	15	476	747	295	220	378	296	265	449	228	224	403
	16	340	624	470	205	299	456	166	395	285	535	276
D5S818	11	1110	1211	446	283	311	901	497	490	300	595	413
D7S820	10	382	102	144	253	180	315	439	267	131	169	396
	12	490	554	263	237	163	148	285	364	148	75	311
D8S1179	12	461	879	493	235	238	413	260	421	91	82	233
	13	297	584	398	235	258	352	153	543	150	87	332
FGA	21	549	529	404	452	318	403	372	504	234	251	272
	25	328	339	334	251	278	287	408	293	227	259	361
PentaD	9	369	900	153	189	183	470	154	637	151	288	488
	11	496	628	230	132	131	393	328	462	150	489	373
PentaE	7	545	654	80	249	160	432	180	325	87	193	350
	11	468	767	211	271	237	179	577	426	128	627	429
TH01	6	1253	568	367	229	289	800	662	297	996	482	324
	9.3	817	558	424	184	297	327	492	598	537	265	349
TPOX	8	603	744	690	555	239	890	480	665	497	475	510
	11	578	889	399	400	299	666	748	660	788	437	517
vWA	17	397	676	570	200	285	475	393	520	420	322	374
	19	393	548	436	292	175	598	380	663	267	270	287

*Represents single use aliquot.

Table B.6: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/μL -20 °C su* 3 kV 8 s		Days Stored					
		0	62	90	256	342	349
Marker	Allele	Peak Height (rfu)					
AMEL	X	2490	2610	2978	770	1959	2123
CSF1PO	11	1111	703	1082	374	1249	1100
D13S317	12	713	556	681	555	443	526
	13	439	849	956	496	553	415
D16S539	12	1366	1899	1172	1630	585	1676
D18S51	10	1108	1091	891	90	436	509
	13	644	908	1354	87	1142	1402
D21S11	28	1065	554	1325	531	676	562
	29	1343	613	754	1038	381	441
D3S1358	15	999	699	1609	798	515	923
	16	705	648	1273	953	1232	604
D5S818	11	2307	950	1329	1077	1412	964
D7S820	10	804	819	812	482	380	859
	12	997	748	753	523	183	682
D8S1179	12	983	806	797	304	189	439
	13	619	794	866	508	193	620
FGA	21	1142	1518	1052	741	614	489
	25	696	846	933	719	623	638
PentaD	9	759	651	927	557	701	1064
	11	1034	432	667	543	1151	799
PentaE	7	1124	835	779	313	463	744
	11	999	901	1125	460	1479	866
TH01	6	2560	734	1283	3309	1118	717
	9.3	1702	606	1284	1821	589	764
TPOX	8	1264	1851	769	1609	1125	926
	11	1194	1337	990	2515	1032	932
vWA	17	836	680	943	1364	772	715
	19	845	954	583	840	656	544

*Represents single use aliquot.

Table B.7: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/ μ L -20 °C 3 kV 3 s		Days Stored											
		0	6	34	62	90	117	149	174	256	342	349	349+ Centri-Sep
Marker	Allele	Peak Height (rfu)											
AMEL	X	1175	1419	798	610	373	872	855	1154	467	1020		963
CSF1PO	11	543	923	268	156	76	705	227	708	156	438		405
D13S317	12	344	399	273	222	103	383	255	464	317	250		211
	13	213	369	300	186	117	540	206	176	207	136		146
D16S539	12	666	1390	324	206	169	803	762	1291	401	470		441
D18S51	10	524	1036	180	115	156	65	151	332	74	216		253
	13	313	538	348	168	160		173	170	78	475		698
D21S11	28	523	325	171	186	113	347	389	449	311	245	61	360
	29	640	122	213	243	215	162	299	323	409	377	83	188
D3S1358	15	476	542	261	238	170	351	410	613	244	276		383
	16	340	616	362	207	223	198	421	458	369	186		256
D5S818	11	1110	970	406	370	182	688	702	1040	342	614		739
D7S820	10	382	336	121	89	71	368	248	513	115	324		379
	12	490	381	213	182	178	202	180	213	290	312		301
D8S1179	12	461	664	287	361	129	451	360	438	61	233		321
	13	297	822	204	320	315	420	110	409	202	353		443
FGA	21	549	375	401	111	83	265	109	177	187	442	67	509
	25	328	623	42	242	186	328	225	473	293	251	72	238
PentaD	9	369	538	175	117	84	461	202	384	284	219		135
	11	496	655	266	85	87	226	297	390	138	288		195
PentaE	7	545	819	124	285	147	163	512	459	151	193		367
	11	468	465	72	115	155		82	214	103	306		107
TH01	6	1253	505	268	100	445	537	888	1287	962	261	221	585
	9.3	817	838	172	319	207	689	1065	1179	709	349	184	545
TPOX	8	603	413	407	389	220	566	783	486	605	441	159	280
	11	578	712	579	336	99	795	268	846	720	316		
vWA	17	397	339	236	196	158	351	431	576	446	149	103	380
	19	393	483	272	269	176	755	449	396	383	262	222	644

Table B.8: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/ μ L -20 °C 3 kV 8 s		Days Stored									
		0	62	90	117	149	174	256	342	349	349+ Centri-Sep
Marker	Allele	Peak Height (rfu)									
AMEL	X	2490	1633	1032	1947	2180	1967	1392	2494	102	2272
CSF1PO	11	1111	567	196	1682	788	1164	653	1056		909
	12	713	787	265	862	794	766	1215	579	80	480
D13S317	13	439	674	288	1222	647	272	785	343		324
	12	1366	763	424	1904	2565	2091	1616	1120	90	1007
D18S51	10	1108	405	399	100	475	537	306	508		574
	13	644	586	405	152	570	261	287	1101		1625
D21S11	28	1065	678	284	831	1309	756	1170	603	123	792
	29	1343	876	570	383	1001	546	1528	912	161	422
D3S1358	15	999	834	458	800	1259	1018	920	676	117	808
	16	705	704	585	463	1328	758	1357	444	87	555
D5S818	11	2307	1320	472	1491	2192	1757	1310	1473	105	1595
D7S820	10	804	291	179	856	793	830	463	754	77	837
	12	997	668	451	462	572	337	1167	730	107	664
D8S1179	12	983	988	348	1015	888	710	195	549	63	793
	13	619	863	865	900	269	663	641	861		1095
FGA	21	1142	298	231	602	292	284	595	1057	147	1302
	25	696	630	505	746	597	750	928	607	156	601
PentaD	9	759	423	212	1096	721	620	1171	499		318
	11	1034	310	219	556	1056	614	570	678		471
PentaE	7	1124	1003	391	383	1767	755	592	474		893
	11	999	385	373	147	280	347	389	735		262
TH01	6	2560	354	1153	1249	2790	2073	3504	619	451	1242
	9.3	1702	1122	544	1635	3324	1957	2653	841	380	1182
TPOX	8	1264	1018	600	1267	1942	777	1907	1076	375	108
	11	1194	883	281	1809	661	1318	2261	762		709
vWA	17	836	555	423	821	1146	1005	1406	378	254	929
	19	845	741	478	1763	1174	688	1187	653	517	1600

Table B.9: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1175	1647	946	731	578	714	914	1358	578	1016	952
CSF1PO	11	543	1373	511	433	268	530	1072	990	303	788	868
D13S317	12	344	532	393	421	200	293	573	402	385	255	464
	13	213	373	200	344	218	450	332	424	215	307	320
D16S539	12	666	1450	1182	780	446	1034	1680	2034	421	1024	596
D18S51	10	524	2176	321	661	453	531	521	743	95	940	611
	13	313	1546	182	291	277	357	356	860		635	980
D21S11	28	523	503	352	392	411	395	568	831	534	602	672
	29	640	137	310	236	269	397	378	341	484	412	377
D3S1358	15	476	803	423	480	537	527	717	766	391	497	542
	16	340	829	269	440	376	366	714	563	258	302	523
D5S818	11	1110	1265	842	615	519	919	1074	1807	415	591	1255
D7S820	10	382	812	318	293	306	309	425	482	328	318	352
	12	490	386	308	359	510	320	619	626	243	495	235
D8S1179	12	461	539	351	393	317	318	296	548	141	280	367
	13	297	649	398	420	258	390	305	743	154	573	433
FGA	21	549	485	719	328	332	458	313	590	280	259	408
	25	328	265	280	518	230	214	407	418	310	225	379
PentaD	9	369	1029		494	267	468	358	689	190	597	482
	11	496	928	275	363	271	577	846	652	328	345	423
PentaE	7	545	961	404	451	342	434	513	449	191	527	491
	11	468	746	286	548	315	240	245	603	132	214	1186
TH01	6	1253	507	514	454	323	526	1185	915	1011	506	349
	9.3	817	836	601	840	436	822	826	1343	1086	452	709
TPOX	8	603	1093	308	424	392	839	894	589	597	393	832
	11	578	866	376	369	317	304	522	716	605	505	519
vWA	17	397	354	475	650	416	483	640	377	356	419	456
	19	393	846	401	376	370	433	445	525	483	395	424

*Represents single use aliquot.

Table B.10: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/μL -60 °C su* 3 kV 8 s		Days Stored	
		0	256
Marker	Allele	Peak Height (rfu)	
AMEL	X	2490	1745
CSF1PO	11	1111	840
D13S317	12	713	1037
	13	439	572
D16S539	12	1366	1198
D18S51	10	1108	250
	13	644	158
D21S11	28	1065	1443
	29	1343	1337
D3S1358	15	999	1044
	16	705	700
D5S818	11	2307	1133
D7S820	10	804	873
	12	997	662
D8S1179	12	983	436
	13	619	482
FGA	21	1142	859
	25	696	944
PentaD	9	759	527
	11	1034	921
PentaE	7	1124	540
	11	999	371
TH01	6	2560	2697
	9.3	1702	2897
TPOX	8	1264	1835
	11	1194	1892
vWA	17	836	1078
	19	845	1477

*Represents single use aliquot.

Table B.11: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/ μ L -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1175	2182	762	930	842	925	1322	1068	634	1176	1264
CSF1PO	11	543	1701	406	1009	429	565	1146	892	145	1037	370
D13S317	12	344	604	254	281	266	255	305	432	446	378	344
	13	213	284	223	243	377	297	379	330	256	435	250
D16S539	12	666	2089	787	1617	563	1581	1296	1101	633	831	454
D18S51	10	524	1024	257	715	411	227	257	351	71	543	627
	13	313	1499	561	567	404	307	395	496		328	529
D21S11	28	523	603	464	310	343	375	294	571	282	307	725
	29	640	389	360	181	250	491	433	606	551	397	516
D3S1358	15	476	959	353	559	464	533	1037	920	588	730	641
	16	340	656	433	431	326	649	691	394	540	523	417
D5S818	11	1110	1335	379	490	515	952	1322	1201	422	778	725
D7S820	10	382	505	156	422	509	262	638	545	329	351	606
	12	490	400	196	251	248	570	327	398	326	314	408
D8S1179	12	461	586	214	155	183	317	401	359	148	500	449
	13	297	839	377	348	405	507	433	383	157	476	529
FGA	21	549	302	340	317	298	359	501	349	561	217	423
	25	328	581	337	119	281	229	475	351	363	312	344
PentaD	9	369	1048	203	503	343	464	344	315	347	470	516
	11	496	587	436	324	235	932	138	567	256	739	527
PentaE	7	545	546	166	302	171	97	447	194	127	733	149
	11	468	954	371	324	254	441	514	389	141	377	513
TH01	6	1253	406	492	394	408	1106	1003	1346	1173	358	467
	9.3	817	583	387	329	569	638	824	640	1080	766	1135
TPOX	8	603	569	619	301	566	511	689	573	423	516	657
	11	578	541	310	941	436	790	833	594	717	701	736
vWA	17	397	433	263	353	263	373	604	615	624	523	582
	19	393	474	351	511	442	503	399	497	542	462	330

Table B.12: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.01 ng/μL -60 °C 3 kV 8 s		Days Stored						
		0	62	117	149	174	256	349
Marker	Allele	Peak Height (rfu)						
AMEL	X	2490	2955	1898	2381	2028	1600	2688
CSF1PO	11	1111	3206	1304	1284	1679	347	782
D13S317	12	713	873	582	369	829	990	657
	13	439	723	667	444	635	568	465
D16S539	12	1366	5064	3566	1473	2093	1478	926
D18S51	10	1108	2187	500	307	647	178	1281
	13	644	1783	681	456	914	101	1094
D21S11	28	1065	988	870	371	1087	656	1381
	29	1343	570	1096	532	1151	1302	992
D3S1358	15	999	1738	1182	1323	1771	1300	1238
	16	705	1351	1438	887	749	1227	811
D5S818	11	2307	1548	1970	1752	2348	933	1421
D7S820	10	804	1278	590	718	1029	754	1162
	12	997	774	1266	373	744	752	811
D8S1179	12	983	471	657	644	664	405	980
	13	619	1087	1033	693	711	428	1153
FGA	21	1142	1009	752	800	638	1513	1037
	25	696	394	487	765	634	998	861
PentaD	9	759	1602	969	388	612	807	1157
	11	1034	1028	2001	156	1055	615	1145
PentaE	7	1124	986	229	497	363	284	333
	11	999	1051	1034	591	694	343	1119
TH01	6	2560	1243	2552	1197	2513	2613	882
	9.3	1702	1051	1501	978	1194	2384	2152
TPOX	8	1264	951	1086	1070	1039	1152	1448
	11	1194	2940	1661	1292	1087	1959	1675
vWA	17	836	1154	790	1083	1180	1638	1285
	19	845	1658	1059	712	968	1424	718

Table B.13: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.1 ng/μL RT 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2266	3047	2055	1839	2358	2657	2778	2921	2900	2522	2284
CSF1PO	11	2464	2796	725	774	1699	2258	1660	1997	1312	1720	1502
D13S317	12	1647	1167	747	794	706	1115	804	1151	889	697	739
	13	1552	1083	544	577	690	1179	955	921	679	669	604
D16S539	12	2837	3222	1402	1740	2244	2932	3065	3137	1874	1465	1907
D18S51	10	2344	1606	647	905	1117	2244	1288	1140	893	1867	859
	13	1706	2656	686	661	552	1752	933	803	840	1087	1443
D21S11	28	1748	1081	816	1146	852	1395	1122	793	1287	953	1021
	29	1652	1033	630	906	762	1030	905	1007	1571	859	1083
D3S1358	15	1812	1659	877	828	935	1592	1446	1477	1426	1245	1157
	16	1273	1423	788	971	1051	1268	1335	1110	1072	834	896
D5S818	11	2914	2530	1164	1450	1911	2528	2307	1898	1584	1548	1564
D7S820	10	1435	1049	932	612	832	612	935	1063	1109	846	817
	12	1388	1268	910	643	715	1020	857	782	871	865	780
D8S1179	12	981	1942	965	1061	832	1728	1321	1236	591	1100	971
	13	1315	2287	657	835	1120	1671	1505	1072	739	1153	1190
FGA	21	1428	1343	1092	1233	954	1406	1435	1047	1370	1098	1093
	25	1186	1229	754	969	904	1005	1210	831	1093	1047	1008
PentaD	9	1651	1531	508	598	722	2026	1517	1477	942	1351	739
	11	1604	1640	542	653	788	950	1182	1028	1031	1109	647
PentaE	7	1537	1639	650	771	619	983	1190	922	795	1288	1176
	11	1923	1226	417	621	764	1190	1060	567	1177	932	842
TH01	6	1914	1517	1276	1253	1474	1881	2342	2252	1780	1708	1165
	9.3	3464	1892	1115	1227	1334	1893	1975	1821	1823	1509	1060
TPOX	8	1457	1688	1366	1462	1438	1893	1827	1856	2392	1557	1390
	11	1819	2109	882	1351	1585	2556	2318	2240	2353	1458	1047
vWA	17	1966	1127	942	1141	1320	1160	1371	1733	1079	1121	882
	19	1674	1376	996	1085	979	1173	1372	1574	1713	965	909

Table B.14: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.1 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2266	3502	2666	2229	2322	2514	2537	2823	2137	2565	2248
CSF1PO	11	2464	3019	1017	1140	1527	1316	2357	1825	1025	1611	1300
D13S317	12	1647	1053	777	840	783	1200	852	1226	713	769	721
	13	1552	1047	518	887	766	1028	1025	1233	649	861	490
D16S539	12	2837	3253	1886	1697	2449	2786	2644	2844	1025	1616	1628
D18S51	10	2344	2155	885	844	1102	1189	918	959	778	1693	1564
	13	1706	2338	896	1019	1240	1146	1158	1350	835	1272	1278
D21S11	28	1748	1107	726	880	1104	1226	1344	1249	1005	840	862
	29	1652	767	966	813	664	829	1347	1384	1130	1094	921
D3S1358	15	1812	1629	969	917	1189	1274	1693	1115	999	1139	1038
	16	1273	1203	934	864	1064	1274	1807	1237	1174	1179	1013
D5S818	11	2914	2253	1041	1187	1349	1675	2767	2296	1289	1470	1260
D7S820	10	1435	928	695	841	709	902	1078	523	891	830	719
	12	1388	1391	822	640	614	857	1050	783	705	657	930
D8S1179	12	981	1927	938	1028	639	1156	1522	847	804	994	1368
	13	1315	1372	1036	1258	952	1408	1216	1299	679	1082	816
FGA	21	1428	1434	1292	1293	852	1010	1220	1304	1024	728	645
	25	1186	1030	1378	991	800	1404	1009	1171	921	947	1056
PentaD	9	1651	1658	476	726	768	1145	1431	1105	749	1065	840
	11	1604	1379	603	513	1070	1241	1474	1583	648	842	911
PentaE	7	1537	1289	1027	686	1066	779	824	968	694	1351	966
	11	1923	1303	742	599	850	675	1021	782	552	1150	810
TH01	6	1914	1408	1203	1404	1744	1807	1873	2113	1421	1476	1316
	9.3	3464	1629	1358	1199	1724	2340	2198	2983	1444	1422	805
TPOX	8	1457	2265	1089	1065	1735	2109	1968	1545	1501	1502	1158
	11	1819	1243	1125	1322	1913	1861	2147	1926	1379	1560	991
vWA	17	1966	1054	1295	1313	1379	1892	1107	1384	958	933	1307
	19	1674	1439	1158	1197	977	1259	1929	1022	1189	1078	998

Table B.15: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.1 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2266	2963	2313	1537	1948	1914	2196	2204	928	1492	1058
CSF1PO	11	2464	2805	1271	849	1335	1571	1511	1602	627	1284	1142
D13S317	12	1647	1251	836	640	787	899	899	1025	314	492	334
	13	1552	1310	939	635	988	812	835	874	328	590	489
D16S539	12	2837	4257	2112	1390	2364	3064	1811	3586	670	1413	1262
D18S51	10	2344	2533	1257	909	1067	921	747	860	557	678	1137
	13	1706	2341	1109	632	1363	549	822	878	460	1046	1096
D21S11	28	1748	1119	1135	775	915	1039	653	815	688	648	553
	29	1652	1323	962	504	625	682	891	1036	855	623	643
D3S1358	15	1812	1672	1151	969	1293	1331	1109	1301	817	873	765
	16	1273	1390	1468	755	1129	1039	1199	1182	624	848	569
D5S818	11	2914	2839	1183	1082	1841	1857	1531	2211	854	1026	1156
D7S820	10	1435	1111	755	776	530	755	670	832	432	757	540
	12	1388	1501	769	1095	781	606	726	782	557	664	730
D8S1179	12	981	1531	700	725	808	507	516	816	370	348	443
	13	1315	1168	922	470	569	766	409	793	453	685	507
FGA	21	1428	1433	1277	565	645	840	451	848	319	518	614
	25	1186	872	1216	664	682	756	488	674	282	451	468
PentaD	9	1651	1534	769	663	1309	1281	681	1113	506	512	578
	11	1604	1982	662	335	1054	723	582	967	359	620	686
PentaE	7	1537	987	644	704	821	841	598	726	442	947	541
	11	1923	1979	542	666	450	759	1018	855	464	805	1103
TH01	6	1914	1380	1679	1461	1731	1863	1817	1377	925	913	579
	9.3	3464	1873	1741	1323	1589	1271	1629	2348	972	953	883
TPOX	8	1457	1699	1395	1332	1266	1500	1283	1336	1009	725	1057
	11	1819	1643	1174	957	1351	861	1114	1555	1087	887	957
vWA	17	1966	1067	980	746	1095	1063	682	1050	512	514	706
	19	1674	1231	1111	966	917	1148	619	733	403	572	484

*Represents single use aliquot.

Table B.16: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.1 ng/ μ L -20 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2266	2310	1318	908	1329	1971	1164	1014	1712	2332	2210
CSF1PO	11	2464	2807	902	540	845	1319	727	1452	830	1383	1311
D13S317	12	1647	809	672	366	474	593	430	514	478	682	669
	13	1552	1144	574	270	416	695	324	725	242	621	429
D16S539	12	2837	2676	1302	611	1435	2125	1110	1976	910	1761	1477
D18S51	10	2344	2240	816	430	541	608	324	594	519	1610	1058
	13	1706	2041	501	472	611	760	469	704	491	1540	836
D21S11	28	1748	1021	524	466	499	957	503	887	748	711	972
	29	1652	648	520	420	359	595	291	686	518	818	895
D3S1358	15	1812	913	727	581	692	1030	936	843	621	962	956
	16	1273	1429	498	375	668	1217	626	943	817	861	1006
D5S818	11	2914	2137	822	610	1057	1666	1253	1202	1176	1850	1543
D7S820	10	1435	816	295	438	417	757	308	355	441	824	614
	12	1388	820	560	188	531	563	557	738	648	780	658
D8S1179	12	981	1308	558	432	469	601	506	520	456	400	386
	13	1315	1572	334	445	557	711	302	519	528	702	553
FGA	21	1428	1034	728	384	250	415	333	522	265	633	944
	25	1186	1050	402	431	499	479	399	435	485	756	604
PentaD	9	1651	1059	676	192	373	813	482	981	439	790	433
	11	1604	1289	486	303	539	491	280	386	533	685	735
PentaE	7	1537	1497	856	163	371	730	348	537	677	592	812
	11	1923	1386	534	210	449	326	362	812	335	783	683
TH01	6	1914	1836	877	757	1166	1643	1104	1336	1180	1176	1050
	9.3	3464	1655	987	687	1247	1512	1670	1519	1386	1599	705
TPOX	8	1457	1352	801	487	1388	1406	632	874	1199	1561	951
	11	1819	1171	980	635	702	1091	895	1079	1219	1280	986
vWA	17	1966	1015	686	483	419	872	598	1035	714	831	696
	19	1674	1136	576	312	508	891	531	554	715	1228	828

Table B.17: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.1 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2266	2334	1646	2211	2869	2805	2195	2528	1707	2355	2094
CSF1PO	11	2464	1699	813	767	1411	1699	1283	1555	680	1710	1238
D13S317	12	1647	781	638	569	1095	758	621	956	532	609	483
	13	1552	671	613	520	929	665	535	919	636	782	388
D16S539	12	2837	2354	1390	1371	2656	2218	1889	2622	970	1486	919
D18S51	10	2344	1375	668	893	836	1001	681	944	324	1093	834
	13	1706	1496	1059	838	660	911	1036	974	786	1432	943
D21S11	28	1748	554	817	908	1114	1258	917	1180	692	1135	829
	29	1652	547	813	798	1148	947	961	1170	871	662	657
D3S1358	15	1812	971	969	1002	1513	945	841	1295	1012	1011	737
	16	1273	853	942	951	1133	1307	1066	1353	782	833	760
D5S818	11	2914	1255	1264	1459	1984	2171	1801	2100	1262	1208	1054
D7S820	10	1435	521	808	676	759	728	530	860	449	751	500
	12	1388	657	692	629	721	884	829	516	856	873	753
D8S1179	12	981	1144	1059	719	1376	866	1154	1418	439	790	704
	13	1315	1288	942	753	1144	1043	865	1426	610	670	649
FGA	21	1428	445	952	1025	1644	1418	648	1099	816	751	623
	25	1186	831	1434	1081	1600	736	753	1053	783	937	603
PentaD	9	1651	719	468	494	913	850	1065	1044	599	1104	585
	11	1604	790	568	537	812	1170	992	1335	435	855	249
PentaE	7	1537	1114	642	463	541	642	517	1071	549	1091	742
	11	1923	717	418	310	530	798	764	716	560	1171	622
TH01	6	1914	732	1495	1181	2903	1812	1343	2027	989	1038	653
	9.3	3464	1163	1368	1397	2696	1920	1677	2128	1144	1447	602
TPOX	8	1457	1068	1192	1438	3315	1438	1441	2117	1580	1390	1062
	11	1819	1290	1310	1135	2929	1620	1525	1572	1354	1481	998
vWA	17	1966	929	1130	1000	1853	1301	1229	1218	1085	1250	866
	19	1674	938	761	891	1932	1101	1235	1467	991	1002	863

*Represents single use aliquot.

Table B.18: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.1 ng/μL -60 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2266	2168	1569	1689	2613	2168	2455	1720	1917	2330	1886
CSF1PO	11	2464	1623	800	747	1920	1484	1664	2157	843	1246	1256
D13S317	12	1647	822	788	456	759	672	630	1007	501	664	646
	13	1552	569	412	448	572	626	776	594	556	473	529
D16S539	12	2837	2539	1467	1017	2341	2516	2237	1818	822	1360	1148
D18S51	10	2344	1659	1058	535	1128	748	1111	580	528	1001	847
	13	1706	1836	672	605	1373	699	701	728	476	1166	1291
D21S11	28	1748	593	992	593	875	952	812	1158	1208	646	591
	29	1652	547	553	500	840	634	597	883	804	454	621
D3S1358	15	1812	1106	885	865	877	1231	1097	1204	788	949	734
	16	1273	990	773	680	769	1143	824	1178	517	836	1060
D5S818	11	2914	1324	1130	903	1133	2079	1679	1491	1089	1413	1176
D7S820	10	1435	821	544	516	508	437	965	759	651	909	657
	12	1388	624	627	469	708	758	932	526	458	576	636
D8S1179	12	981	1439	898	419	1022	529	1036	791	615	540	343
	13	1315	1282	820	544	860	1014	728	659	528	683	631
FGA	21	1428	878	665	700	700	1126	973	1254	621	839	788
	25	1186	571	1016	711	632	656	893	661	554	652	421
PentaD	9	1651	924	653	394	1253	665	1387	699	657	836	598
	11	1604	892	297	432	698	960	975	466	410	654	631
PentaE	7	1537	1076	374	462	648	1214	790	1012	449	574	770
	11	1923	603	636	631	851	669	707	571	427	538	526
TH01	6	1914	1196	1480	939	1414	1205	1450	1690	787	877	986
	9.3	3464	1313	1118	840	1488	1962	2253	1543	946	1184	1107
TPOX	8	1457	1388	792	876	1427	1919	2057	1744	1087	1006	1041
	11	1819	1091	1410	818	1522	1386	1532	1353	1316	1443	1181
vWA	17	1966	892	824	824	1011	1157	1042	1095	889	657	864
	19	1674	766	1200	706	653	1112	1022	880	556	557	598

Table B.19: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.2 ng/ μ L RT 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	1947	3274	2258	2147	2737	2063	2527	2497	1845	2548	1694
CSF1PO	11	1098	2960	1406	1604	2515	2192	2373	2304	1128	1800	1795
D13S317	12	969	1192	1207	1084	1697	1273	1064	1593	736	1135	1252
	13	808	1322	964	862	1516	1221	1428	1212	526	1335	534
D16S539	12	1353	3782	2601	2267	3970	3706	4023	3798	1212	2425	2034
D18S51	10	816	2770	1443	1626	1543	1261	1171	1294	846	1659	1378
	13	882	2680	943	1319	1096	1097	1033	1482	945	1997	1414
D21S11	28	799	1222	1303	1180	1295	1327	1247	1643	651	1130	1129
	29	701	1482	1252	1077	1354	1166	1229	1054	921	1006	932
D3S1358	15	774	1887	1064	1567	1905	1781	1844	2436	875	1446	1111
	16	969	1933	1388	1418	1441	1415	1731	2015	942	1003	1097
D5S818	11	1445	2940	2119	1762	2919	2086	2808	3361	1492	2115	1944
D7S820	10	678	1071	948	898	1256	1024	1035	1374	1113	1293	961
	12	768	1409	1092	899	1455	703	937	1672	944	992	836
D8S1179	12	894	1150	942	1115	1528	988	1216	982	463	1097	578
	13	857	1589	1300	977	1727	682	1051	1114	592	842	832
FGA	21	755	1197	910	1133	1026	1039	1023	952	673	927	671
	25	829	888	1363	1135	1162	1044	1033	1336	542	1128	729
PentaD	9	831	2366	894	892	1676	1099	1381	1401	932	1589	790
	11	684	1704	754	792	1368	1367	1550	1623	489	999	1020
PentaE	7	809	2117	1130	1071	1360	817	1261	1358	548	1366	1416
	11	521	1910	931	974	1420	1096	1394	1474	707	1322	711
TH01	6	1742	3037	1917	2134	2702	1951	2265	3424	1030	1690	1445
	9.3	1261	1996	1681	1603	3412	2367	1870	2791	1717	1921	1348
TPOX	8	1382	1304	1555	891	2103	1559	1392	2390	1148	1568	1104
	11	924	2158	1131	1433	1784	2061	1915	2159	921	1247	1232
vWA	17	1109	1278	1402	1163	1020	1458	1157	1607	1026	1164	853
	19	1295	1195	1108	1631	1518	1177	1440	1571	938	850	641

Table B.20: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.2 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1947	2936	1740	1837	2325	2906	2332	2718	2038	2557	1896
CSF1PO	11	1098	4007	753	1001	2496	2631	1989	1862	1288	2044	1596
D13S317	12	969	1678	1018	968	1303	1155	1043	1280	897	1107	706
	13	808	960	942	757	1388	1488	1171	969	659	990	689
D16S539	12	1353	4789	1950	1903	3736	3415	3241	3523	1351	1572	1222
D18S51	10	816	2086	690	1173	1094	1221	963	1099	793	2221	1488
	13	882	3042	579	823	1368	1234	963	1115	803	1438	738
D21S11	28	799	1515	1437	1061	1136	1342	1203	1425	1294	1390	1164
	29	701	1476	932	1248	1467	1903	1144	1317	1337	1229	773
D3S1358	15	774	2000	871	1375	1855	2029	1374	1136	1507	1202	1016
	16	969	1769	1119	1273	2100	1894	1207	1103	1036	1333	1064
D5S818	11	1445	3103	1419	1795	2540	2779	2219	1928	1666	2207	1985
D7S820	10	678	1376	1140	716	923	1457	844	930	1070	942	778
	12	768	1539	930	1162	1018	1100	1055	1053	963	807	865
D8S1179	12	894	1423	872	825	1178	1363	1035	743	585	895	773
	13	857	1925	975	634	1037	1145	991	895	727	977	616
FGA	21	755	1174	1301	1233	1416	1508	1007	946	1035	1241	559
	25	829	1290	1038	1052	815	1236	779	1023	1300	1120	1125
PentaD	9	831	1717	628	716	1700	1490	1373	1128	974	1233	806
	11	684	1477	505	514	1374	1801	1264	1796	637	1584	789
PentaE	7	809	2029	708	939	1313	1460	1047	1660	598	1824	804
	11	521	1835	628	1070	1113	1206	747	1238	916	1296	825
TH01	6	1742	2592	2056	1492	2772	2742	2868	2635	1286	1544	1549
	9.3	1261	3090	2148	1312	2843	3148	3888	2534	1584	1588	1032
TPOX	8	1382	2444	959	1144	1944	2691	1680	1539	1830	1533	925
	11	924	1669	1201	1172	1772	1945	1378	1780	1668	1388	1423
vWA	17	1109	1570	1187	1093	1096	1482	1155	1350	966	1018	849
	19	1295	1384	1169	819	1318	1752	1387	1183	1002	1495	881

Table B.21: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.2 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1947	2187	1621	1559	1538	1998	2111	1942	1415	1663	1438
CSF1PO	11	1098	1580	1017	667	978	1200	1336	1218	671	952	456
D13S317	12	969	843	511	518	544	509	559	550	558	672	395
	13	808	675	416	406	700	555	723	428	418	469	246
D16S539	12	1353	1620	1244	971	1477	2269	2294	1562	894	1615	577
D18S51	10	816	1483	882	413	535	585	481	485	345	932	540
	13	882	1189	591	528	355	626	492	521	358	718	648
D21S11	28	799	600	451	674	540	957	871	565	555	977	483
	29	701	593	466	655	497	997	821	690	482	450	530
D3S1358	15	774	1224	664	742	815	1130	1084	1012	783	751	511
	16	969	969	751	546	679	892	864	822	345	862	559
D5S818	11	1445	1160	625	1004	1340	1398	1523	1129	1158	1256	744
D7S820	10	678	524	524	601	632	929	549	566	694	582	422
	12	768	981	389	663	669	431	471	581	651	487	279
D8S1179	12	894	942	473	690	646	918	807	602	430	674	343
	13	857	1311	645	907	496	1182	887	696	518	904	446
FGA	21	755	890	608	888	676	900	609	578	615	608	555
	25	829	783	876	782	854	912	858	689	718	409	426
PentaD	9	831	802	584	379	454	649	966	920	521	409	282
	11	684	637	374	364	541	798	777	442	342	583	352
PentaE	7	809	1043	460	672	372	951	813	600	615	608	511
	11	521	765	501	459	410	962	581	689	519	296	312
TH01	6	1742	1171	735	1003	1580	2148	1148	1137	1168	686	647
	9.3	1261	1130	1041	1096	1323	1845	1257	1396	1338	1113	912
TPOX	8	1382	1282	618	984	1639	1892	1609	973	1191	1105	758
	11	924	1239	1027	924	1129	1640	1423	1497	976	1387	931
vWA	17	1109	760	775	881	983	1011	1034	1142	765	778	681
	19	1295	891	568	734	843	1316	1052	1096	634	702	696

*Represents single use aliquot.

Table B.22: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.2 ng/μL -20 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	1947	2708	1640	1440	1425	2189	2504	2334	1427	1534	1698
CSF1PO	11	1098	2285	680	463	1047	1095	1116	821	627	632	901
D13S317	12	969	1032	737	439	638	697	919	668	403	347	576
	13	808	861	541	345	440	856	584	817	569	349	415
D16S539	12	1353	3135	1180	826	1715	2173	2206	1919	809	861	1258
D18S51	10	816	2181	619	361	410	706	863	714	584	610	599
	13	882	2056	670	346	466	442	576	452	518	635	819
D21S11	28	799	1005	581	407	499	896	833	974	714	507	688
	29	701	1138	688	468	478	1113	579	839	595	662	662
D3S1358	15	774	1176	613	678	884	1446	1293	1185	777	794	711
	16	969	1091	711	623	470	1207	1253	905	465	725	721
D5S818	11	1445	1911	930	730	1022	1857	1580	1529	1167	752	1016
D7S820	10	678	799	474	414	451	485	577	507	355	513	514
	12	768	807	634	270	618	572	465	749	571	748	745
D8S1179	12	894	1666	453	645	451	834	721	633	384	744	681
	13	857	2041	386	591	469	947	689	710	387	235	751
FGA	21	755	1089	902	950	666	903	836	779	509	445	818
	25	829	1162	936	528	363	504	674	878	476	569	575
PentaD	9	831	765	372	380	553	1149	772	658	218	609	589
	11	684	1051	370	171	737	676	753	746	218	378	328
PentaE	7	809	1140	535	358	526	461	683	638	415	793	438
	11	521	1120	474	360	503	624	570	747	483	449	785
TH01	6	1742	1596	1139	854	1009	1796	1566	1499	1011	1131	968
	9.3	1261	1657	1328	1074	959	1897	1613	1822	1051	1022	1024
TPOX	8	1382	1530	1332	835	668	2199	1802	1879	1345	1066	1146
	11	924	2122	1320	909	866	1663	1372	1600	733	935	884
vWA	17	1109	799	856	775	665	1132	1215	1154	605	735	895
	19	1295	1283	870	834	922	977	1110	1266	659	725	1077

Table B.23: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.2 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	1947	2754	1839	1722	2204	2381	1968	1920	1473	1998	1342
CSF1PO	11	1098	2175	1238	863	2103	2443	2301	2124	1126	1374	1286
D13S317	12	969	1435	948	799	835	900	1109	893	597	810	541
	13	808	842	774	890	900	1261	1081	740	588	635	442
D16S539	12	1353	3270	2260	1623	2558	3120	3674	2823	1371	1658	708
D18S51	10	816	1659	787	797	942	1486	1108	929	725	1189	737
	13	882	2167	1019	869	1389	927	774	975	709	635	833
D21S11	28	799	1284	1099	925	1170	1374	1470	1462	1080	988	678
	29	701	1187	1279	783	1214	1178	1436	1261	961	779	581
D3S1358	15	774	1534	1203	1325	1420	1463	1395	1380	924	795	920
	16	969	1769	1327	1392	1459	1221	1439	1320	878	1077	661
D5S818	11	1445	2136	1723	1348	2649	2611	2450	2415	1329	1490	1204
D7S820	10	678	1627	830	591	871	981	1032	1175	683	1014	515
	12	768	962	824	533	950	1184	1431	1094	940	701	508
D8S1179	12	894	1495	863	703	744	642	1172	841	524	874	376
	13	857	1393	1023	688	998	1002	959	667	498	706	400
FGA	21	755	1134	1016	844	793	1134	1415	1024	800	991	544
	25	829	1166	1289	1291	817	927	772	605	800	545	430
PentaD	9	831	1474	626	769	1249	1216	1675	1174	753	841	740
	11	684	1260	795	690	1180	1784	1250	785	818	810	590
PentaE	7	809	1199	1086	784	1080	763	714	833	612	1362	886
	11	521	1593	826	924	924	997	1086	1073	396	834	717
TH01	6	1742	1887	1601	1001	2440	2646	1833	2118	1472	1196	948
	9.3	1261	2312	2023	1473	1816	2045	1945	2073	1138	1002	1011
TPOX	8	1382	1191	1865	1616	1832	1594	1848	1189	1126	945	1005
	11	924	1207	1045	795	1896	1929	2002	1772	1150	1370	944
vWA	17	1109	868	1057	782	1042	1125	968	1353	859	737	758
	19	1295	948	1122	953	916	1429	1634	1228	737	708	651

*Represents single use aliquot.

Table B.24: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 0.2 ng/μL -60 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	1947	3082	1768	1637	2215	2291	2343	1794	1700	1894	2185
CSF1PO	11	1098	2474	1055	1010	2125	1638	1140	1929	651	1862	1668
D13S317	12	969	1231	953	582	838	1095	1075	1138	604	592	876
	13	808	1203	855	558	434	634	678	1174	515	632	697
D16S539	12	1353	2995	1796	1199	2292	3522	2596	2976	1406	1441	1205
D18S51	10	816	3251	1082	673	1058	872	1161	726	755	1091	845
	13	882	3266	1205	651	1021	822	819	883	768	1015	910
D21S11	28	799	1259	929	626	947	1235	1042	1149	966	793	892
	29	701	904	761	748	746	828	1246	1119	675	753	1032
D3S1358	15	774	1986	1094	773	1474	1018	1717	1745	1054	1004	1043
	16	969	1556	878	809	1024	1591	1221	1266	996	1089	1234
D5S818	11	1445	2216	1323	1089	1767	2400	2611	2056	1419	1276	1771
D7S820	10	678	1117	1105	444	1055	575	861	1102	760	883	1065
	12	768	1352	673	635	1006	832	999	1095	827	836	1025
D8S1179	12	894	1730	598	633	1040	1151	1280	603	507	701	809
	13	857	2208	737	554	651	613	1142	1073	528	676	834
FGA	21	755	875	653	743	687	989	886	1129	978	752	836
	25	829	923	662	757	648	889	597	958	737	793	690
PentaD	9	831	2077	668	348	1022	1281	1190	879	504	699	1002
	11	684	1209	825	424	1002	1257	1119	1055	724	716	721
PentaE	7	809	2150	556	399	740	1570	818	1167	895	907	1046
	11	521	1328	887	503	629	1139	1003	1072	440	913	1217
TH01	6	1742	2339	1521	1160	2443	2500	2939	3064	1730	1166	1379
	9.3	1261	1836	1689	1246	2235	2750	1599	2861	1847	1433	1272
TPOX	8	1382	2008	1265	1122	1606	1342	1871	2373	1313	1319	1044
	11	924	1659	1325	1145	2084	1147	1103	1943	2039	1075	1168
vWA	17	1109	1164	961	400	909	1179	1355	1182	732	820	911
	19	1295	1036	1339	829	1207	1281	1112	1015	659	1130	1086

Table B.25: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 1 ng/μL RT 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2287	3395	2866	2617	2921	2944	2832	2831	2304	2720	2231
CSF1PO	11	947	2517	1028	1065	1846	1938	1798	2102	1054	1855	1738
D13S317	12	957	1139	623	781	807	1518	904	907	725	873	936
	13	863	911	908	913	588	1166	1076	1111	670	944	863
D16S539	12	1693	3130	1765	1716	2732	3043	2500	3096	1631	2044	1403
D18S51	10	1077	2113	818	1026	1248	1188	1215	1110	954	1261	1517
	13	1120	2115	1133	1261	850	1509	1121	909	761	1879	1030
D21S11	28	741	1190	1264	1004	879	987	1369	1500	985	1194	1066
	29	814	1172	1097	832	688	1117	899	973	965	864	986
D3S1358	15	1213	1422	1199	964	1107	2009	1453	1571	1044	1399	1354
	16	1034	970	778	722	881	1370	1317	1498	1196	1213	1332
D5S818	11	1739	1876	1669	1458	2242	2495	2633	2600	1657	1860	1635
D7S820	10	656	954	760	846	741	942	876	988	983	1353	1085
	12	627	1213	735	880	851	1119	952	1238	809	997	931
D8S1179	12	1068	1480	983	890	1171	1368	1431	1269	782	1118	766
	13	887	1737	1638	1279	1045	1068	1181	1327	601	1283	1000
FGA	21	1231	1130	1607	1210	808	1682	1068	1532	1003	952	961
	25	1113	1328	867	1512	1062	1911	1275	1321	1247	666	1323
PentaD	9	894	1597	588	496	1114	1392	1436	1408	660	996	1029
	11	800	1550	667	556	855	1043	1156	1155	791	1360	552
PentaE	7	709	1196	743	909	734	948	1225	823	681	1231	1359
	11	999	1442	578	639	879	1235	1132	1099	595	1183	1669
TH01	6	1504	2083	1683	2049	1622	1622	2364	2569	1504	1013	1585
	9.3	1548	1980	1314	923	1576	2724	2781	2335	1808	1538	1328
TPOX	8	1171	1868	1473	1673	1568	2379	2407	1944	1948	1670	1613
	11	992	1453	1363	1262	1944	2295	2078	1492	1578	1767	1387
vWA	17	1087	1497	1515	1078	1568	1776	1576	1308	1694	1312	1347
	19	1330	1404	1190	1292	1074	1848	1716	2274	1855	1322	1143

Table B.26: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 1 ng/ μ L +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2287	3057	2586	3316	3094	3516	2308	2393	1931	2372	2050
CSF1PO	11	947	1900	869	2882	1856	2029	1584	1836	1155	1994	1817
D13S317	12	957	1043	787	845	1123	1737	1030	936	764	761	752
	13	863	1089	774	922	947	1374	649	1058	720	634	868
D16S539	12	1693	2617	1973	3047	2934	3380	2585	3323	1666	1653	1941
D18S51	10	1077	3006	1106	2336	1301	1040	890	868	675	1068	1475
	13	1120	1279	903	2619	1279	1123	1097	956	632	1086	1819
D21S11	28	741	1266	1326	845	907	1714	1080	1146	1110	840	1313
	29	814	974	830	862	1372	1579	1036	1000	980	792	906
D3S1358	15	1213	1482	1272	1488	1369	1486	1242	1517	1210	1065	947
	16	1034	1208	1042	1198	1540	1790	1182	1269	1131	835	703
D5S818	11	1739	1991	1509	2098	2283	2782	1874	2025	1630	1382	1849
D7S820	10	656	869	1080	945	905	1350	622	779	1016	1103	1298
	12	627	1374	959	846	866	1102	917	931	677	1109	986
D8S1179	12	1068	1811	1149	1307	1293	1491	1185	903	685	828	1205
	13	887	1615	1047	1740	1567	1373	1101	1181	563	721	971
FGA	21	1231	1147	1178	1097	1008	1444	1325	1309	1326	1191	1090
	25	1113	1171	1061	1144	1166	1336	1040	1033	775	912	811
PentaD	9	894	1621	719	558	1555	1835	1033	1003	819	865	865
	11	800	1477	535	843	1381	1524	1129	1015	696	676	915
PentaE	7	709	873	683	1465	1427	1307	866	954	935	1309	1146
	11	999	1169	931	1055	1179	796	661	1166	1069	521	575
TH01	6	1504	1502	1823	1230	2487	2433	2391	2482	1506	1182	1236
	9.3	1548	1813	1469	1199	2162	3227	1711	2500	1509	1382	1454
TPOX	8	1171	1425	2289	1980	1672	2083	1980	2380	1500	1249	1452
	11	992	1682	1368	1488	2081	2658	1704	2092	1981	847	1160
vWA	17	1087	1184	1589	1322	1482	1505	1749	1495	1200	824	908
	19	1330	1290	1273	1388	1195	1770	1697	1572	761	1074	1029

Table B.27: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 1 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2287	2755	1738	2516	2802	3461	2069	2477	1301	1577	2266
CSF1PO	11	947	2678	1071	2162	2165	2881	1580	2271	1058	1265	1579
D13S317	12	957	1323	887	1147	1039	1436	1047	924	545	1031	854
	13	863	1419	717	811	1061	1501	929	983	670	652	822
D16S539	12	1693	3938	1808	2987	3254	3361	2402	2803	1228	1768	1669
D18S51	10	1077	2236	936	2046	1434	1542	619	1478	618	1367	1223
	13	1120	2616	1124	1878	1247	1222	956	1314	858	1619	1590
D21S11	28	741	1335	835	1126	2068	1671	952	1353	1147	895	975
	29	814	1189	802	992	1440	1357	983	1065	1142	613	686
D3S1358	15	1213	2206	1072	1813	2195	2006	1551	1369	956	1212	1069
	16	1034	1666	1264	906	1749	1465	882	1720	941	1247	1010
D5S818	11	1739	2530	1353	1746	2854	3154	2081	3011	1496	1545	1839
D7S820	10	656	1323	990	1166	936	1124	1005	1290	809	881	1078
	12	627	1775	890	972	1068	1242	1083	897	533	979	1096
D8S1179	12	1068	1356	838	1152	952	843	507	860	575	700	809
	13	887	1227	755	950	1216	1233	842	1193	542	500	876
FGA	21	1231	781	1267	1336	611	962	1032	659	626	809	925
	25	1113	884	789	1299	1662	1102	793	848	635	721	922
PentaD	9	894	1770	977	914	1244	1372	1115	1497	601	691	1210
	11	800	1954	715	1052	917	2171	1161	681	841	1015	1120
PentaE	7	709	2239	863	1324	1275	989	990	770	1141	584	1393
	11	999	1738	532	1110	1371	1458	1176	2062	823	1416	973
TH01	6	1504	1842	1322	1693	2020	2842	2902	2653	1590	1691	1641
	9.3	1548	2373	1994	1745	2806	3193	2576	3352	1568	994	1403
TPOX	8	1171	1558	1425	1524	1759	1655	1217	1727	1545	1140	962
	11	992	1797	987	1419	1734	1970	1470	1620	1315	1236	1284
vWA	17	1087	1448	1054	1316	1490	1450	1301	1478	1128	863	1048
	19	1330	1664	1131	1335	1395	1786	1095	1067	771	721	1139

*Represents single use aliquot.

Table B.28: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 1 ng/μL -20 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2287	2985	2460	1848	2443	2980	2971	2784	2719	2125	2696
CSF1PO	11	947	2773	1289	1304	2493	2864	2788	2215	999	2192	1639
D13S317	12	957	1001	731	817	1117	1486	1276	1123	713	913	1026
	13	863	1353	577	855	873	1178	1219	963	794	1010	909
D16S539	12	1693	3941	1803	2069	4160	3596	4120	3846	1718	2159	2025
D18S51	10	1077	3431	757	1315	1667	1330	1523	1127	1197	2075	1229
	13	1120	2347	816	1791	1264	1193	1403	790	958	1290	1603
D21S11	28	741	1116	986	883	1224	1287	1576	1348	770	1015	1331
	29	814	1256	989	780	982	1365	1136	1117	1380	1311	1454
D3S1358	15	1213	1840	993	962	1264	1778	1838	1453	1097	1148	1562
	16	1034	1229	971	1248	1373	1508	1582	1201	1078	1314	1347
D5S818	11	1739	2510	1420	1388	2377	2833	2956	2361	1487	2040	2150
D7S820	10	656	1389	1081	991	655	1254	1018	1065	829	1017	1284
	12	627	1660	785	808	746	1090	1042	1072	971	938	989
D8S1179	12	1068	1595	897	760	1180	789	1052	980	662	997	1132
	13	887	1175	877	987	1251	1170	934	712	509	929	780
FGA	21	1231	1657	998	1124	931	1031	1147	722	1154	1259	927
	25	1113	904	1191	772	852	829	1196	736	785	968	881
PentaD	9	894	1049	696	714	1673	1591	1566	1110	700	822	817
	11	800	1184	685	658	1213	1897	944	1332	634	1080	1029
PentaE	7	709	2086	521	1086	1107	1258	1610	1209	1119	1368	1724
	11	999	1996	676	973	885	1117	1377	1101	990	1620	1324
TH01	6	1504	1433	1487	1695	2555	2011	2485	3743	2577	1154	1465
	9.3	1548	2085	1360	1385	2489	2832	3571	2703	2012	1885	1312
TPOX	8	1171	1493	720	1076	1625	2429	2675	1780	1714	1758	1142
	11	992	1446	1284	1265	1576	1566	1760	1439	1960	1631	1880
vWA	17	1087	1092	1062	949	1309	1426	1386	1461	1021	1417	1519
	19	1330	1538	1008	759	1361	1431	1857	1728	1094	1304	808

Table B.29: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 1 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2287	2990	2512	2102	2948	3672	2997	2943	2513	2579	2138
CSF1PO	11	947	1796	953	1116	1945	1794	2065	2016	1134	1868	1597
D13S317	12	957	969	709	698	1067	1003	860	1175	981	976	721
	13	863	765	761	597	806	1397	1219	1135	754	899	732
D16S539	12	1693	2251	1802	1579	3419	3340	2704	2457	1222	1676	1335
D18S51	10	1077	2127	1291	1033	847	1089	955	1066	784	1761	1186
	13	1120	2398	791	1068	1031	1230	1008	919	836	1747	1086
D21S11	28	741	1058	819	797	1218	1304	1113	1222	1422	1178	848
	29	814	1132	1003	781	786	1191	1284	959	1133	916	682
D3S1358	15	1213	1185	1004	990	1441	1716	1363	1375	1064	1448	1056
	16	1034	989	1057	809	1317	1358	1443	1562	1227	1218	833
D5S818	11	1739	1943	1153	1106	2389	2572	2436	2516	1364	1994	1729
D7S820	10	656	772	833	618	1097	994	954	895	863	1102	692
	12	627	1049	849	657	764	1085	712	1057	666	872	889
D8S1179	12	1068	1750	1204	964	1395	1235	1825	1202	859	1005	1026
	13	887	1244	731	1012	1110	1435	1274	1274	830	1166	938
FGA	21	1231	1010	1146	1196	1109	1583	1421	1441	1389	1067	1103
	25	1113	1110	1388	1036	1018	1028	922	1052	1083	1267	435
PentaD	9	894	1240	397	525	852	1302	1353	1341	736	1094	511
	11	800	922	602	511	942	932	912	1022	752	1096	600
PentaE	7	709	1232	947	674	1003	1172	1077	1070	1150	1527	834
	11	999	1092	809	735	891	1381	1243	900	604	922	991
TH01	6	1504	1224	1493	1397	1903	3402	2461	1684	2320	1178	1044
	9.3	1548	1601	1396	959	1956	1581	2463	3019	1719	1457	1213
TPOX	8	1171	1418	1593	1202	2546	2220	2750	2072	2226	1423	1422
	11	992	1708	1655	1271	1949	2551	1714	2370	1756	1442	1248
vWA	17	1087	1120	1384	1193	1653	1788	1419	1313	1656	1276	1310
	19	1330	1426	1015	1076	1089	2017	1496	1729	1310	1539	991

*Represents single use aliquot.

Table B.30: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 1 ng/μL -60 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2287	3222	2404	2353	2040	2970	2369	2464	2074	2457	2374
CSF1PO	11	947	3279	904	1000	1419	1806	1235	1693	1067	1688	1442
D13S317	12	957	1423	869	585	1058	1264	1068	948	850	938	1181
	13	863	1254	714	755	1076	1073	795	1370	652	721	765
D16S539	12	1693	3391	1659	1753	2291	2805	3233	2599	1132	1802	1419
D18S51	10	1077	2030	1054	1087	1025	1118	831	947	637	1419	1434
	13	1120	2302	784	1187	844	1144	908	1040	536	1774	1533
D21S11	28	741	1236	780	997	934	1302	1475	958	993	1070	1061
	29	814	855	540	793	1026	1081	1211	1162	878	1182	942
D3S1358	15	1213	1827	1054	1085	1058	1843	1429	1373	1052	1517	1033
	16	1034	1742	771	996	1299	1231	1385	1423	1067	1250	979
D5S818	11	1739	2302	1523	1538	1660	2267	2244	2195	1207	1848	1494
D7S820	10	656	1497	645	770	850	1217	739	828	530	1157	738
	12	627	1379	1207	899	817	879	911	1152	749	803	566
D8S1179	12	1068	2121	1020	900	822	1364	1141	1255	689	780	859
	13	887	1600	833	638	862	1010	1335	1171	837	730	1232
FGA	21	1231	1393	979	1514	949	1472	1439	1039	1238	910	908
	25	1113	1438	1102	1252	659	849	911	972	943	965	486
PentaD	9	894	1231	462	441	1027	1087	1126	833	452	1025	1007
	11	800	1351	589	619	948	1689	1191	817	683	920	596
PentaE	7	709	1542	616	796	876	1025	814	859	799	1326	1035
	11	999	1420	532	665	720	794	484	1003	833	1482	792
TH01	6	1504	2309	1408	1392	1236	2471	2486	1454	1461	1565	1094
	9.3	1548	1931	1370	1330	1809	2068	2479	2818	1634	1527	1406
TPOX	8	1171	2312	1293	1396	2046	1921	1584	1880	1665	1458	1106
	11	992	2334	1206	1322	1872	2026	1816	1927	1570	1415	1325
vWA	17	1087	1772	1248	1418	1342	1538	1989	1329	954	1307	1045
	19	1330	1395	1702	1108	808	1681	1492	1039	1152	1005	1025

Table B.31: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 4 ng/μL RT 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2259	2793	2569	2360	2861	3006	2876	2968	2140	3043	2370
CSF1PO	11	1396	3296	1727	1452	2412	3667	2732	2719	1455	1879	2034
D13S317	12	1191	1458	1290	1492	1606	1851	1367	1708	1032	1164	986
	13	1095	1583	1642	995	1456	1962	1649	1502	958	1172	737
D16S539	12	1969	4305	2485	2073	3764	4153	3141	4715	1542	2588	1754
D18S51	10	1463	2635	960	1102	1626	1592	1412	1687	1227	1505	1882
	13	1310	3060	1484	2012	1486	1505	1083	1220	894	1638	1271
D21S11	28	1023	1616	1383	1393	1683	1532	1846	2313	1281	1452	1428
	29	932	1355	1139	1144	1554	1784	1470	1744	1558	1134	1189
D3S1358	15	1344	1634	1701	1163	1484	2242	2414	1878	1691	1860	1154
	16	1319	2096	1621	1378	1537	1873	1674	2497	994	891	1511
D5S818	11	2179	2960	2024	1806	3219	3400	3500	3948	1569	1643	1940
D7S820	10	848	1681	1541	1014	1161	1728	1295	1340	1148	1170	1116
	12	1062	1816	1433	965	1289	1147	1441	1816	1142	1606	1485
D8S1179	12	1357	1911	1334	701	1320	1387	1552	1244	754	1021	888
	13	1102	1495	1028	1463	1279	1505	1305	1531	810	1067	947
FGA	21	881	1466	1726	1153	1309	1564	1206	1253	1028	1175	799
	25	792	1265	1218	1173	1042	1173	1237	1220	1043	1083	922
PentaD	9	1025	2130	954	960	1516	1894	1817	1808	984	1113	1190
	11	887	2005	781	999	2227	2040	1759	1611	1047	1498	833
PentaE	7	1263	2020	815	1030	1662	1512	1452	2044	1276	1617	1302
	11	759	2315	1152	902	1497	1698	1144	1081	885	1027	1270
TH01	6	2038	2476	1614	1715	3325	3592	4169	3853	2248	2105	1747
	9.3	1869	1986	1827	2301	3050	3087	2295	4710	1967	1556	1949
TPOX	8	1113	1530	1545	1542	1861	2294	1859	1925	1787	1237	1363
	11	1216	1562	1299	1342	2377	2921	2406	2127	1822	1565	1319
vWA	17	1801	1032	1126	1184	1695	1918	1797	1903	1355	1028	1145
	19	1275	1327	1328	1145	1197	1499	1440	1428	1170	1106	1131

Table B.32: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 4 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2259	2998	2968	2386	2200	3182	2725	2522	2563	2637	2377
CSF1PO	11	1396	2721	1796	1251	2114	3451	2347	2173	1283	2256	2607
D13S317	12	1191	1194	1298	1200	1045	2093	1523	1528	1065	966	1213
	13	1095	1545	1474	1130	1392	1114	1157	1358	977	1353	952
D16S539	12	1969	4365	2467	2155	2710	5243	3692	2892	1955	1993	2283
D18S51	10	1463	2951	1125	1392	874	1661	1185	865	1074	1572	1585
	13	1310	3262	1585	1727	1806	1699	1153	970	831	1259	1513
D21S11	28	1023	1547	1712	1404	1358	1668	1609	1684	1309	1303	1585
	29	932	1092	1357	985	1309	1296	1414	1264	1107	824	1194
D3S1358	15	1344	1841	1618	1182	1580	2038	1790	1497	1555	1456	1556
	16	1319	1608	1687	1306	1127	1856	1553	1603	1327	1354	1131
D5S818	11	2179	2866	1950	1789	2313	3438	2776	2815	1740	2025	2167
D7S820	10	848	1738	1314	1104	1020	1230	1119	927	1075	1251	1118
	12	1062	1241	1267	1071	1205	1692	1255	1538	1047	1337	1202
D8S1179	12	1357	1455	1391	950	1394	1194	1485	1210	792	854	1190
	13	1102	1995	1111	1011	1072	1304	1192	1105	990	1286	1200
FGA	21	881	1346	1695	1427	1049	1004	1106	963	1376	1407	1022
	25	792	1235	1336	1187	1074	1285	826	1099	1321	1101	862
PentaD	9	1025	1323	932	800	1412	2060	1665	1589	652	1168	1228
	11	887	1372	940	816	1466	2861	1787	1616	637	1136	1293
PentaE	7	1263	1539	1318	870	816	1445	1423	1260	1053	1283	1705
	11	759	1833	788	1003	1212	1519	1131	989	1025	1545	1678
TH01	6	2038	2579	1500	2400	2973	3102	2629	3341	1804	1642	1873
	9.3	1869	1847	2296	2110	1949	3556	3484	2745	1774	2036	1559
TPOX	8	1113	2046	1565	1102	1717	2489	2089	2655	1307	1500	1551
	11	1216	2064	1555	1411	1231	2720	1630	1940	2108	1202	1327
vWA	17	1801	1692	1524	1047	1109	1587	1692	1819	1178	1275	1204
	19	1275	1215	1269	1220	1560	1744	1441	1593	1215	1211	1347

Table B.33: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 4 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2259	2850	2212	1895	3583	3364	2190	3404	2386	2532	1975
CSF1PO	11	1396	1833	1129	798	1957	1710	1703	1824	1140	1825	1258
D13S317	12	1191	889	1133	836	1127	1141	1103	1125	759	1001	652
	13	1095	927	702	585	962	1182	892	897	709	563	543
D16S539	12	1969	2495	1807	1105	2910	3155	2716	2558	1672	1946	1585
D18S51	10	1463	1924	1171	894	1339	896	1136	1045	866	1497	800
	13	1310	2116	1054	1017	1806	1018	642	1169	809	1258	960
D21S11	28	1023	979	1236	864	1838	943	1561	964	1198	1179	994
	29	932	1037	879	743	1467	1331	1035	1056	1562	1172	559
D3S1358	15	1344	1040	968	809	1713	1423	1637	1315	1265	1550	1094
	16	1319	1193	1340	882	1477	1365	1609	1506	1048	1197	1235
D5S818	11	2179	1612	1419	1112	2610	2713	2211	2378	1507	1832	1555
D7S820	10	848	880	714	477	770	854	1017	830	920	1157	817
	12	1062	1022	865	647	1142	1187	800	849	1170	1125	852
D8S1179	12	1357	1331	1282	891	1486	1369	1194	1225	978	1192	1115
	13	1102	1338	880	900	1379	1353	1139	1375	1015	1686	601
FGA	21	881	1180	1207	864	1200	1463	1158	1276	980	1522	1021
	25	792	953	1320	947	1395	1776	1308	1047	823	879	999
PentaD	9	1025	928	497	386	1381	1394	1137	855	986	1139	775
	11	887	1137	391	380	1344	1259	1311	1097	619	1031	544
PentaE	7	1263	933	886	539	957	1261	703	1377	709	1145	794
	11	759	944	879	804	1222	963	747	881	803	1083	650
TH01	6	2038	1533	1398	1394	2176	2632	1758	2282	1593	1289	1326
	9.3	1869	1711	1533	1226	2515	2629	3218	2374	1635	1988	1172
TPOX	8	1113	1420	1606	1383	1952	2623	2685	2105	2219	2206	1267
	11	1216	1831	1459	1021	1997	2256	2262	1744	1778	1966	1334
vWA	17	1801	1474	1069	1155	1588	1697	1750	1322	1606	1521	1288
	19	1275	1266	1362	928	1654	1522	1447	1977	1447	1321	1096

*Represents single use aliquot.

Table B.34: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 4 ng/μL -20 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2259	2639	2785	2123	2826	3414	2648	3248	2240	2360	2428
CSF1PO	11	1396	2099	850	900	1669	2223	2244	1912	1054	1608	1625
D13S317	12	1191	790	797	791	1212	1166	1125	1282	754	703	784
	13	1095	1194	913	624	1205	1159	932	1005	577	697	823
D16S539	12	1969	2341	1668	1643	2693	3282	3012	3168	1475	1533	1447
D18S51	10	1463	1853	1065	859	1225	1036	1209	1024	658	2025	1754
	13	1310	1510	1160	1141	1155	1202	830	1366	835	1303	1374
D21S11	28	1023	907	1167	729	1258	1409	1337	1299	1479	1219	1041
	29	932	983	1103	1079	947	1326	1163	1187	789	743	854
D3S1358	15	1344	1423	1086	1164	1885	1894	1658	1891	1008	1092	972
	16	1319	994	1040	828	1327	1890	1592	1144	891	1371	1042
D5S818	11	2179	1842	1361	1406	2100	3283	2991	2221	1423	1436	1517
D7S820	10	848	1033	1042	790	1193	1491	868	1196	852	957	1045
	12	1062	1178	1149	1035	948	1156	1015	1035	1030	999	581
D8S1179	12	1357	1934	1051	918	1378	1210	1615	1028	713	943	940
	13	1102	2162	926	922	1127	1308	1187	1528	785	1032	1003
FGA	21	881	1212	1244	1427	1301	1079	1235	1179	950	987	735
	25	792	1257	1258	1058	1886	1429	649	906	1019	746	1277
PentaD	9	1025	1182	553	637	1040	1115	1538	1186	640	696	720
	11	887	1078	720	483	736	1366	1024	1052	561	772	1052
PentaE	7	1263	1411	590	695	1262	1023	1396	1129	806	1207	999
	11	759	1431	866	609	1267	1046	1108	1162	840	767	789
TH01	6	2038	1619	1767	1223	2405	3019	2535	1951	1255	1728	1288
	9.3	1869	1368	1572	1426	1965	2353	3447	3223	1037	1712	1075
TPOX	8	1113	1494	1482	1425	2206	2484	2376	2000	1737	1515	1352
	11	1216	1461	1281	1671	2081	2260	2058	2219	1563	1284	1493
vWA	17	1801	1411	1400	1339	1642	1990	1664	1547	1161	998	949
	19	1275	1483	1168	1103	1879	2023	1366	1391	1013	764	1400

Table B.35: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 4 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2259	3540	2512	2239	2252	3335	2461	2671	1928	1899	2211
CSF1PO	11	1396	3577	980	1268	2451	2211	1458	2443	1218	2098	1560
D13S317	12	1191	1703	1174	900	1332	1924	1354	1429	866	1098	769
	13	1095	1343	1356	912	1305	1305	1621	1145	762	1021	685
D16S539	12	1969	4031	2263	2138	4162	4330	3795	3543	1650	2399	2146
D18S51	10	1463	2166	1352	1191	1589	1280	1245	1343	797	1652	1600
	13	1310	2928	1019	1062	1511	1626	1309	998	1005	1374	1520
D21S11	28	1023	1612	1520	1235	1640	1770	1276	1915	1458	1492	1209
	29	932	1089	1094	763	1547	1764	1482	1202	1125	1686	1074
D3S1358	15	1344	2421	1530	1506	1667	2001	1484	2615	1277	1728	1249
	16	1319	1281	1460	1423	1855	1818	2125	1580	986	1347	1153
D5S818	11	2179	2753	2255	1842	2366	2870	2943	3245	1682	2555	2027
D7S820	10	848	1800	1321	1150	1378	1253	1118	1477	955	1107	1110
	12	1062	1355	1324	1063	1274	1289	1337	1150	893	1203	1083
D8S1179	12	1357	1317	1229	1057	1036	1028	1020	964	775	1097	909
	13	1102	1553	1516	826	1216	966	1057	900	578	881	471
FGA	21	881	1454	1133	1413	1398	921	1204	1137	733	1286	974
	25	792	1683	1342	875	1091	1525	1339	1043	717	807	912
PentaD	9	1025	2060	871	643	1684	1420	1196	1142	873	1437	967
	11	887	1816	750	587	1380	1479	1475	1746	714	1159	772
PentaE	7	1263	2309	962	966	1682	1680	1407	1349	907	1244	1080
	11	759	1697	1360	1015	1248	1090	1261	1334	1033	1298	1309
TH01	6	2038	1515	2139	1595	3661	3585	2421	3098	1589	1416	1853
	9.3	1869	2028	1748	1814	3042	3835	2785	2592	1529	2325	1375
TPOX	8	1113	1767	1566	1142	2053	2110	2305	2231	1241	1565	1328
	11	1216	1505	1525	1360	1759	1887	1572	2205	1682	923	987
vWA	17	1801	1742	1433	1423	1623	1272	1383	1717	1293	1309	754
	19	1275	1527	1374	1323	1301	1422	1169	1094	1228	856	1177

*Represents single use aliquot.

Table B.36: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 4 ng/μL -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2259	2461	2099	1538	2296	2789	3087	3020	2146	2466	2251
CSF1PO	11	1396	2530	1046	782	2291	3021	2677	1773	1371	1677	1922
D13S317	12	1191	1472	1112	890	1211	1450	1321	1684	794	738	1078
	13	1095	1268	882	875	1314	1042	1520	1340	745	756	858
D16S539	12	1969	3502	2014	1331	3890	3383	4645	4213	1465	2257	1940
D18S51	10	1463	1919	1010	770	1185	1441	1524	1073	1245	1404	979
	13	1310	2528	719	678	1177	1485	1282	1495	971	1206	1410
D21S11	28	1023	1182	1311	862	1750	1564	1478	1578	1461	976	1093
	29	932	1444	1369	884	1313	1634	1412	1715	1280	1233	996
D3S1358	15	1344	1602	992	1217	2048	1512	2264	1935	1007	1013	1265
	16	1319	1664	1337	796	1708	1609	1997	1785	1030	1159	1080
D5S818	11	2179	2175	1411	1331	2820	2931	3143	3238	1837	1779	1700
D7S820	10	848	1112	931	956	1514	1259	1521	1287	1051	1022	985
	12	1062	987	962	504	961	1543	1284	1261	1071	1250	1034
D8S1179	12	1357	1689	944	865	1221	1339	1312	1256	663	1017	659
	13	1102	1300	705	561	1364	1399	1566	1263	975	613	949
FGA	21	881	1088	1158	712	1035	1230	1185	1390	1316	1040	1124
	25	792	1054	1394	1193	946	1256	1510	1187	921	921	654
PentaD	9	1025	1155	524	431	1651	1357	1697	1550	771	1375	1230
	11	887	1122	623	324	1394	1822	1769	1580	796	804	807
PentaE	7	1263	1536	861	737	1040	1896	1311	1598	686	1404	1439
	11	759	1084	1054	683	1788	1046	1444	1045	744	1269	1100
TH01	6	2038	2213	1446	1307	2792	3069	3352	3029	2073	1136	1629
	9.3	1869	2016	1296	1747	3185	2522	4192	3230	1350	1749	1178
TPOX	8	1113	1129	1432	899	2684	2130	2962	2231	1671	1537	1566
	11	1216	1492	976	967	2068	1894	1814	2139	1838	1649	1002
vWA	17	1801	1049	1096	1215	1498	2069	1508	1658	1749	1057	1270
	19	1275	1442	1192	747	1309	1478	1875	1479	1311	1111	1207

Table B.37: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 8 ng/μL RT 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2639	3682	2817	2444	2969	3490	2855	2964	2680	2459	2638
CSF1PO	11	1732	2946	1087	875	2558	2143	1788	2214	1198	2128	1756
D13S317	12	1081	1216	934	787	1470	1375	1125	1109	907	817	775
	13	1015	1077	974	819	1227	1058	1257	1030	785	714	830
D16S539	12	1887	3239	1725	1707	3546	3125	3143	3233	1985	1791	1858
D18S51	10	1761	2476	1163	783	1360	1058	1160	948	891	1693	1618
	13	1287	2308	1136	1029	1067	1487	1371	1108	688	1616	797
D21S11	28	1164	1160	940	1024	1244	1308	1328	1536	1241	1026	931
	29	1275	1021	1229	910	1149	1324	1302	1589	1008	912	1030
D3S1358	15	1290	1538	1139	968	1364	1947	1805	1632	1330	1372	1269
	16	1256	1537	1332	907	1698	1569	1313	1653	1196	1195	1266
D5S818	11	1885	2604	1624	1312	2665	2854	2559	2916	1580	2042	1926
D7S820	10	924	1125	799	747	1021	1194	808	926	1171	965	1075
	12	963	1439	838	827	1160	1143	1128	1107	697	1156	953
D8S1179	12	1137	1759	1150	906	1752	1662	1400	1443	788	1307	1095
	13	1024	2531	1113	1284	1403	1344	1714	1606	1012	1632	1454
FGA	21	1001	1493	1330	1059	1409	1399	1811	1371	1276	1100	986
	25	1179	1862	1299	1189	1183	1391	1214	1179	790	791	1237
PentaD	9	1123	1572	611	563	1257	1829	1853	1241	956	1074	662
	11	1049	1713	762	604	1627	1425	1548	977	850	1331	939
PentaE	7	889	1704	975	778	1508	1457	933	912	766	1331	1158
	11	1504	1549	917	699	1418	1150	1026	1009	701	1361	1218
TH01	6	2112	1676	1518	1465	2334	2216	2073	3123	2319	1740	1536
	9.3	2452	2267	1540	1871	3058	2948	2404	2884	1646	1325	1296
TPOX	8	905	1942	1645	1777	3316	2519	2300	2025	2257	1730	1553
	11	1434	1995	1609	1525	1884	2559	2312	2348	2101	1926	1322
vWA	17	1429	1479	1407	1338	1770	2041	1914	2344	1809	1266	1274
	19	1277	1314	1318	1101	1943	2154	1739	1897	1594	1648	1117

Table B.38: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 8 ng/μL +4 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2639	3256	2585	2215	3649	3468	4595	2974	3605	2569	4328
CSF1PO	11	1732	2961	1157	956	3015	2855	3474	1995	2160	2326	3883
D13S317	12	1081	1447	780	1035	1060	1121	1230	1102	1029	792	1307
	13	1015	895	896	622	1250	833	1215	779	1033	899	1052
D16S539	12	1887	2376	1496	1404	4140	3506	4441	3119	2585	2082	3984
D18S51	10	1761	2807	1133	1328	1775	1138	2566	1193	2079	1565	3256
	13	1287	2682	805	1146	1971	1663	1507	1032	1530	1784	3133
D21S11	28	1164	1231	911	1135	1245	1019	1198	1092	1145	1188	1129
	29	1275	1008	828	738	1425	1191	1352	1198	1298	1210	861
D3S1358	15	1290	1163	1044	1136	1486	1471	2028	1070	1110	1280	1368
	16	1256	1256	743	768	1603	1469	1712	1176	1242	1102	961
D5S818	11	1885	2053	1424	1329	2771	2678	3506	2372	2174	2349	2774
D7S820	10	924	1328	751	907	1251	960	1197	1153	1167	833	1246
	12	963	1374	661	824	1272	1215	1331	764	1187	846	1104
D8S1179	12	1137	1713	1504	739	1454	1454	2174	1193	1384	1090	1482
	13	1024	1653	1234	1257	1619	1285	1887	1402	1156	1149	1624
FGA	21	1001	1304	1267	1339	1343	950	1258	1333	1243	1077	954
	25	1179	1035	1053	944	1529	1235	1710	1335	1239	865	1175
PentaD	9	1123	1591	572	667	1242	1541	1800	1350	1151	1167	879
	11	1049	1207	480	518	1798	1397	1604	1210	914	1130	1182
PentaE	7	889	1101	629	1137	1321	1117	1598	1115	1183	1654	1423
	11	1504	1268	924	693	1131	1345	1287	945	1141	1232	1399
TH01	6	2112	1689	1352	1156	2217	2480	2754	2155	1615	1603	1363
	9.3	2452	1664	1293	1147	2478	2504	2531	2875	2335	1395	1305
TPOX	8	905	1646	1031	1226	2452	2875	2192	1857	1803	1414	1221
	11	1434	2001	1706	1363	2472	2161	2559	2366	1800	1574	1532
vWA	17	1429	1442	1158	1135	1656	2047	1736	1162	1486	1070	1604
	19	1277	1547	1371	922	1752	1742	1961	1399	1605	951	1194

Table B.39: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 8 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2639	3402	2865	2731	2581	3680	3614	2710	2255	2295	3224
CSF1PO	11	1732	3142	1351	1379	1761	3802	3937	2676	1378	2599	4203
D13S317	12	1081	1702	1085	1210	1096	1404	2032	1496	1010	1365	1308
	13	1015	1806	936	776	1033	1174	1014	1653	636	888	1019
D16S539	12	1887	3856	2726	2004	2833	5860	4792	4028	1497	2690	3863
D18S51	10	1761	3974	1606	1173	1160	2161	1739	1585	841	1191	3103
	13	1287	2893	1685	1406	1096	1676	2540	1080	887	1266	3051
D21S11	28	1164	1319	957	1165	1271	2238	1296	1671	1087	1439	1577
	29	1275	1481	1317	1062	1106	1831	1244	1455	1256	1584	964
D3S1358	15	1290	1883	1572	1555	1507	2098	2198	1857	1406	1666	1461
	16	1256	2030	1296	875	1301	1947	1618	1711	959	2027	1898
D5S818	11	1885	3044	2213	1627	2374	2790	3702	3240	1656	1868	2940
D7S820	10	924	2245	1138	1132	1194	1481	1440	1406	860	1420	1491
	12	963	2140	1368	975	1368	1350	1406	990	1102	1425	784
D8S1179	12	1137	1903	1131	1088	1068	1611	1402	1392	621	1273	1236
	13	1024	1711	1064	1158	1123	1452	1567	1262	587	1156	1552
FGA	21	1001	982	1218	1370	1218	1441	1546	1282	1010	1063	987
	25	1179	1486	1398	1257	1015	1140	1139	1190	864	762	882
PentaD	9	1123	1781	1212	647	1123	1770	2126	1528	856	2209	978
	11	1049	1550	962	881	989	1987	1978	1794	843	1266	1876
PentaE	7	889	2187	1264	954	1101	1833	1623	1732	1276	1872	1752
	11	1504	1622	1273	1314	902	1612	2131	1051	948	1973	1496
TH01	6	2112	2468	2595	1620	2604	3648	2973	3229	1492	1348	1423
	9.3	2452	2161	1895	2198	2406	2991	3644	3143	1720	1995	1443
TPOX	8	905	1986	1552	1319	1988	1661	2137	2157	1616	1277	1703
	11	1434	2051	1461	1201	1465	2317	2160	1719	1228	1152	1518
vWA	17	1429	1377	1605	1416	1326	1689	1821	1539	1094	1293	1086
	19	1277	1341	1556	1074	1087	2255	1392	1370	1189	1144	1334

*Represents single use aliquot.

Table B.40: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 8 ng/μL -20 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2639	3628	2778	2390	3098	3859	4045	2817	2305	2688	3092
CSF1PO	11	1732	3825	1437	1440	2172	2913	4068	2217	1224	2537	2716
D13S317	12	1081	1720	1426	1112	1391	1188	1521	1725	1024	939	874
	13	1015	1637	1067	1000	1068	1195	1434	1458	838	1023	792
D16S539	12	1887	3730	2571	2228	2630	4429	5219	3803	1948	2488	3390
D18S51	10	1761	2779	1340	1764	1624	1619	2314	1211	1082	2228	2792
	13	1287	3878	1493	1580	1439	1771	1871	1462	730	1972	2512
D21S11	28	1164	1638	953	1437	1666	1274	1737	1433	1704	789	1341
	29	1275	1471	1538	1120	1363	1499	1564	1567	1249	1501	953
D3S1358	15	1290	2247	1635	919	1924	2416	2247	1698	1295	1277	1580
	16	1256	1952	1598	952	1322	2349	1847	1504	1167	1327	1418
D5S818	11	1885	3557	1817	2043	2543	3938	3887	2851	1884	2225	2851
D7S820	10	924	1476	1307	1063	1149	1008	1190	1267	1023	1301	1378
	12	963	1830	1277	1188	1345	1345	1348	1623	1215	1344	1294
D8S1179	12	1137	2561	1249	1107	1213	1459	1666	1118	1080	1186	1325
	13	1024	2280	1017	992	1293	1176	1724	1341	1006	1151	1490
FGA	21	1001	1325	1145	947	1318	1328	1623	1387	1305	1290	992
	25	1179	1472	1186	1099	1024	1574	950	981	1569	1078	1097
PentaD	9	1123	1444	897	827	1656	1987	2402	1381	662	835	1567
	11	1049	2298	996	1010	1359	2197	1698	1923	613	1082	939
PentaE	7	889	1853	1114	1073	1527	1596	2234	1940	1139	1465	1571
	11	1504	2138	1153	795	1565	2008	2126	1685	1204	1359	2063
TH01	6	2112	2526	1953	1948	3167	3259	3645	3183	2284	1738	1479
	9.3	2452	2831	2462	1815	1890	3752	3302	2960	2609	1787	1798
TPOX	8	905	2266	1475	1732	2391	2502	2047	2269	2084	1936	1525
	11	1434	1728	1286	1527	2265	2336	1749	1889	2215	1545	1289
vWA	17	1429	1883	1295	1238	1183	1593	1869	1723	1341	1472	943
	19	1277	1535	1346	1096	1146	2083	2056	1242	1131	973	1229

Table B.41: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 8 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	2639	3636	3083	2376	2904	3743	3472	2717	3458	3015	2589
CSF1PO	11	1732	1860	1074	1116	1743	2332	2258	1240	1362	2149	1933
D13S317	12	1081	1421	886	998	934	1343	1086	1109	966	1028	1012
	13	1015	1164	757	849	906	1022	711	1053	580	929	756
D16S539	12	1887	2911	1957	2052	2529	3133	3614	3543	1972	2537	1516
D18S51	10	1761	1648	965	1020	1379	1682	1524	1619	1079	1675	1978
	13	1287	1706	1161	1015	1096	1322	1822	1236	1197	1776	1682
D21S11	28	1164	1233	885	1240	1161	1666	1059	1390	1222	1204	1314
	29	1275	984	897	1185	965	1631	1158	1519	1204	901	1091
D3S1358	15	1290	1676	1068	946	1184	1648	1412	1547	1311	1647	1200
	16	1256	1212	1107	877	1725	2144	1235	1233	1485	1125	1294
D5S818	11	1885	2160	1718	1474	2265	2730	2894	2677	1817	1941	1614
D7S820	10	924	1109	998	824	827	803	1052	987	1102	1351	941
	12	963	1124	1004	805	871	960	843	1069	869	1067	857
D8S1179	12	1137	2031	1343	1014	1134	1438	1286	1304	1109	1526	1335
	13	1024	1840	1161	1265	1322	2088	1502	1591	814	1167	754
FGA	21	1001	1397	1464	1504	1008	1625	1058	1071	947	1580	1586
	25	1179	1265	1409	1085	1258	1686	1241	1477	1428	1691	1140
PentaD	9	1123	1431	769	705	1426	1676	1439	987	479	989	1036
	11	1049	1387	647	609	1537	1172	1262	1816	693	912	912
PentaE	7	889	1391	788	690	1051	1669	1000	1100	1291	1325	1322
	11	1504	1550	671	925	991	1206	875	754	1084	1149	1138
TH01	6	2112	1906	1213	1240	2052	3200	1656	2583	2074	1483	880
	9.3	2452	1582	1525	1301	2613	2904	1777	2205	1927	1446	1608
TPOX	8	905	1975	1377	1295	2334	2588	1823	2082	2081	1658	1374
	11	1434	1987	1747	1424	1586	2380	1910	1921	2187	1319	1863
vWA	17	1429	1857	1313	1483	1424	2097	1752	1180	1537	1427	1553
	19	1277	1306	1262	1272	1482	1609	1293	1218	1201	1648	1456

*Represents single use aliquot.

Table B.42: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

TE 8 ng/μL -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2639	2723	2723	2140	2821	3339	2820	2730	2246	2206	2250
CSF1PO	11	1732	1545	1133	927	1965	2074	2222	1913	1282	1867	2905
D13S317	12	1081	741	1097	869	1161	1085	1048	1215	814	810	820
	13	1015	1197	814	689	871	1083	890	996	978	848	801
D16S539	12	1887	2694	1761	1718	2743	3041	2520	2884	1527	2074	2296
D18S51	10	1761	1467	1171	1190	1434	1327	1723	1016	1051	1215	1078
	13	1287	2123	1099	833	1266	1170	1703	768	801	1390	1865
D21S11	28	1164	983	1094	920	1299	1403	932	1325	1371	1176	936
	29	1275	786	1129	843	1082	996	1117	1415	1295	955	970
D3S1358	15	1290	1253	1331	1404	1288	1399	1587	1583	1314	1087	966
	16	1256	1125	1296	839	1445	1723	1287	1407	827	1186	1236
D5S818	11	1885	2205	1143	1350	2433	2710	2698	2375	1905	1596	1681
D7S820	10	924	828	741	811	926	763	865	928	996	800	1160
	12	963	926	853	791	797	1045	1037	1201	981	869	845
D8S1179	12	1137	1548	1147	1183	1339	1342	1648	1625	763	1065	801
	13	1024	1223	961	1198	1151	1402	1454	1393	615	1352	965
FGA	21	1001	1411	1363	1194	1149	1559	1183	1298	1014	871	1048
	25	1179	914	1466	1207	862	1154	1165	972	835	1054	1139
PentaD	9	1123	1122	981	439	1274	803	1263	1692	791	1009	815
	11	1049	1167	780	690	1393	1096	1466	1552	592	1029	1024
PentaE	7	889	1286	883	568	995	943	1248	893	958	1710	1238
	11	1504	1054	795	1088	900	963	790	1224	773	1219	1085
TH01	6	2112	1236	1386	1300	1902	1971	2388	2522	1874	1505	1350
	9.3	2452	1582	1652	1304	2519	2420	2188	3424	2030	1360	1478
TPOX	8	905	1288	1153	1096	1883	1714	2036	2239	1603	1287	1082
	11	1434	1283	1476	1197	2597	2475	1491	1440	1996	1306	2155
vWA	17	1429	1541	1717	1486	1660	2307	1223	2002	1519	1241	1319
	19	1277	1039	1699	1321	1569	1589	1224	1550	1262	1008	1093

Table B.43: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL RT 3 kV 3 s		Days Stored											
		0	6	34	62	90	117	149	174	256	342	349	349+ Centri-Sep
Marker	Allele	Peak Height (rfu)											
AMEL	X	1927	3421	947	737	481	549	262	201	180		195	241
CSF1PO	11	1684	3018	86	77								
D13S317	12	964	1055	340	180	48	82						
	13	1036	937	352	221	69							
D16S539	12	1854	3469	368	129	49							
D18S51	10	2307	3134	140	84								
	13	1282	3029	91	58								
D21S11	28	1083	1030	448	223	84		82					
	29	834	823	479	204	72		71					
D3S1358	15	1236	1528	397	396	273	296	103	132	86	119	63	74
	16	932	1236	546	273	169	386	116	127				
D5S818	11	1557	2284	563	347	360	506	209	295	75	113	111	60
D7S820	10	1033	1030	153	195	172	112	93					
	12	1228	1225	273	150	84							
D8S1179	12	903	1598	270	241	107	65						
	13	946	1853	168	164								
FGA	21	661	882	184	47	58							
	25	1034	662	286	135								
PentaD	9	1226	1754	83	52		69						
	11	1600	1736	116	57								
PentaE	7	1054	711	62									
	11	1408	1825	47									
TH01	6	1508	1410	802	111	146	173	85					
	9.3	1591	1716	512	180	169	104	206					
TPOX	8	1375	1342	367	72								
	11	1054	1776	165	56								
vWA	17	1113	1278	564	237	261	203	285	119	87	61		
	19	1141	1101	429	308	155		153	106	88	107		

Table B.44: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL RT 3 kV 8 s		Days Stored									
Marker	Allele	0	62	90	117	149	174	256	342	349	349+ Centri-Sep
		Peak Height (rfu)									
AMEL	X	4024	2018	1411	1149	572	611	412	115	418	499
CSF1PO	11	3500	150								
D13S317	12	2007	383	137	119		134				
	13	2122	450	211							
D16S539	12	3803	275	140	65	63	138				
D18S51	10	4836	180	80	90				62		
	13	2723	118	63	61						
D21S11	28	2281	473	259	72	124	63	98			109
	29	1712	418	213	72	118		71			
D3S1358	15	2627	845	828	465	174	369	200	86	124	165
	16	1962	582	491	614	188		127	249	81	
D5S818	11	3267	738	1103	800	346	886	170	261	203	124
D7S820	10	2140	402	520	177	148	149	61			
	12	2495	290	243							
D8S1179	12	1901	637	316	133	115	68				
	13	1955	439	88							
FGA	21	1353	127	62							
	25	2132	368	157							
PentaD	9	2513	101	49	88						
	11	3342	115								
PentaE	7	2182		44							
	11	2885	81								
TH01	6	3085	236	460	290	135	158		95		60
	9.3	3298	372	511	171	330					
TPOX	8	2785	199	40	87		103				
	11	2169	156								
vWA	17	2365	683	781	445	651	362	201	131	89	78
	19	2421	868	463	118	353	330	208	221		

Table B.45: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1927	3095	1696	1538	1215	2317	2101	1483	1258	2272	1884
CSF1PO	11	1684	1992	764	496	331	986	1037	864	133	784	670
D13S317	12	964	1066	469	447	323	747	636	502	378	494	337
	13	1036	830	669	295	478	670	837	504	352	619	308
D16S539	12	1854	2653	1278	1040	586	1350	2056	1440	672	1458	825
D18S51	10	2307	2065	611	645	408	609	687	403	64	1206	572
	13	1282	2473	660	334	310	576	676	635		794	439
D21S11	28	1083	977	771	623	497	821	1116	844	776	517	469
	29	834	766	700	692	667	840	985	667	443	263	466
D3S1358	15	1236	1304	791	555	769	1046	633	579	702	942	734
	16	932	1437	801	474	492	832	652	796	636	728	499
D5S818	11	1557	2067	958	810	777	1584	2009	1210	851	1170	1015
D7S820	10	1033	1379	557	623	398	870	627	624	372	1114	531
	12	1228	1184	552	338	448	569	595	352	341	286	448
D8S1179	12	903	1625	516	626	491	1078	1011	815	308	771	719
	13	946	1680	604	566	655	587	547	469	206	353	450
FGA	21	661	590	790	765	553	1052	567	602	672	450	351
	25	1034	1043	1128	865	455	1004	604	371	408	527	326
PentaD	9	1226	1326	248	252	169	365	432	312	138	626	435
	11	1600	1523	408	319	212	608	745	426	119	356	326
PentaE	7	1054	878	427	534	353	659	592	258	234	957	385
	11	1408	1079	509	383	351	593	469	371	157	446	452
TH01	6	1508	1380	746	819	765	1778	991	1177	1477	874	453
	9.3	1591	1533	1057	820	806	2103	1190	1227	1552	757	517
TPOX	8	1375	1627	1050	748	781	1616	1535	1118	1309	782	718
	11	1054	1566	1011	953	763	1284	907	860	1059	1007	654
vWA	17	1113	1464	1114	907	636	1378	918	870	984	757	586
	19	1141	866	1011	673	647	795	1396	1010	1090	538	690

Table B.46: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL +4 °C 3 kV 8 s		Days Stored	
		0	256
Marker	Allele	Peak Height (rfu)	
AMEL	X	4024	3008
CSF1PO	11	3500	330
D13S317	12	2007	936
	13	2122	873
D16S539	12	3803	1727
D18S51	10	4836	157
	13	2723	130
D21S11	28	2281	1953
	29	1712	1125
D3S1358	15	2627	1701
	16	1962	1537
D5S818	11	3267	2117
D7S820	10	2140	949
	12	2495	860
D8S1179	12	1901	774
	13	1955	513
FGA	21	1353	1660
	25	2132	1036
PentaD	9	2513	361
	11	3342	301
PentaE	7	2182	615
	11	2885	380
TH01	6	3085	3550
	9.3	3298	3762
TPOX	8	2785	3279
	11	2169	2686
vWA	17	2365	2450
	19	2421	2723

Table B.47: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1927	2911	1798	1894	1225	2413	2397	2073	579	2278	1959
CSF1PO	11	1684	2930	879	503	504	1050	1599	1187	130	1571	272
D13S317	12	964	1064	837	546	324	1139	746	841	431	984	197
	13	1036	889	515	579	385	1010	748	889	452	615	147
D16S539	12	1854	3120	1718	1339	953	1863	2211	2040	482	1500	366
D18S51	10	2307	2825	561	447	556	346	801	907		889	424
	13	1282	2376	920	810	682	679	927	768		1059	559
D21S11	28	1083	1434	719	709	571	1189	848	1453	1097	856	324
	29	834	1035	1019	674	652	982	766	943	875	1250	254
D3S1358	15	1236	1433	758	637	702	1085	1148	1349	406	1137	545
	16	932	1046	705	618	476	1151	1122	785	472	973	458
D5S818	11	1557	1871	1289	1032	664	1929	1550	2073	680	1163	899
D7S820	10	1033	826	875	533	447	655	728	773	321	857	185
	12	1228	1103	823	642	469	1066	771	820	458	757	131
D8S1179	12	903	1634	1106	644	683	918	795	909	109	699	356
	13	946	2204	660	654	574	966	779	606	128	524	296
FGA	21	661	1527	1146	865	658	1029	549	756	744	773	193
	25	1034	891	688	466	822	1098	852	1068	553	776	
PentaD	9	1226	1505	503	248	242	944	691	670	132	642	78
	11	1600	1601	348	433	287	764	832	669	153	755	
PentaE	7	1054	1888	492	267	415	450	1064	960	140	729	172
	11	1408	1526	662	558	275	629	754	729	99	1336	161
TH01	6	1508	1377	1071	976	786	2063	1708	1517	1627	679	645
	9.3	1591	1257	1004	810	910	1703	1917	1827	1744	916	545
TPOX	8	1375	1247	1360	953	655	2499	1742	1842	1372	1125	356
	11	1054	1835	1090	834	1252	1108	1381	1464	1173	1427	449
vWA	17	1113	1327	1346	688	713	1524	944	1311	937	1209	332
	19	1141	1311	847	954	529	1581	1352	1081	944	985	397

*Represents single use aliquot.

Table B.48: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL -20 °C su* 3 kV 8 s		Days Stored		
Marker	Allele	0	256	349
		Peak Height (rfu)		
AMEL	X	4024	1454	3977
CSF1PO	11	3500	361	556
D13S317	12	2007	1145	400
	13	2122	1186	289
D16S539	12	3803	1351	741
D18S51	10	4836	129	840
	13	2723	120	1149
D21S11	28	2281	2975	687
	29	1712	2353	518
D3S1358	15	2627	1050	1125
	16	1962	1212	970
D5S818	11	3267	1761	1869
D7S820	10	2140	878	373
	12	2495	1215	271
D8S1179	12	1901	308	735
	13	1955	363	608
FGA	21	1353	2016	383
	25	2132	1541	86
PentaD	9	2513	392	162
	11	3342	425	110
PentaE	7	2182	365	344
	11	2885	270	327
TH01	6	3085	4106	1305
	9.3	3298	4486	1125
TPOX	8	2785	3703	725
	11	2169	3179	920
vWA	17	2365	2471	703
	19	2421	2507	831

*Represents single use aliquot.

Table B.49: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/ μ L -20 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1927	2955	1255	1386	998	1510	991	827	349	824	828
CSF1PO	11	1684	3797	583	445	572	681	853	560	92	372	299
D13S317	12	964	1098	627	406	492	387	378	354	262	177	194
	13	1036	952	509	395	295	455	308	270	165		272
D16S539	12	1854	4300	887	1085	886	1411	838	929	255	651	405
D18S51	10	2307	2810	675	756	557	365	295	181		416	225
	13	1282	2923	730	556	436	506	361	281		371	218
D21S11	28	1083	1394	994	785	443	707	657	543	406	185	263
	29	834	854	532	656	323	351	277	318	323	526	253
D3S1358	15	1236	1871	945	836	663	1023	477	514	260	299	466
	16	932	1556	759	815	361	844	529	543	303	368	363
D5S818	11	1557	2561	862	769	650	1547	1251	1022	250	453	429
D7S820	10	1033	1320	806	560	606	417	215	136	169	354	187
	12	1228	1525	537	498	292	513	275	316	103	287	203
D8S1179	12	903	1553	392	556	450	466	277	268	105	278	266
	13	946	1750	457	693	417	315	367	260		159	69
FGA	21	661	853	897	556	368	267	392	175	110	124	177
	25	1034	1122	465	379	175	402	300	121	198	173	
PentaD	9	1226	1777	361	542	274	410	287	314	120	120	369
	11	1600	1927	362	274	239	334	325	176		243	157
PentaE	7	1054	2403	457	522	290	607	355	287		511	212
	11	1408	1121	375	493	374	361	331	103		218	227
TH01	6	1508	1915	663	928	672	619	1419	1306	251	523	488
	9.3	1591	1633	1034	550	459	1518	904	999	581	341	287
TPOX	8	1375	1643	659	552	320	1049	736	787	629	420	363
	11	1054	1360	819	740	306	951	569	649	398	395	233
vWA	17	1113	965	967	799	424	632	733	639	262	444	274
	19	1141	999	781	694	531	861	573	638	205	253	330

Table B.50: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/ μ L -20 °C 3 kV 8 s		Days Stored				
		0	174	256	342	349
Marker	Allele	Peak Height (rfu)				
AMEL	X	4024	2435	951	2049	2046
CSF1PO	11	3500	1705	266	830	718
D13S317	12	2007	1027	752	386	474
	13	2122	766	464	127	667
D16S539	12	3803	2831	738	1463	961
D18S51	10	4836	533		948	545
	13	2723	821		851	528
D21S11	28	2281	1603	1160	423	646
	29	1712	920	928	1199	620
D3S1358	15	2627	1464	701	666	1170
	16	1962	1535	862	830	912
D5S818	11	3267	2914	724	1012	1099
D7S820	10	2140	389	492	778	454
	12	2495	903	303	628	496
D8S1179	12	1901	790	314	703	649
	13	1955	757	162	404	168
FGA	21	1353	543	316	306	422
	25	2132	378	575	446	72
PentaD	9	2513	984	361	271	860
	11	3342	551	109	548	374
PentaE	7	2182	883	150	1162	505
	11	2885	311	87	500	563
TH01	6	3085	3749	690	1169	1223
	9.3	3298	2869	1624	758	673
TPOX	8	2785	2340	1808	1040	856
	11	2169	1957	1142	979	553
vWA	17	2365	2011	748	1128	692
	19	2421	2001	593	647	809

Table B.51: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1927	3149	1412	1310	1381	2409	1991	1740	1382	2090	1504
CSF1PO	11	1684	3626	969	500	598	2022	1918	1233	472	1202	76
D13S317	12	964	1417	752	616	744	973	1010	1088	655	919	197
	13	1036	1339	818	658	603	937	944	732	748	727	200
D16S539	12	1854	4668	1857	1090	1151	2901	2744	2813	1007	1560	340
D18S51	10	2307	3137	710	441	585	947	909	777	145	1484	193
	13	1282	3231	844	390	650	1018	1053	451	169	1285	158
D21S11	28	1083	1454	929	1049	977	1110	1441	1318	1095	1227	227
	29	834	1329	1140	646	537	1620	945	1121	984	989	339
D3S1358	15	1236	1779	1112	862	668	1869	1057	1160	935	1063	325
	16	932	1376	1273	690	694	1496	1560	1245	887	695	437
D5S818	11	1557	2438	1351	871	909	2876	2459	2542	1167	1507	741
D7S820	10	1033	1444	829	1014	756	1114	1071	933	933	657	132
	12	1228	1088	806	652	583	1062	1104	963	807	665	99
D8S1179	12	903	2198	555	497	611	822	1056	837	297	866	157
	13	946	1989	622	535	563	880	803	838	255	847	261
FGA	21	661	1292	1126	1097	720	1058	804	1128	1107	883	183
	25	1034	1082	1179	1062	835	925	1034	736	843	937	146
PentaD	9	1226	2075	510	250	449	995	975	1072	473	852	71
	11	1600	1544	530	327	400	960	1102	947	544	900	161
PentaE	7	1054	1430	592	287	606	1151	1029	1073	335	1246	79
	11	1408	2412	675	305	532	906	839	921	297	1254	97
TH01	6	1508	2245	1304	1338	816	2544	2551	2096	1733	1029	300
	9.3	1591	1957	1220	1119	1213	3307	1977	1594	2263	1231	504
TPOX	8	1375	1605	813	991	786	1536	1593	1617	1908	1230	272
	11	1054	1251	959	806	791	2397	1408	2370	2178	1765	257
vWA	17	1113	1420	645	798	700	1436	989	1001	917	1229	258
	19	1141	1262	834	618	793	1472	554	1017	988	624	395

*Represents single use aliquot.

Table B.52: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL -60 °C su* 3 kV 8 s		Days Stored		
Marker	Allele	0	256	349
		Peak Height (rfu)		
AMEL	X	4024	3591	3120
CSF1PO	11	3500	1286	153
	12	2007	1701	397
D13S317	13	2122	1942	412
	12	3803	2678	674
D16S539	10	4836	371	402
	13	2723	460	313
D18S51	28	2281	2900	465
	29	1712	2576	721
D21S11	15	2627	2416	700
	16	1962	2278	945
D3S1358	11	3267	3055	1581
D5S818	10	2140	2514	269
	12	2495	2149	194
D7S820	12	1901	783	321
	13	1955	661	545
D8S1179	21	1353	2829	367
	25	2132	2123	293
FGA	9	2513	1279	151
	11	3342	1469	323
PentaD	7	2182	890	174
	11	2885	805	188
PentaE	6	3085	4316	607
	9.3	3298	5769	1074
TH01	8	2785	4883	563
	11	2169	5597	532
TPOX	17	2365	2378	550
	19	2421	2559	848

*Represents single use aliquot.

Table B.53: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/ μ L -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	1927	3041	1630	1352	1019	1985	1527	1643	1301	1701	918
CSF1PO	11	1684	2574	355	533	377	1415	1048	422	175	770	431
	12	964	997	276	589	305	743	610	342	456	440	224
D13S317	13	1036	814	237	452	477	435	483	374	535	373	232
	12	1854	2967	654	652	701	1401	1661	1413	443	1136	812
D18S51	10	2307	3203	446	713	356	584	377	277	69	660	607
	13	1282	2113	630	454	768	412	568	327		333	427
D21S11	28	1083	1005	998	630	377	947	621	777	663	494	292
	29	834	783	582	425	396	835	466	418	375	440	246
D3S1358	15	1236	1247	688	592	394	880	617	719	534	648	453
	16	932	956	492	445	374	951	554	577	510	545	298
D5S818	11	1557	1860	461	579	724	1268	1310	1003	707	812	395
D7S820	10	1033	877	306	475	295	646	534	365	334	381	230
	12	1228	1292	201	407	410	688	422	436	399	381	207
D8S1179	12	903	1506	814	426	459	761	501	435	153	551	517
	13	946	1495	598	442	501	681	481	232	242	513	269
FGA	21	661	1501	1095	646	362	849	615	321	485	696	252
	25	1034	1126	680	700	309	801	567	385	478	348	207
PentaD	9	1226	1280	170	338	231	483	361	506	176	750	405
	11	1600	1764	248	233	297	558	605	385	167	450	142
PentaE	7	1054	1480	356	354	333	599	772	343	155	364	281
	11	1408	1094	524	361	379	406	302	538	133	504	396
TH01	6	1508	905	781	961	586	999	812	926	1177	750	414
	9.3	1591	1084	813	828	719	1167	1415	837	1239	644	519
TPOX	8	1375	1440	852	706	651	1525	1262	739	1385	641	179
	11	1054	1418	564	779	549	1408	1083	1305	1162	819	441
vWA	17	1113	1125	525	680	605	1119	549	893	763	665	270
	19	1141	1282	774	901	535	1087	929	529	563	452	165

Table B.54: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.01 ng/μL -60 °C 3 kV 8 s		Days Stored		
Marker	Allele	0	256	349
		Peak Height (rfu)		
AMEL	X	4024	3814	2208
CSF1PO	11	3500	563	1049
D13S317	12	2007	1379	541
	13	2122	1628	568
D16S539	12	3803	1405	1983
D18S51	10	4836	223	1491
	13	2723	157	1050
D21S11	28	2281	2067	734
	29	1712	1171	598
D3S1358	15	2627	1639	1124
	16	1962	1555	736
D5S818	11	3267	2161	971
D7S820	10	2140	1048	572
	12	2495	1237	517
D8S1179	12	1901	453	1253
	13	1955	747	643
FGA	21	1353	1473	606
	25	2132	1437	499
PentaD	9	2513	554	1013
	11	3342	548	353
PentaE	7	2182	499	674
	11	2885	420	977
TH01	6	3085	3485	1022
	9.3	3298	3755	1276
TPOX	8	2785	4186	451
	11	2169	3550	1051
vWA	17	2365	2284	671
	19	2421	1660	402

Table B.55: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.1 ng/ μ L RT 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3106	2391	2165	1814	2064	2292	2323	1945	1112	1488	1257
CSF1PO	11	2292	1712	789	604	1671	929	788	394	179	218	205
D13S317	12	1930	1104	735	469	861	902	590	450	363	216	279
	13	1803	956	705	499	998	759	376	466	148	240	262
D16S539	12	3063	2443	1693	1226	2696	1991	1926	1085	345	464	183
D18S51	10	2205	1650	1128	620	895	787	533	419	303	341	226
	13	2063	1224	990	657	1098	722	563	437	301	307	152
D21S11	28	2320	1243	1030	485	906	820	763	439	426	358	273
	29	2101	992	861	528	1006	766	734	550	302	298	275
D3S1358	15	2133	1121	978	733	1295	1454	910	823	465	494	565
	16	1996	1149	846	609	1200	831	932	616	460	465	281
D5S818	11	3463	1623	946	971	2067	2325	1825	1209	635	665	508
D7S820	10	1908	1224	938	634	667	1014	690	375	286	338	172
	12	1964	1381	790	487	745	659	555	643	291	371	221
D8S1179	12	1654	1480	863	752	918	793	739	391	286	294	254
	13	1414	1148	1033	885	946	1099	957	510	242	319	203
FGA	21	1838	1364	1036	960	623	847	516	465	211	258	266
	25	1425	1674	1184	733	540	548	693	307	244	282	248
PentaD	9	2052	636	520	320	902	506	415	378	123	88	129
	11	1699	1057	610	320	816	531	450	208	209	174	156
PentaE	7	1530	1365	660	477	629	397	293	483	76	116	81
	11	1266	860	635	489	419	629	243	169	126		176
TH01	6	2841	2280	1043	812	1707	2080	1132	1143	603	359	433
	9.3	2696	1332	1482	692	2135	2243	1377	988	632	333	440
TPOX	8	2097	1607	1352	1137	1269	1322	1102	597	517	340	248
	11	1636	1732	1512	772	977	1243	1092	436	247	246	437
vWA	17	1845	979	1088	866	1032	1504	950	707	716	542	421
	19	2179	1385	1071	659	1258	1511	1142	838	450	522	492

Table B.56: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.1 ng/μL RT 3 kV 8 s		Days Stored				
Marker	Allele	0	174	256	342	349
		Peak Height (rfu)				
AMEL	X	7181	4994	4352	3634	2820
CSF1PO	11	5302	819	841	488	480
D13S317	12	4403	1030	1538	494	627
	13	4099	1037	654	539	600
D16S539	12	7026	2380	1650	1079	412
D18S51	10	5061	929	1451	780	520
	13	4843	930	1422	720	346
D21S11	28	5382	1044	1878	855	640
	29	4795	1247	1361	702	629
D3S1358	15	4864	1931	1968	1154	1335
	16	4639	1441	1887	1084	663
D5S818	11	7673	2831	2673	1497	1182
D7S820	10	4429	806	1320	756	390
	12	4487	1391	1330	834	492
D8S1179	12	3819	962	1254	728	571
	13	3272	1271	1077	788	457
FGA	21	4155	1109	971	630	590
	25	3259	703	1127	691	548
PentaD	9	4712	805	616	173	297
	11	3988	440	1010	395	349
PentaE	7	3577	1009	382	256	189
	11	2948	358	598	114	397
TH01	6	6622	2566	2505	823	961
	9.3	6292	2215	2656	757	994
TPOX	8	4722	1446	2306	828	557
	11	3701	1047	1136	606	962
vWA	17	4292	1848	3003	1332	969
	19	5045	2187	1899	1296	1125

Table B.57: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.1 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3106	2587	1986	2019	2548	2858	2163	2250	1706	1632	1364
CSF1PO	11	2292	2345	1482	1120	3030	3175	1792	1559	705	1304	858
D13S317	12	1930	1461	977	973	1098	1824	1116	896	657	450	483
	13	1803	1157	914	1024	1167	1241	885	570	578	658	455
D16S539	12	3063	3470	2173	2431	3685	4835	2785	2279	1664	1475	1105
D18S51	10	2205	1833	1185	1037	1923	1797	810	1204	562	1012	1123
	13	2063	2338	1643	1006	1536	1709	1149	817	678	815	756
D21S11	28	2320	1788	1663	1605	1291	1724	1209	1130	770	800	719
	29	2101	1168	1061	1282	1386	1476	843	776	916	613	799
D3S1358	15	2133	1711	1390	1467	1528	2139	1317	1240	868	888	921
	16	1996	1988	1444	1507	1405	1917	1121	858	741	982	791
D5S818	11	3463	2214	2115	1439	2174	3081	1968	1646	1169	1291	1238
D7S820	10	1908	1239	1236	763	1479	1781	695	810	883	571	597
	12	1964	1717	1454	1084	751	1064	1137	1044	781	662	717
D8S1179	12	1654	1538	1194	854	982	1408	1071	747	533	523	510
	13	1414	1465	1002	1080	956	1010	592	836	386	492	329
FGA	21	1838	1326	1464	1452	813	1213	793	765	642	642	440
	25	1425	1026	1479	1130	902	1273	747	635	511	515	276
PentaD	9	2052	888	1002	744	1726	1596	841	895	765	632	335
	11	1699	898	1103	790	1625	1339	793	1119	957	608	402
PentaE	7	1530	1565	908	956	1739	1386	703	769	721	653	767
	11	1266	1865	1100	1019	792	1013	1015	1165	677	644	377
TH01	6	2841	2168	1651	1614	2442	2161	2310	1700	1045	987	947
	9.3	2696	2332	1668	1149	3250	2782	2271	1640	984	1063	908
TPOX	8	2097	1756	1484	1239	1864	1914	1440	1417	890	901	795
	11	1636	1305	1276	1270	1251	2216	1365	954	919	932	610
vWA	17	1845	1465	1090	1315	948	1844	983	872	541	682	649
	19	2179	1157	1002	1288	1199	1386	1011	870	321	554	524

Table B.58: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.1 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3106	2794	2231	1817	2650	3457	3007	2262	2113	2264	2004
CSF1PO	11	2292	2562	1218	976	3245	3606	2850	2624	1888	2063	1740
D13S317	12	1930	1151	810	777	1192	1745	1536	979	998	909	777
	13	1803	1281	1054	805	1028	1419	1378	1127	845	855	915
D16S539	12	3063	3295	2159	1921	3711	4273	4338	3200	1879	1920	2177
D18S51	10	2205	2541	1422	1141	1835	1683	1459	1281	1075	1856	1135
	13	2063	1869	1571	1185	1321	1558	1368	1075	1195	1401	1483
D21S11	28	2320	1700	1227	1298	1265	1448	2019	1604	1145	983	1395
	29	2101	1227	1306	1140	1109	1499	1607	1375	1108	1019	1180
D3S1358	15	2133	1615	1184	943	1746	1733	1303	1626	1517	968	1254
	16	1996	1178	872	648	1544	1570	1398	1368	1202	1082	1062
D5S818	11	3463	2130	1638	1545	2376	2681	2968	2479	1941	1752	1767
D7S820	10	1908	1512	714	751	1445	1026	1385	1265	944	882	1080
	12	1964	1228	1179	846	1114	1493	1080	867	1319	1076	903
D8S1179	12	1654	1946	1195	783	1006	1371	1441	984	847	904	1073
	13	1414	1627	1017	748	1306	1496	1166	930	707	795	1166
FGA	21	1838	1361	1080	1414	880	1090	947	1040	908	1339	820
	25	1425	1567	1003	940	861	1147	1134	785	896	739	1030
PentaD	9	2052	1068	964	875	1830	1740	1671	1203	647	1303	764
	11	1699	1213	736	798	1511	1459	1685	1400	934	940	1018
PentaE	7	1530	1338	1127	899	1684	1185	1507	1022	1095	1540	1136
	11	1266	1518	985	873	1853	2037	1455	930	1320	1676	1037
TH01	6	2841	1851	2058	1348	1974	2934	2702	3068	1851	1131	1308
	9.3	2696	1969	1577	1274	2445	2706	2519	2901	1717	1610	1249
TPOX	8	2097	1467	1123	1102	2009	2130	2470	1979	1523	1527	1216
	11	1636	1183	872	1293	1980	2692	1845	1737	1997	1204	1494
vWA	17	1845	1330	1236	1162	938	1374	1082	1036	1197	933	1249
	19	2179	1095	931	992	1185	1578	1252	1319	1072	995	1156

*Represents single use aliquot.

Table B.59: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.1 ng/μL -20 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3106	2782	2195	2173	2296	3053	2325	1756	1990	1870	1502
CSF1PO	11	2292	1240	884	1145	1964	2008	1682	1085	682	907	744
D13S317	12	1930	831	870	820	967	1203	817	726	516	589	487
	13	1803	655	568	862	721	1168	851	733	683	477	325
D16S539	12	3063	2205	1699	1842	2638	2312	2901	2079	1231	1049	688
D18S51	10	2205	1616	1124	884	1430	1161	1121	674	587	825	604
	13	2063	1414	1078	1285	915	1291	1225	537	962	791	433
D21S11	28	2320	1033	995	724	952	1066	1268	1221	1007	611	656
	29	2101	1276	1057	892	835	1091	1000	873	827	599	367
D3S1358	15	2133	1028	1268	1013	1057	1039	1315	1075	1044	753	652
	16	1996	977	617	453	1252	1168	1035	797	1277	785	640
D5S818	11	3463	1557	1399	1080	2047	2069	1704	2191	1111	863	920
D7S820	10	1908	925	645	696	943	678	814	665	741	664	509
	12	1964	917	913	539	937	966	834	573	723	616	415
D8S1179	12	1654	1309	1064	914	1097	1598	1240	897	452	608	275
	13	1414	1315	1160	1079	979	1346	1132	528	612	465	527
FGA	21	1838	1587	1110	804	878	972	1370	675	846	807	494
	25	1425	1281	1077	815	928	1239	915	821	645	288	370
PentaD	9	2052	899	664	619	845	1107	905	912	559	436	389
	11	1699	593	565	476	748	1049	713	870	599	308	275
PentaE	7	1530	1301	799	712	1128	414	877	801	548	569	632
	11	1266	875	529	911	820	871	1029	909	623	678	393
TH01	6	2841	1452	1510	1075	1979	1484	1739	2445	1289	964	629
	9.3	2696	1312	1325	989	1877	2028	1634	2138	1210	932	690
TPOX	8	2097	1626	1439	970	1420	1431	1586	1302	1395	1393	576
	11	1636	1854	1768	1644	1847	2325	1157	1326	1466	851	710
vWA	17	1845	1360	1488	994	1026	1173	1354	982	1109	618	454
	19	2179	1033	1317	951	942	1148	1370	1301	1002	792	432

Table B.60: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.1 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3106	2373	2515	1775	2609	2639	2631	2432	2420	2306	1954
CSF1PO	11	2292	1492	914	607	2404	1931	2399	2354	2012	2166	1395
D13S317	12	1930	845	1131	686	803	1347	1098	1042	789	991	533
	13	1803	833	1035	644	1056	854	1454	967	675	681	652
D16S539	12	3063	2253	1825	1637	3930	3852	3860	2996	2199	1476	1298
D18S51	10	2205	1320	1356	769	1546	1264	1521	1391	1457	1527	1067
	13	2063	1336	1437	788	1709	1568	1442	1448	929	1371	1173
D21S11	28	2320	875	896	837	1110	1192	1103	1161	1764	1100	822
	29	2101	1044	911	927	1170	1206	1367	1035	1213	809	847
D3S1358	15	2133	1133	1085	807	1720	1699	1578	1179	1149	1138	1074
	16	1996	848	939	919	1147	1224	1514	1289	876	1358	922
D5S818	11	3463	1564	1617	1181	2115	2859	3020	2203	2152	1752	1686
D7S820	10	1908	913	929	599	1072	1123	1259	685	1093	986	819
	12	1964	1081	981	730	1027	820	1128	705	1053	1144	931
D8S1179	12	1654	965	986	1220	1205	1487	1043	840	831	785	553
	13	1414	1173	1177	1299	1466	1462	1197	1061	1065	872	795
FGA	21	1838	1480	1639	720	896	837	1368	774	1083	875	676
	25	1425	1160	1574	1118	1149	1168	1034	780	1165	884	654
PentaD	9	2052	969	658	591	1197	1356	1761	1174	1220	1482	509
	11	1699	552	655	597	1209	1413	1185	1322	919	1228	350
PentaE	7	1530	1008	705	678	1454	1240	1566	1150	927	1568	600
	11	1266	1092	1005	615	1132	995	1313	1273	807	1228	730
TH01	6	2841	2052	1345	889	2677	2618	2443	1430	1464	1172	1298
	9.3	2696	1454	1450	1144	2182	2831	1551	1557	1537	1360	916
TPOX	8	2097	1515	1409	1496	2117	2440	2547	1420	1576	1357	1206
	11	1636	1251	1770	1427	1878	2135	2103	1390	1758	1650	925
vWA	17	1845	1148	962	1409	1237	1710	1775	1182	849	853	1007
	19	2179	1236	1586	877	1655	1571	1167	1359	1261	1243	705

*Represents single use aliquot.

Table B.61: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.1 ng/μL -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3106	2306	2648	1675	2583	3021	2238	2302	1529	1605	1852
CSF1PO	11	2292	1755	1568	1319	2385	2581	1846	1610	1151	1989	965
D13S317	12	1930	1485	1519	832	1332	1499	985	1411	850	691	549
	13	1803	1027	1231	880	1185	1322	1026	1327	670	647	612
D16S539	12	3063	2996	2211	1690	3598	4481	3026	3501	1075	1746	1200
D18S51	10	2205	2240	1904	1572	1261	1977	1243	1145	751	1738	668
	13	2063	1911	1323	1163	1289	1567	1247	1411	692	1251	925
D21S11	28	2320	1504	1051	951	1166	1919	1269	1097	790	1079	860
	29	2101	1339	1147	1164	1425	1296	1203	1212	992	734	876
D3S1358	15	2133	1755	1515	1183	1727	1968	1660	1151	950	1219	862
	16	1996	1785	1515	938	1291	2294	1555	1230	816	1039	880
D5S818	11	3463	1949	1849	1646	2437	2902	2440	2182	1263	1454	1113
D7S820	10	1908	1475	1292	772	1262	1325	954	999	732	898	640
	12	1964	2075	1062	1291	1367	1100	1224	1216	921	1096	457
D8S1179	12	1654	1427	939	895	1221	1217	1019	758	560	1001	476
	13	1414	1085	1268	776	1090	1396	975	796	289	777	591
FGA	21	1838	1599	1249	1253	1045	1011	1031	827	792	777	538
	25	1425	1374	952	964	838	876	945	520	558	612	678
PentaD	9	2052	1239	987	1035	1580	1389	941	1257	634	1100	573
	11	1699	1436	876	730	1914	2146	1050	1251	707	759	671
PentaE	7	1530	1523	1070	996	1226	1296	1329	1040	931	1476	753
	11	1266	1120	842	1189	1462	1186	944	908	757	915	690
TH01	6	2841	1242	2001	1661	2099	2405	2436	2524	1308	1588	1258
	9.3	2696	2186	1440	909	2018	2161	2582	2164	982	932	977
TPOX	8	2097	1861	1590	1081	2173	1982	1789	1573	1002	1183	790
	11	1636	1266	1279	1016	1958	1782	1801	1553	1330	1123	1015
vWA	17	1845	1164	1438	985	1075	1498	1122	1330	739	879	510
	19	2179	1251	1040	1091	1016	1667	1376	1055	581	703	896

Table B.62: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.2 ng/μL RT 3 kV 3 s		Days Stored											
		0	6	34	62	90	117	149	174	256	342	349	349+ Centri-Sep
Marker	Allele	Peak Height (rfu)											
AMEL	X	2898	2868	2267	1879	2422	2481	1989	1582	1289	1034	814	1167
CSF1PO	11	1408	2382	1009	774	1170	1354	692	278		72		
D13S317	12	1417	1082	1122	873	925	821	719	377	227	278	109	159
	13	1033	1473	969	857	763	858	452	375	231	158	114	70
D16S539	12	2096	3455	2004	1285	2155	1801	1049	1040	241	79	134	162
D18S51	10	1235	2308	1519	1204	1409	794	496	248	169	118	124	76
	13	997	2014	1129	880	995	783	452	471		100	60	126
D21S11	28	1321	1394	1216	653	759	1233	709	414	360	179	168	206
	29	1164	1770	949	825	760	1039	654	437	327	131	134	107
D3S1358	15	1718	1961	1187	1372	1319	1499	1067	802	238	386	395	369
	16	1333	1332	1225	1090	1125	1042	558	842	446	393	290	311
D5S818	11	2174	2419	1610	1519	2211	1942	1817	1351	745	601	485	442
D7S820	10	1343	1607	1082	773	644	889	399	297	182	127	69	162
	12	1136	1465	1031	787	627	751	504	368	190	242	111	114
D8S1179	12	1287	1536	906	575	949	1253	390	202	171	137	141	209
	13	1415	1822	738	548	964	921	650	327	215	114	92	208
FGA	21	1448	1176	1355	853	620	491	243	178	149	126	64	64
	25	1395	1779	933	747	636	516	194	234	108			95
PentaD	9	1128	1214	547	495	1261	811	454	323				
	11	939	1253	634	340	502	657	323	268				
PentaE	7	1039	1587	1090	694	492	559	358	180				68
	11	1313	1511	788	492	497	261	229	156				
TH01	6	1850	2477	1555	1583	1638	2007	1188	894	305	278	217	236
	9.3	2322	1672	1106	1166	2249	2514	1071	885	462	270	203	263
TPOX	8	1772	1490	1290	836	904	673	319	204	71	77	149	184
	11	1326	1957	1268	602	1096	1192	938	777	186		233	73
vWA	17	1863	1377	1360	876	980	1208	803	821	399	343	280	320
	19	1525	1613	927	1162	802	1094	717	523	426	413	343	481

Table B.63: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.2 ng/μL RT 3 kV 8 s		Days Stored					
		0	174	256	342	349	349+ Centri-Sep
Marker	Allele	Peak Height (rfu)					
AMEL	X	5855	4452	3201	2891	2330	2903
CSF1PO	11	2802	612	107	198	135	
	12	2864	837	673	715	348	522
D13S317	13	2077	856	686	407	355	229
	12	4122	2350	765	225	469	568
D16S539	12	4122	2350	765	225	469	568
	10	2499	548	505	303	393	256
D18S51	13	1997	1049	85	275	191	428
	28	2669	1005	1073	464	535	687
D21S11	29	2330	1034	1003	331	433	350
	15	3522	1837	677	968	1332	1179
D3S1358	16	2738	1949	1298	1014	944	975
	11	4425	3187	2252	1549	1622	1435
D5S818	11	4425	3187	2252	1549	1622	1435
	10	2687	669	570	343	217	539
D7S820	12	2277	835	601	644	384	386
	12	2601	581	445	394	419	550
D8S1179	13	2860	931	561	346	272	549
	21	2878	519	395	387	106	177
FGA	25	2802	682	274	150	198	245
	9	2306	722	115	103	176	
PentaD	11	1871	593				
	7	2067	382	62		158	241
PentaE	11	2585	356				
	6	3776	2059	876	678	699	744
TH01	9.3	4652	1983	1337	683	662	830
	8	3545	575	197	232	437	492
TPOX	11	2634	2188	498	70	676	199
	17	3826	2488	1046	974	831	825
vWA	19	3120	1593	1125	1199	1010	1253

Table B.64: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.2 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2898	2424	2150	1829	2848	3235	3020	2402	2739	2479	2332
CSF1PO	11	1408	1440	995	769	2073	2268	2277	1613	1494	1483	1531
D13S317	12	1417	1010	892	782	1275	1269	1100	936	1028	945	853
	13	1033	1154	598	904	929	1087	1023	997	964	849	750
D16S539	12	2096	2012	1662	1486	3517	3687	2958	2884	1685	1721	1371
D18S51	10	1235	1153	847	916	1715	1145	1389	918	1529	1686	1518
	13	997	1335	1062	740	1433	1684	855	1007	1024	1024	809
D21S11	28	1321	1466	1036	985	1366	1597	1275	1215	1491	1007	1156
	29	1164	988	907	911	922	1057	1159	1196	1362	864	967
D3S1358	15	1718	1365	983	832	1377	1874	1327	1089	1287	1413	1244
	16	1333	1132	756	900	1328	1582	1164	1100	1462	1047	913
D5S818	11	2174	1816	1286	1234	2412	2516	1917	2662	1594	1653	1663
D7S820	10	1343	1013	789	716	1127	843	1097	568	1137	1208	890
	12	1136	1009	723	892	1428	1384	895	1251	803	990	1007
D8S1179	12	1287	1570	1074	786	1896	1414	1523	1415	1221	1126	918
	13	1415	1595	1082	782	1068	1776	1232	1257	897	1081	964
FGA	21	1448	1712	1099	947	918	1036	1053	1341	973	1069	973
	25	1395	1615	1456	1512	1215	1410	1198	1088	1079	1162	839
PentaD	9	1128	684	711	430	1436	1237	1477	1401	1264	862	658
	11	939	841	775	508	1327	1350	1162	1315	693	661	760
PentaE	7	1039	975	1025	940	1300	1000	911	853	1287	1293	1307
	11	1313	845	815	653	1204	902	883	747	840	1085	1025
TH01	6	1850	1906	936	1136	2248	2392	2883	2137	1521	1118	1247
	9.3	2322	2102	1577	1093	2436	2296	2470	1929	1688	1575	1089
TPOX	8	1772	1855	1798	1296	2336	2822	1552	1983	2105	2097	1445
	11	1326	1653	1336	1372	1729	1868	2572	1917	1892	1186	1297
vWA	17	1863	1390	820	1181	1981	1662	1486	1696	1787	1026	1204
	19	1525	1502	1272	864	1073	1757	1847	1375	1720	1216	1139

Table B.65: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.2 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2898	2629	2741	2651	2780	3396	3071	2732	2466	2255	2372
CSF1PO	11	1408	1551	1177	976	3028	2229	2452	1966	1581	2176	1622
D13S317	12	1417	1093	1004	1032	1021	1418	1495	883	1039	835	829
	13	1033	797	964	868	892	1406	1429	1094	875	693	723
D16S539	12	2096	2738	2164	1496	3646	3523	3442	3090	1796	1920	1733
D18S51	10	1235	1407	1414	1021	1792	1592	1829	1139	1154	1811	1339
	13	997	1616	1002	1491	1377	1724	1269	1128	1130	860	1111
D21S11	28	1321	1084	1087	1196	882	1658	1399	1288	1664	1109	845
	29	1164	1296	943	905	1135	1634	1330	1421	901	728	1042
D3S1358	15	1718	1217	1146	1171	1494	1811	1996	1598	1528	1158	1183
	16	1333	1385	980	1246	1507	1951	1535	1488	1010	1250	1202
D5S818	11	2174	1764	1674	1760	2481	2361	3028	2395	1913	1888	1971
D7S820	10	1343	1175	1180	917	960	1367	989	1046	957	960	969
	12	1136	992	1210	754	724	1339	1210	1179	870	1108	986
D8S1179	12	1287	1476	915	1370	1444	1865	1411	1139	967	950	995
	13	1415	1056	1339	1085	1077	1382	1752	1017	977	1197	690
FGA	21	1448	1829	1827	1297	850	1563	1442	1281	1158	697	1059
	25	1395	1350	1074	1393	1283	1485	1312	1075	833	1084	788
PentaD	9	1128	786	917	527	1404	1267	1519	1302	1004	840	884
	11	939	771	688	553	1313	1606	1380	1512	922	690	719
PentaE	7	1039	1129	798	872	1936	1250	1537	1381	870	1253	833
	11	1313	1306	1217	740	1101	1136	1316	1122	938	1191	1040
TH01	6	1850	1407	1668	1179	2159	2659	2522	2530	1508	918	1375
	9.3	2322	1303	1096	1159	1815	2469	2485	2298	1841	1594	1260
TPOX	8	1772	1598	1212	1107	1809	2270	2769	2419	1799	1460	1311
	11	1326	1859	1698	1623	1681	2594	3012	2154	2067	1552	1155
vWA	17	1863	1535	1963	1367	1169	1896	1898	1415	1148	1125	1302
	19	1525	1445	1397	1189	1037	1883	1273	1544	963	1281	946

*Represents single use aliquot.

Table B.66: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.2 ng/μL -20 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2898	2835	2337	2549	2372	2942	2429	2574	2216	1910	1935
CSF1PO	11	1408	2518	1575	976	2607	3018	2811	2554	1731	1771	1168
D13S317	12	1417	1695	1168	1508	1111	1558	1228	1034	684	984	561
	13	1033	1537	1402	1016	1251	1037	1571	1234	765	969	656
D16S539	12	2096	3194	2641	2595	3027	6070	4361	3890	2237	1746	1495
D18S51	10	1235	2263	1457	1626	1649	1846	1371	1217	900	1236	905
	13	997	2155	1881	1221	1850	1371	1748	1205	513	1310	1171
D21S11	28	1321	1615	1299	1327	1253	2355	1424	1505	1390	1036	741
	29	1164	1766	1664	1452	1365	1662	1599	1175	1169	799	949
D3S1358	15	1718	2101	1592	1497	1777	2160	1952	1807	1164	1194	1157
	16	1333	2296	1341	1511	1233	1753	2103	1816	1216	1072	996
D5S818	11	2174	2731	1986	1875	2036	3802	2916	2633	1716	1802	1568
D7S820	10	1343	1324	1079	959	695	1552	1736	1223	1303	1294	893
	12	1136	1918	1605	1349	1088	1417	1280	688	929	1095	1004
D8S1179	12	1287	1366	1047	1341	1271	1496	1304	828	699	746	877
	13	1415	1310	1562	1125	1234	1718	1073	667	705	831	688
FGA	21	1448	1652	1561	1055	1113	1058	1078	767	783	1005	671
	25	1395	1735	1363	1230	946	1470	878	819	755	743	685
PentaD	9	1128	1319	1083	965	1664	1476	1361	1167	736	831	631
	11	939	1360	1040	851	1011	1527	1345	1672	1002	890	604
PentaE	7	1039	1969	1199	1360	1149	1772	1827	1526	1155	715	794
	11	1313	2029	1083	1052	1324	1557	924	804	887	1294	602
TH01	6	1850	2535	1754	1860	1960	3619	2597	3148	1710	1607	1294
	9.3	2322	2315	2189	2499	2354	2862	3326	2373	1445	1002	1223
TPOX	8	1772	1894	1485	1443	1607	2510	1802	2183	1267	1090	817
	11	1326	1445	1400	1467	1415	2493	1827	1303	1137	1459	1008
vWA	17	1863	1128	1229	1402	1161	1770	1514	1186	1136	1018	824
	19	1525	1835	1228	1491	1227	1747	1097	1123	1191	889	731

Table B.67: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.2 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2898	2934	2377	2045	2444	3407	2881	2374	2893	2528	2564
CSF1PO	11	1408	1924	1700	1134	3210	3238	3998	3223	2504	2213	1953
D13S317	12	1417	1293	1220	1195	1101	1821	1520	1513	1092	1333	1019
	13	1033	1243	829	1125	1324	1829	1832	1383	965	1168	1027
D16S539	12	2096	2713	2407	2244	4134	4744	5308	4858	2532	1999	1932
D18S51	10	1235	2008	1467	1487	1805	2502	1780	1366	1096	1772	1613
	13	997	1849	1061	1532	1612	1206	1851	1504	1678	1638	1687
D21S11	28	1321	1292	950	1280	1584	1930	1679	1757	1283	1800	1567
	29	1164	1158	1296	1181	1159	1760	1936	1696	1135	1645	1329
D3S1358	15	1718	1444	1250	1534	1803	2413	2566	1518	1475	1408	1564
	16	1333	1052	1470	1013	1821	2068	2092	1754	1485	1633	1061
D5S818	11	2174	1990	1856	1798	2729	4254	3272	2941	2173	2280	2445
D7S820	10	1343	1415	869	1108	1153	1716	1494	975	1266	1217	1336
	12	1136	1008	1182	1289	1308	1721	1512	1354	1539	1122	1310
D8S1179	12	1287	944	1139	1037	1361	1668	1578	1198	975	1378	899
	13	1415	1331	907	1117	1307	1550	1200	1518	843	1368	1010
FGA	21	1448	1465	1405	1916	1141	1690	1406	1313	1376	1219	1080
	25	1395	1450	1332	1625	1305	1107	1503	853	1268	1274	926
PentaD	9	1128	1281	792	568	1713	2314	2042	1322	1052	1492	847
	11	939	1056	1089	608	2123	1878	2219	1561	1088	1091	1071
PentaE	7	1039	1102	1018	1002	1884	1813	2187	1489	1353	1532	1045
	11	1313	1491	1190	1001	1571	2039	1972	1650	1494	1587	1293
TH01	6	1850	1604	2099	1891	2547	3492	3060	3082	1918	1766	1532
	9.3	2322	1835	1426	2131	2705	3727	3425	2866	2074	1663	1475
TPOX	8	1772	1596	1214	1456	1765	2266	2751	2364	2167	1758	1627
	11	1326	1348	1233	1588	1888	2053	2585	2284	2522	1636	1131
vWA	17	1863	980	1260	1346	1530	1759	1888	1712	1687	1398	1372
	19	1525	1423	1328	1287	1512	1707	1674	1667	1536	1118	1159

*Represents single use aliquot.

Table B.68: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 0.2 ng/μL -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	2898	2149	1956	1888	2247	3729	2383	2286	2442	2347	2372
CSF1PO	11	1408	1246	794	1251	1857	2536	2157	1278	1108	2086	1358
D13S317	12	1417	807	827	821	1195	1066	1352	746	1054	967	782
	13	1033	668	725	839	892	1068	1129	930	666	721	602
D16S539	12	2096	1954	1417	1877	2881	3670	3092	2230	1713	1787	1323
D18S51	10	1235	1168	915	1103	1270	1737	1092	834	938	1367	1262
	13	997	1026	874	1135	862	1274	1225	732	999	1153	1156
D21S11	28	1321	1066	1029	909	875	1562	1069	1205	1288	1151	866
	29	1164	968	888	796	851	1288	1380	920	1098	1034	938
D3S1358	15	1718	1159	1039	983	1181	1745	1587	1175	1018	1241	884
	16	1333	968	691	938	1208	1882	1526	1191	1235	1285	843
D5S818	11	2174	1407	1125	1357	1895	3137	2366	1802	1687	1810	1525
D7S820	10	1343	958	1036	904	795	976	725	802	985	920	838
	12	1136	979	699	921	886	1140	1169	882	815	688	1153
D8S1179	12	1287	745	932	1410	1371	1588	1310	1088	665	1136	738
	13	1415	981	1015	934	1223	1620	1138	1101	858	887	1173
FGA	21	1448	1318	1223	1190	857	1650	1269	961	1360	1453	870
	25	1395	1786	1291	985	866	1836	1278	1087	1231	953	813
PentaD	9	1128	568	538	821	1025	1389	1398	1162	560	754	491
	11	939	543	648	629	1241	1874	1218	796	858	851	833
PentaE	7	1039	825	799	1136	1137	1558	1215	704	975	1347	968
	11	1313	827	855	871	971	1518	1314	702	920	916	1068
TH01	6	1850	1725	922	1788	1632	2477	2393	1802	2361	885	994
	9.3	2322	1182	1241	1161	1800	2412	2594	1926	1684	1076	1316
TPOX	8	1772	1470	1592	1275	2011	2837	2053	1559	1920	1651	1532
	11	1326	1396	1446	1194	1867	2732	2471	1431	2491	1035	1240
vWA	17	1863	1455	1609	1324	1125	2013	1179	1375	1010	1666	1009
	19	1525	1421	1381	1149	1119	1904	1377	1192	1085	1044	897

Table B.69: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 1 ng/μL RT 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	3162	3363	2829	3898	2711	3649	2637	2447	2267	1506	1817
CSF1PO	11	1932	2504	1306	2883	2181	2271	1389	1158	469	193	313
D13S317	12	1415	1506	965	1190	1180	1525	788	839	416	451	360
	13	1300	1341	1015	907	1168	1598	990	616	294	361	276
D16S539	12	2379	3435	2539	3661	3480	3217	2642	2121	644	487	641
D18S51	10	1597	2068	1494	2702	1572	1500	725	987	620	290	325
	13	1365	1915	1289	2110	1388	1399	789	843	547	177	353
D21S11	28	1552	1544	1085	954	1010	1514	1061	1016	797	343	362
	29	1905	1282	1277	862	1292	1212	883	831	508	464	340
D3S1358	15	1396	1535	1383	1105	1658	2267	1521	1115	578	749	530
	16	1249	1339	1270	1416	1303	1820	1235	1169	705	581	573
D5S818	11	2580	2263	1660	2667	2657	3734	2289	2439	1434	931	1012
D7S820	10	1058	1457	1060	1389	990	1168	813	799	572	283	269
	12	923	1437	1156	1079	1329	1451	839	640	525	395	284
D8S1179	12	1411	1868	1161	1689	1203	1671	1118	1078	416	433	444
	13	1859	1367	1257	2151	1627	1796	1058	862	375	393	242
FGA	21	1822	1945	1360	1322	1100	1360	780	672	558	156	222
	25	1665	2267	1125	1088	751	1064	829	815	340	213	199
PentaD	9	1373	1152	854	638	1045	1720	977	769	229	140	94
	11	1109	1157	773	705	1357	1205	814	528	175	183	
PentaE	7	1041	1191	994	1318	766	1319	671	300	326	110	76
	11	1438	1478	572	1375	1107	874	750	517	189	75	81
TH01	6	2153	2034	1221	1346	2352	2558	2313	2491	810	950	536
	9.3	2346	1943	1418	1234	2312	2289	2248	1925	1379	673	439
TPOX	8	2224	2037	1679	1868	1933	1896	1417	1727	975	329	463
	11	1478	2185	1765	2102	1384	1695	1502	1537	588	468	240
vWA	17	2010	2019	1661	1487	1577	2038	1430	1538	960	670	649
	19	1945	1303	1864	1371	1509	1474	1055	1485	781	817	714

Table B.70: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 1 ng/ μ L RT 3 kV 8 s		Days Stored		
		0	342	349
Marker	Allele	Peak Height (rfu)		
AMEL	X	6559	3726	6240
CSF1PO	11	3885	587	1263
D13S317	12	2864	1334	1368
	13	2615	1085	1068
D16S539	12	4815	1512	2527
D18S51	10	3291	868	1241
	13	2804	557	1414
D21S11	28	3191	1044	1455
	29	3895	1397	1369
D3S1358	15	2895	2318	2080
	16	2576	1807	2313
D5S818	11	5309	2909	4024
D7S820	10	2176	902	1051
	12	1897	1228	1079
D8S1179	12	2907	1081	1587
	13	3778	1018	850
FGA	21	3682	398	769
	25	3347	541	702
PentaD	9	2791	444	377
	11	2305	582	218
PentaE	7	2148	336	310
	11	2933	231	324
TH01	6	4444	2852	2112
	9.3	4783	2035	1714
TPOX	8	4475	827	1622
	11	2939	1154	839
vWA	17	4151	1700	2322
	19	4041	2097	2565

Table B.71: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 1 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3162	2821	3676	3743	2893	3754	3270	3722	2260	2457	2865
CSF1PO	11	1932	1965	2956	2774	2962	4618	3883	4537	1719	2992	2423
D13S317	12	1415	1826	1547	1446	1855	2021	1826	1958	872	976	1211
	13	1300	1603	1546	1288	1598	2109	1765	1752	1040	1216	1298
D16S539	12	2379	2609	4334	2990	4877	6197	4730	6610	2707	3009	2534
D18S51	10	1597	2580	3297	2613	2463	2071	1879	3083	1510	2475	2071
	13	1365	2384	2164	2035	1390	2420	1918	2376	1398	2297	2366
D21S11	28	1552	2154	1523	1910	1682	2790	1998	1929	1733	1442	1639
	29	1905	1921	1443	1656	1778	1960	1815	1725	1770	1414	1666
D3S1358	15	1396	1692	1214	1824	2107	2648	2287	2493	1735	1289	1747
	16	1249	1711	1441	1645	1732	2563	1963	2475	1310	988	1339
D5S818	11	2580	2298	2715	2582	3842	4093	3860	3538	2526	2414	2485
D7S820	10	1058	1214	1156	1459	1275	1813	1084	1696	1502	1369	1294
	12	923	1158	1682	1561	1308	1683	1379	1572	1421	1169	1593
D8S1179	12	1411	1560	1392	1315	1747	2020	1415	1646	990	1019	1051
	13	1859	1587	1643	2013	1825	1543	1674	1467	1059	1057	1259
FGA	21	1822	1820	1303	1589	1247	1485	1419	1442	1273	1264	1273
	25	1665	1883	1114	1588	1384	1453	1296	1285	1146	1142	1038
PentaD	9	1373	1245	1459	1224	1715	1868	2405	1744	1324	879	1174
	11	1109	1252	1448	1274	2367	2634	1781	1855	805	1055	924
PentaE	7	1041	1837	1527	1379	1834	2263	1947	1504	1092	1447	1277
	11	1438	1712	1360	1756	1655	2208	1545	2233	1216	1857	1389
TH01	6	2153	2571	1355	2638	2717	3876	4409	3294	1939	1415	1427
	9.3	2346	2426	1378	2174	3505	3914	3749	3797	2353	1752	1948
TPOX	8	2224	2048	1850	1620	2189	2315	2503	2347	1986	1169	1527
	11	1478	1515	2258	2055	2404	1786	2150	2516	1764	1791	1376
vWA	17	2010	1990	1007	1479	1475	2091	1570	1802	1430	1266	1606
	19	1945	1432	1285	2320	1831	2727	1932	1670	992	905	1092

Table B.72: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 1 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3162	2270	3190	2417	2658	2960	3364	2865	2454	2427	1942
CSF1PO	11	1932	1903	2642	1960	3484	3965	3828	3078	1737	2441	2019
D13S317	12	1415	1248	1543	1405	1418	1826	2249	1646	985	1268	1104
	13	1300	1344	1408	1110	1689	1915	1388	1551	954	802	957
D16S539	12	2379	2686	3046	2611	3209	4796	5358	4922	2332	2924	2239
D18S51	10	1597	2126	2088	2068	1436	2384	2131	1774	1468	1803	1489
	13	1365	1820	2734	1496	1775	1818	2532	1789	1585	2084	1550
D21S11	28	1552	1378	1973	1870	1380	2120	2005	2237	1381	1119	1346
	29	1905	1539	1826	1758	1392	2312	2522	1706	1604	1290	1303
D3S1358	15	1396	1550	1792	1771	2140	2420	2739	2130	1307	1085	1412
	16	1249	1644	1471	1360	1925	2698	2466	1834	1336	1331	1302
D5S818	11	2580	2284	2680	2018	2810	3476	3529	3893	2394	1952	2058
D7S820	10	1058	1036	1395	1299	1150	1958	2072	1685	1344	1340	1285
	12	923	1021	1663	1282	1279	1724	2163	1242	1214	1402	1043
D8S1179	12	1411	959	1493	1217	1381	1839	1440	1267	938	910	975
	13	1859	1334	2103	1040	1505	2220	1584	1433	874	818	797
FGA	21	1822	1280	1593	1443	1399	1081	1856	1164	1118	808	755
	25	1665	1223	1439	1223	1224	1025	1683	1855	959	964	731
PentaD	9	1373	801	1454	931	2487	2052	2662	1876	875	947	833
	11	1109	1144	1529	781	1996	2821	2797	1998	982	814	1081
PentaE	7	1041	1460	1630	1358	1002	1535	1730	2117	1211	1063	1399
	11	1438	983	1256	1447	1867	1794	1935	1311	1040	1152	1371
TH01	6	2153	1568	2266	1517	2460	2995	3899	3012	2090	1929	1594
	9.3	2346	1585	1957	1967	3660	4114	2481	4266	1763	1921	1684
TPOX	8	2224	1445	1495	1668	1710	2228	2452	2419	1411	1444	1413
	11	1478	1326	1812	1232	1860	2517	2354	2103	1903	1252	1228
vWA	17	2010	1008	1632	1574	1480	1872	2128	1775	1098	1240	1180
	19	1945	1043	1513	1446	1412	2191	2572	1475	1184	1116	1026

*Represents single use aliquot.

Table B.73: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 1 ng/μL -20 °C 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	3162	3055	3141	2042	3250	3685	3181	3500	2981	2686	2420
CSF1PO	11	1932	2472	2598	1656	3989	3730	3156	3954	3406	3002	2530
D13S317	12	1415	1587	1581	990	1713	1927	1432	2349	997	1273	1274
	13	1300	1312	1387	1158	1861	1855	1405	1718	1122	1075	1254
D16S539	12	2379	3034	4103	2423	4942	5371	5084	5239	2623	2780	2609
D18S51	10	1597	2490	3183	1276	1938	2097	1943	1881	1309	1829	1762
	13	1365	2266	2525	1945	2455	1799	2219	2082	1835	2116	1578
D21S11	28	1552	1490	1549	1718	1901	2099	1726	2311	1450	1289	1478
	29	1905	1916	1377	1481	1708	1355	1737	2081	1760	971	1006
D3S1358	15	1396	1635	2406	1410	2372	2391	2060	2135	1469	1744	1969
	16	1249	1960	1695	1419	1552	1998	2260	2766	1759	1440	1431
D5S818	11	2580	2859	2628	2165	4197	3747	2900	3968	2431	2694	2237
D7S820	10	1058	1543	1701	1357	1458	1512	1781	1788	954	1445	1242
	12	923	1457	1198	1061	1286	1555	1631	1490	1230	1265	1410
D8S1179	12	1411	1540	1840	1237	1920	2082	1321	1835	988	1555	1316
	13	1859	1539	918	1021	1494	2322	1444	1385	1109	1272	1294
FGA	21	1822	1705	1831	1346	1543	1415	1376	1544	1412	1200	957
	25	1665	1603	1596	1465	1798	1213	1589	1765	1100	1265	850
PentaD	9	1373	1227	1937	930	2131	2433	1589	1823	1219	1436	1216
	11	1109	1511	1606	752	1612	1672	2291	1752	1158	1136	1016
PentaE	7	1041	1800	1773	1403	1610	2069	1921	1545	1576	1800	1826
	11	1438	1693	1789	921	1809	1765	1536	1623	1122	1797	1263
TH01	6	2153	1634	2312	1966	2650	3524	4146	4160	1745	1529	1680
	9.3	2346	2389	1706	1718	2854	3536	4401	3845	1624	1844	1754
TPOX	8	2224	1650	2266	1312	2235	2736	2443	2742	2562	1968	1736
	11	1478	1968	2068	1471	2086	2512	1922	2523	1940	1472	1868
vWA	17	2010	1632	1836	1152	1424	1987	1933	1902	1262	1264	1464
	19	1945	1356	1494	1044	1598	1801	1570	1823	1367	1249	1244

Table B.74: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 1 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	3162	2778	2829	2895	3860	3146	2835	3793	2531	2723	2959
CSF1PO	11	1932	1501	1834	1031	3533	3724	2308	2430	1862	2553	2699
D13S317	12	1415	1113	1105	867	1455	1828	1389	1332	989	1013	1119
	13	1300	954	1141	766	1415	1660	1060	1822	770	1093	909
D16S539	12	2379	2516	2447	2017	4676	4090	3579	4480	1875	2000	2131
D18S51	10	1597	1607	1650	1461	2432	1715	1731	1737	1141	1884	1386
	13	1365	1448	1601	1331	2384	1472	1493	1800	1051	2089	1693
D21S11	28	1552	1453	1763	1224	2047	1900	1495	1978	1262	1491	1238
	29	1905	1217	1374	878	1470	1406	1502	1242	1317	1050	1609
D3S1358	15	1396	1405	1481	1096	2241	1977	1851	1947	1069	1530	1351
	16	1249	1141	1426	1068	1787	1843	1723	2200	1102	1222	1095
D5S818	11	2580	1904	2224	1534	3341	2948	2454	3331	1872	2123	2600
D7S820	10	1058	1141	1073	872	1411	1495	1051	1120	1011	1174	1165
	12	923	1290	1156	987	1641	1464	1407	1366	1152	1146	1238
D8S1179	12	1411	1287	1489	1407	2259	1794	1478	1856	832	1514	1527
	13	1859	1407	1664	1423	2318	1789	1749	1683	903	1308	1388
FGA	21	1822	2099	1640	1758	1539	1749	1430	1461	1100	1661	1217
	25	1665	1114	2186	1752	1909	1951	1400	2012	889	1219	1458
PentaD	9	1373	851	951	669	2439	2379	1995	2108	1092	1123	966
	11	1109	917	784	607	2158	1722	1638	1428	899	1276	1098
PentaE	7	1041	1126	1181	848	2245	1983	1111	1565	1541	1352	1761
	11	1438	1272	1634	872	1671	1833	1208	1781	1029	1323	1627
TH01	6	2153	1119	1542	1034	3592	2863	2790	2808	1768	1489	2515
	9.3	2346	1336	1563	1326	2260	3348	1795	3695	1100	1508	1623
TPOX	8	2224	1715	2018	1264	3244	2853	1808	2801	1687	1937	1497
	11	1478	1922	1277	1481	2879	3086	2947	3422	1891	1918	2408
vWA	17	2010	1425	1503	1421	2400	2278	1902	1703	1393	1729	1526
	19	1945	1178	1661	1275	1875	2205	1955	2119	974	1548	1571

*Represents single use aliquot.

Table B.75: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 1 ng/μL -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3162	2638	2741	2445	3072	3581	3015	3191	2508	2887	2630
CSF1PO	11	1932	1292	1262	1296	2731	3188	2691	2406	2158	2562	2054
D13S317	12	1415	1381	898	1056	1211	1622	1549	1457	990	1191	957
	13	1300	861	888	899	1096	1694	1094	1120	936	866	725
D16S539	12	2379	2039	2097	1500	3462	4422	4296	3965	2877	2245	2045
D18S51	10	1597	1120	1161	1279	2143	1738	1205	1374	1950	1471	1214
	13	1365	1410	1246	1069	1736	2156	1077	1450	1301	2054	1458
D21S11	28	1552	1746	1418	1086	1232	1907	1512	1965	1086	1471	1371
	29	1905	1367	1122	1059	1135	1925	1714	1453	1175	1065	1290
D3S1358	15	1396	1525	1437	1417	1437	2454	1960	1862	1494	1427	1172
	16	1249	1341	1198	807	1306	1722	1770	1792	1220	1255	1314
D5S818	11	2580	1870	1940	1699	2406	3432	3451	3503	1779	2081	1774
D7S820	10	1058	998	986	919	982	1420	1478	1372	986	1078	1162
	12	923	1163	1190	958	1330	1569	1165	1399	1323	1186	1263
D8S1179	12	1411	1289	1344	1019	2164	2211	1176	1737	797	1268	863
	13	1859	1059	1096	1062	1246	2046	1498	1804	1110	1166	908
FGA	21	1822	1895	1423	1641	1243	2017	1840	1923	1205	1244	1207
	25	1665	1849	1182	1732	1438	1659	1501	1344	1286	1445	1326
PentaD	9	1373	861	719	626	1721	1922	1935	1633	1164	1169	1173
	11	1109	729	507	880	1595	1884	1544	1394	930	1186	713
PentaE	7	1041	860	739	772	1511	1756	1436	1430	1474	1564	1360
	11	1438	1176	724	868	1438	2057	1521	1044	1619	1898	1262
TH01	6	2153	1631	1395	1634	2773	4733	3223	2911	1738	1379	1463
	9.3	2346	1677	1304	1494	1934	2979	3050	3000	1222	1104	1004
TPOX	8	2224	1851	1419	1276	2485	2714	2516	2011	2488	1987	1369
	11	1478	1403	1592	1370	2522	2834	2746	2666	1790	1689	1262
vWA	17	2010	1270	1537	1341	1516	2636	1492	1864	1186	1107	1338
	19	1945	2048	1496	1456	1751	1899	2491	1963	1221	1228	1534

Table B.76: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 4 ng/μL RT 3 kV 3 s		Days Stored											
		0	6	34	62	90	117	149	174	256	342	349	349+ Centri-Sep
Marker	Allele	Peak Height (rfu)											
AMEL	X	3315	3177	2649	2578	2757	3292	2996	2608	1772	1459	1167	873
CSF1PO	11	2947	3055	2017	1052	3092	1804	1855	1941	575	304	172	115
D13S317	12	2430	1667	1384	1317	1555	1449	1421	1192	406	247	327	200
	13	2252	1761	1129	1266	1787	1647	1488	857	421	299	166	186
D16S539	12	3586	5035	2867	2407	4157	4959	3469	2625	764	389	257	215
D18S51	10	1965	3568	2040	1567	2312	1347	1340	969	335	296	353	338
	13	2399	2683	1671	1497	2501	1483	1162	999	445	304	161	185
D21S11	28	2554	2272	1614	1566	1650	1394	1261	1630	695	368	184	209
	29	1826	1589	1317	1352	1393	1826	1502	1087	487	454	269	463
D3S1358	15	2222	2188	1667	2043	2104	2184	2675	2069	953	529	522	477
	16	2350	1773	1733	1355	1543	1616	1902	1596	718	537	506	417
D5S818	11	3974	3132	2246	2111	3391	3619	3129	2410	1381	980	589	565
D7S820	10	1971	1764	1560	1266	1478	1477	1176	647	418	518	247	365
	12	1843	1767	1529	1268	1503	1317	1099	916	705	311	206	79
D8S1179	12	1695	2108	1376	1153	1455	1620	1233	886	356	384	253	125
	13	1736	1506	1257	1100	1271	1262	1240	791	349	352	356	243
FGA	21	2337	2188	1955	1263	1151	1127	713	818	473	227	182	198
	25	2410	1370	1597	1254	1200	1007	1181	431	305	163		106
PentaD	9	1834	2031	1332	793	1712	1158	1433	1426	201	169	75	73
	11	2001	1987	1022	708	1456	1205	1295	934	224	290		
PentaE	7	1909	2412	967	1201	1327	955	1106	769	174	287		172
	11	2375	2231	1283	1106	1039	939	639	765	187			
TH01	6	2891	2404	2569	2636	2366	2920	4035	3020	1359	433	399	349
	9.3	3174	1945	2219	2189	3247	3318	3436	1830	782	389	512	317
TPOX	8	2196	2268	1475	1388	2097	1316	1993	1294	777	376	175	371
	11	2015	1480	1566	1418	1807	1723	2028	1521	503	530	170	
vWA	17	2270	2040	1564	1752	1266	1436	2177	1382	939	499	381	470
	19	2636	1623	1314	1579	1339	1640	1528	1683	670	478	456	410

Table B.77: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 4 ng/μL RT 3 kV 8 s		Days Stored			
		0	342	349	349+ Centri-Sep
Marker	Allele	Peak Height (rfu)			
AMEL	X	6759	3648	4252	1904
CSF1PO	11	6020	576	498	226
D13S317	12	4865	458	920	383
	13	4505	550	447	363
D16S539	12	7205	730	759	444
D18S51	10	3987	595	1008	669
	13	4815	574	459	368
D21S11	28	5205	718	548	425
	29	3702	885	789	947
D3S1358	15	4498	1031	1516	969
	16	4804	1018	1428	851
D5S818	11	7677	1851	1727	1143
D7S820	10	4009	944	690	735
	12	3685	581	609	165
D8S1179	12	3428	994	914	281
	13	3542	934	1293	524
FGA	21	4645	597	698	428
	25	4760	421	214	233
PentaD	9	3729	310	64	143
	11	4056	562	211	
PentaE	7	3889	556	119	330
	11	4783		72	97
TH01	6	5805	817	1105	717
	9.3	6424	760	1414	647
TPOX	8	4355	985	665	109
	11	4037	1384	624	817
vWA	17	4607	1303	1464	1034
	19	5386	1254	1758	897

Table B.78: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 4 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3315	2288	3232	2551	3470	2691	3744	3321	2674	2843	2624
CSF1PO	11	2947	1756	2838	1871	3821	3522	4083	3194	2448	2663	2239
D13S317	12	2430	1766	1639	1442	1883	2128	2501	1904	1478	1327	1049
	13	2252	1717	1759	1180	1625	1537	2066	1754	1228	964	882
D16S539	12	3586	3209	3595	3163	4713	5030	6018	5933	2804	2589	1860
D18S51	10	1965	1588	2541	1827	1741	2086	1854	2213	1673	2094	1602
	13	2399	1938	1853	2026	2449	1460	1339	2251	1446	2642	1837
D21S11	28	2554	2085	1821	1330	1745	2123	2782	2791	1962	1182	1595
	29	1826	1649	1429	1542	1715	2028	2455	2173	1952	1825	1346
D3S1358	15	2222	1872	1894	1754	1970	2706	3239	2908	1691	1698	1695
	16	2350	1659	1951	1928	2011	2376	3109	2378	1429	1216	1364
D5S818	11	3974	2645	3014	2426	3539	4659	4685	4108	2547	2878	2532
D7S820	10	1971	2050	1828	1705	1453	1476	1640	1731	1692	1263	1167
	12	1843	1562	1903	1438	2079	1933	2087	1936	2050	1325	1118
D8S1179	12	1695	1160	2039	1737	1800	1972	1534	1751	1412	1364	822
	13	1736	1669	1761	1683	1834	1843	1544	1454	1193	1264	886
FGA	21	2337	2219	1698	1738	1573	1660	2383	1880	1411	1543	843
	25	2410	1795	1785	1791	1675	1620	2004	1149	1335	1289	1128
PentaD	9	1834	1120	1475	1123	2068	2327	3003	2589	1301	994	799
	11	2001	965	1404	1154	2348	2009	1804	2363	1306	1270	747
PentaE	7	1909	1690	1517	1491	1822	1978	1551	2575	1961	1680	1275
	11	2375	1329	1715	1307	1883	1435	2053	1513	1591	1856	1577
TH01	6	2891	2080	2834	2221	3576	4850	5323	3632	1600	2286	1495
	9.3	3174	2489	2678	2118	3650	3639	5098	5420	2492	1829	1981
TPOX	8	2196	1745	2072	1779	2550	2679	2988	2912	2512	2002	1462
	11	2015	1437	1993	2001	2454	2522	3214	2510	1968	1445	1784
vWA	17	2270	1879	1749	1606	2007	1901	1844	2146	1683	1772	1373
	19	2636	1762	1331	1501	1560	2312	2385	2180	1767	1397	1620

Table B.79: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 4 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	3315	3280	2814	2340	3860	2715	3572	3696	2953	3292	3266
CSF1PO	11	2947	2153	1556	1223	3732	2571	2993	2646	2172	3161	2457
D13S317	12	2430	1217	1308	903	1463	1345	1372	1610	1420	1173	1231
	13	2252	1248	1096	998	1688	1282	1511	1315	1374	1171	1423
D16S539	12	3586	3109	2653	1838	4837	4053	4185	4991	2787	2637	2412
D18S51	10	1965	2767	2003	1223	2053	1958	1785	1635	1873	2099	2120
	13	2399	2067	1414	1092	1818	1693	1436	1612	1426	1589	1740
D21S11	28	2554	1888	1517	1062	1825	1552	1752	2013	1962	2096	1690
	29	1826	1276	1308	1131	1496	1491	1479	1969	1813	1444	1520
D3S1358	15	2222	1680	1573	1298	1911	1926	1970	1928	1424	1763	1703
	16	2350	1606	1554	832	2229	1675	1996	1977	1805	1396	1519
D5S818	11	3974	2397	1988	1537	3786	3205	3262	3669	2706	2515	2487
D7S820	10	1971	1152	1251	889	1274	1229	1416	1602	1300	1316	1442
	12	1843	1604	1269	1017	1543	1209	1254	1504	1459	1469	1544
D8S1179	12	1695	2197	1830	1405	2240	2127	1502	1716	1567	1470	1537
	13	1736	2110	1842	916	1658	2059	1341	1460	1711	1595	1437
FGA	21	2337	2461	1905	1688	2029	1333	1658	2242	1645	2100	1590
	25	2410	1799	1623	1318	2039	1087	1090	1507	1356	1520	1472
PentaD	9	1834	1197	742	773	1666	1573	1855	1924	1567	1146	1074
	11	2001	1253	866	495	1912	1761	1558	1628	931	1229	907
PentaE	7	1909	1602	1111	1109	2064	1388	1669	1459	1382	1844	2245
	11	2375	1547	1040	1092	1631	1259	1262	1390	1756	1560	1673
TH01	6	2891	1592	1728	1712	3348	2592	2550	3705	2593	2118	2000
	9.3	3174	2148	1616	1450	3206	2377	3043	3200	2337	1309	2103
TPOX	8	2196	2643	1604	1425	2291	2533	2399	3386	2580	1660	2177
	11	2015	1867	2041	1327	2994	2331	2667	2812	2782	1884	1965
vWA	17	2270	1791	1657	1267	2180	2038	2305	2254	1938	1282	1690
	19	2636	1951	2073	1696	2110	2055	1829	2206	1942	1885	2331

*Represents single use aliquot.

Table B.80: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 4 ng/μL -20 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3315	3141	3125	3244	2722	3357	3523	3375	2890	2698	2856
CSF1PO	11	2947	1883	1649	1439	1409	3564	2687	2523	2097	2126	1927
D13S317	12	2430	1430	1010	1118	1657	1841	1811	1618	1203	1115	1096
	13	2252	1059	1473	1361	1563	1145	1251	1593	1099	948	925
D16S539	12	3586	2624	2521	2415	2851	5026	4711	4368	2565	2258	2065
D18S51	10	1965	1575	1658	1495	544	1705	1616	1164	1580	1684	1737
	13	2399	1645	1568	1274	596	2049	1377	1401	1138	1887	1677
D21S11	28	2554	1481	1461	1861	2862	1851	2216	1934	1688	1565	1382
	29	1826	1189	1576	1225	1591	1582	1499	1742	1549	1329	1611
D3S1358	15	2222	1317	1695	1577	1694	2264	2369	1894	1467	1260	1318
	16	2350	1437	1603	1289	1631	1467	1815	1549	1550	1476	1080
D5S818	11	3974	2477	1824	1543	2364	3093	3930	3219	2173	2044	2158
D7S820	10	1971	1430	1027	1327	1787	1450	1656	1274	1530	1272	912
	12	1843	1317	1297	1235	1704	1516	1787	1760	1229	1204	998
D8S1179	12	1695	1465	1588	1436	1302	2181	2154	1541	1239	1051	1246
	13	1736	1708	1514	1546	1412	2198	1729	1426	1116	1295	1162
FGA	21	2337	1803	1998	2077	2337	1162	1894	1486	1401	1361	998
	25	2410	1590	1816	2183	1924	1403	1681	1658	1360	1012	1154
PentaD	9	1834	697	957	734	968	2159	1697	1314	1071	1064	918
	11	2001	1016	951	842	639	1621	1416	1305	1284	767	993
PentaE	7	1909	1034	1159	1167	1077	1520	1455	1490	1578	1710	1312
	11	2375	976	1128	1218	921	1552	1703	1522	982	1847	1133
TH01	6	2891	2080	1679	2004	4470	3563	4046	4143	2048	1511	1657
	9.3	3174	1835	2141	1950	4073	2839	3676	3375	2053	1740	1445
TPOX	8	2196	1861	1943	1845	3384	2532	3471	2828	1765	2087	1925
	11	2015	1852	1203	2037	3554	3491	2485	3029	1779	1646	1762
vWA	17	2270	1778	1835	1475	2166	2276	2107	2615	1307	1360	1646
	19	2636	1794	1934	1968	2286	1673	2571	1936	1451	1253	1290

Table B.81: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 4 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3315	4024	3025	3149	3831	3423	3218	2706	2489	2600	2506
CSF1PO	11	2947	3491	2552	2108	4887	4551	3943	3760	2556	2467	2876
D13S317	12	2430	2017	1809	1385	2451	2053	2474	1505	1475	1220	971
	13	2252	2210	1428	1471	2327	1979	1993	1516	1257	1272	1183
D16S539	12	3586	5845	3192	3749	5628	5880	4933	5443	2594	3047	2844
D18S51	10	1965	3484	2409	1896	2453	2489	2114	1581	1543	3004	2722
	13	2399	2646	2644	2025	2700	2038	1827	1454	1412	2278	2081
D21S11	28	2554	2911	2038	1915	3121	2621	2743	2358	1581	2011	2111
	29	1826	2391	2049	2113	1890	2501	2482	1751	1606	1161	1529
D3S1358	15	2222	2726	2064	2386	2536	2328	2805	2394	1838	2298	2089
	16	2350	2468	2025	1639	2337	2531	2409	2444	1501	1945	1751
D5S818	11	3974	4179	3079	2667	4127	4699	3854	3549	2381	2882	2524
D7S820	10	1971	2022	1534	1652	2130	2106	2133	2100	1344	2061	1942
	12	1843	2427	1778	1669	2444	2249	1817	1714	1500	1861	1637
D8S1179	12	1695	2523	1340	1179	2015	1931	1768	1683	1230	1301	1159
	13	1736	2865	1145	1269	2089	2052	1903	1652	1192	1350	1329
FGA	21	2337	2182	1774	2129	1818	1116	1932	1429	1303	1200	1314
	25	2410	2180	2110	1921	1760	1800	1847	1400	1001	1175	1244
PentaD	9	1834	1647	1164	1325	2663	3123	2090	2182	1565	1315	1733
	11	2001	1690	1012	1066	2031	2751	2481	2220	1433	1225	1526
PentaE	7	1909	29 20	1551	1394	2318	2421	2297	2340	1555	1968	2006
	11	2375	2574	2324	1669	2111	2340	2028	1796	1594	1649	2041
TH01	6	2891	3598	2027	2436	3922	4890	3840	4044	2356	2156	1667
	9.3	3174	2908	2743	2075	3912	3005	4241	3227	2020	1550	2581
TPOX	8	2196	2212	2112	1367	3015	2827	2665	2388	1687	1572	1560
	11	2015	2522	1719	2154	2422	2316	2926	2472	1930	1696	1584
vWA	17	2270	1733	1561	1997	1921	2153	2463	1966	1345	1510	1695
	19	2636	2171	1693	2332	2315	2771	1838	1938	1310	1406	1081

*Represents single use aliquot.

Table B.82: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 4 ng/μL -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3315	2957	1783	2601	3623	3267	3525	3228	3167	3353	2725
CSF1PO	11	2947	2207	983	1763	5831	4379	3262	3761	3171	4020	3483
D13S317	12	2430	1478	1010	1310	2399	2064	2182	2144	1344	1326	1267
	13	2252	1415	1033	1433	2260	1610	2144	1795	1336	1164	1000
D16S539	12	3586	3704	1716	2860	7007	6026	5806	5378	2842	3068	2861
D18S51	10	1965	2389	944	1803	2685	2483	1326	2088	1598	2682	1984
	13	2399	2628	878	1153	2586	2711	1938	2259	1873	2096	2375
D21S11	28	2554	1729	1466	1665	2554	1967	2590	2703	1921	1966	1797
	29	1826	1433	1318	1891	2360	1526	2318	2099	1861	1430	1851
D3S1358	15	2222	1687	1085	1812	2792	2016	2554	2393	1750	1742	1977
	16	2350	1696	1074	1681	2695	2598	3132	2042	1838	1815	1419
D5S818	11	3974	2815	1588	2150	4138	4039	4452	3604	2678	2635	2997
D7S820	10	1971	1444	1103	1482	1572	1621	2029	1667	1723	1755	1538
	12	1843	1939	946	1346	2094	1558	1878	1917	1620	1397	1720
D8S1179	12	1695	1495	990	1423	2124	1768	1661	1988	998	1463	1069
	13	1736	1785	978	1224	2129	2152	1881	1757	1276	1505	1675
FGA	21	2337	1406	1320	1673	1916	1676	1552	1970	1710	1804	1324
	25	2410	1820	1345	1690	1976	1346	2060	1525	1307	1553	1113
PentaD	9	1834	1166	475	829	2250	2811	2824	2987	1383	1981	1530
	11	2001	1706	585	1012	2743	2324	2704	1983	1601	1262	1135
PentaE	7	1909	1625	766	1561	2490	1641	1982	2365	1320	2091	2178
	11	2375	1720	935	1452	2864	2192	1965	1763	1389	1725	1758
TH01	6	2891	2106	2126	1840	4444	3804	4671	4348	1582	1699	1686
	9.3	3174	1779	1411	1837	3797	3560	4056	3641	2615	2157	2321
TPOX	8	2196	1598	1309	1612	3248	2593	2591	2611	2782	2523	2087
	11	2015	1634	1060	1610	3036	2213	2768	2676	2025	2016	1875
vWA	17	2270	1378	1194	918	3060	1919	2128	2294	1684	1625	1503
	19	2636	1488	1439	1645	2115	1516	1963	2116	1701	1614	1679

Table B.83: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 8 ng/μL RT 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3254	2857	2967	2535	3219	3297	2839	2990	1847	1221	1475
CSF1PO	11	3350	1628	1373	991	2292	1881	1161	1296	502	211	142
D13S317	12	2423	1159	910	1233	1155	1144	1119	1122	553	259	156
	13	1683	1370	825	788	1295	998	617	722	662	206	211
D16S539	12	3058	2732	2469	1844	3577	3317	2479	2411	867	294	381
D18S51	10	2518	2073	1523	1078	1214	1109	695	744	312	328	173
	13	1724	1291	1754	1061	1397	1552	911	843	424	246	252
D21S11	28	2347	1350	1311	1139	1476	1335	1099	1130	624	386	247
	29	2219	1488	931	929	969	1230	1167	930	701	231	201
D3S1358	15	2250	1117	1191	1201	1634	1722	1929	1577	604	458	458
	16	2180	1213	935	1122	1362	1723	1399	1100	753	509	324
D5S818	11	3897	1521	1758	1600	2814	2582	2825	1985	1385	683	782
D7S820	10	1948	1255	1100	812	1177	1027	885	1017	488	292	233
	12	2407	1436	1129	1035	1162	1166	1068	531	420	217	223
D8S1179	12	1819	1569	1837	1281	1268	1316	1187	1206	462	263	271
	13	1529	1587	1404	1341	1924	1477	1130	1068	448	375	292
FGA	21	1578	1684	1473	1735	1411	1289	1096	735	280	158	231
	25	1816	1548	1717	1832	1579	938	1243	764	422	112	124
PentaD	9	2075	1017	877	559	1043	982	469	870	304	120	123
	11	1826	826	672	594	985	773	798	607	368	147	
PentaE	7	1651	1293	989	849	1051	1475	785	749	518	114	147
	11	2088	972	865	565	1197	838	921	318	291		120
TH01	6	2894	1684	1408	1407	2572	2397	3044	1913	1186	473	411
	9.3	2555	2002	1232	1919	1906	1955	1788	2252	1126	564	377
TPOX	8	1556	1960	1931	1525	2164	2353	1467	1658	946	367	308
	11	1814	2048	1779	1599	2788	2203	2030	1337	789	209	377
vWA	17	2209	1756	1588	1560	1689	2220	1435	1451	936	314	418
	19	2528	1950	1637	1739	1534	1938	1645	1686	830	486	458

Table B.84: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 8 ng/μL RT 3 kV 8 s		Days Stored		
Marker	Allele	0	342	349
		Peak Height (rfu)		
AMEL	X	7139	3316	3687
CSF1PO	11	7332	657	439
D13S317	12	5252	794	479
	13	3685	626	661
D16S539	12	6706	910	1179
D18S51	10	5597	1039	478
	13	3814	767	718
D21S11	28	5182	1190	734
	29	4861	737	591
D3S1358	15	4971	1408	1426
	16	4911	1583	978
D5S818	11	7646	2153	2513
D7S820	10	4226	887	741
	12	5348	653	679
D8S1179	12	4156	725	650
	13	3401	1041	682
FGA	21	3445	440	567
	25	3991	310	295
PentaD	9	4568	375	125
	11	4047	454	398
PentaE	7	3611	164	420
	11	4637	365	341
TH01	6	6377	1428	1192
	9.3	5607	1674	1117
TPOX	8	3402	1013	721
	11	3948	565	888
vWA	17	4920	899	1090
	19	5659	1384	1169

Table B.85: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 8 ng/μL +4 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3254	3239	2769	3071	3353	3577	3124	3037	2570	2627	2446
CSF1PO	11	3350	1717	1948	1166	3020	3423	2591	2210	1720	2273	2056
D13S317	12	2423	1236	1194	1070	1573	2134	1821	1313	1188	1101	1207
	13	1683	1169	1238	1298	1360	1464	1488	1289	1342	1030	955
D16S539	12	3058	2575	2421	2194	4526	4447	4575	3493	2095	2014	1962
D18S51	10	2518	2004	1979	1120	1552	1610	1607	1330	1297	1177	1334
	13	1724	2071	2183	1213	2033	1989	983	1095	909	1741	1487
D21S11	28	2347	1671	1445	1217	1990	1596	1883	2127	1357	1353	988
	29	2219	1451	1607	1137	1953	2005	1465	1744	1108	1688	1112
D3S1358	15	2250	1407	1539	1512	2217	1767	2244	1896	1429	1540	1233
	16	2180	1261	1195	1086	1828	2042	2000	1435	1118	1387	1258
D5S818	11	3897	2363	2062	1941	2709	4194	3242	2804	2142	1578	1895
D7S820	10	1948	1052	1571	975	1473	1455	1607	1122	1015	1390	1165
	12	2407	1518	1479	1223	1244	1658	1166	1144	1263	845	920
D8S1179	12	1819	1780	2097	1650	1782	2008	1886	1394	873	1423	1238
	13	1529	1636	1690	1154	1780	2726	1470	1464	936	1497	1001
FGA	21	1578	1933	2180	1702	1705	1986	2010	1482	1063	1211	790
	25	1816	2099	1784	1852	1434	1617	1197	1448	1293	1301	816
PentaD	9	2075	1103	1003	665	1583	2127	2037	1555	767	1002	794
	11	1826	850	854	694	1917	1976	1425	1350	648	1079	843
PentaE	7	1651	1122	1200	1055	1513	2016	1818	1285	1040	1616	957
	11	2088	1063	1475	1077	1577	1801	1451	1148	1087	1316	1209
TH01	6	2894	2220	1747	1650	2101	3430	3108	3035	2154	1492	1647
	9.3	2555	2237	1865	2093	2332	3041	3029	3580	2419	1244	1086
TPOX	8	1556	2378	2032	1527	3212	2987	2724	2553	2284	1618	1369
	11	1814	2018	1750	1374	2783	2443	3116	2812	1779	1404	1610
vWA	17	2209	1746	2121	2200	2064	1871	2218	2160	1573	1284	1300
	19	2528	1946	1586	1732	1856	2111	1527	1317	1494	1305	1363

Table B.86: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 8 ng/μL -20 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	3254	3411	2754	2659	3623	2952	2981	3259	2476	2228	2601
CSF1PO	11	3350	2689	1310	1333	4221	4123	3828	3941	2265	3447	3032
D13S317	12	2423	1928	1456	1858	1931	1816	1746	2256	1113	1351	1185
	13	1683	1843	1536	1316	2320	1870	1758	1847	960	1130	1184
D16S539	12	3058	4025	2566	2405	6036	6229	5127	5586	2544	3275	2577
D18S51	10	2518	2712	1515	1507	2972	2421	1661	1987	1384	1941	1992
	13	1724	2217	1177	1059	2106	2102	2139	1560	1556	2450	1581
D21S11	28	2347	2440	1576	2268	2510	1935	1997	2005	1964	1913	1925
	29	2219	1803	2008	2078	2223	1974	1797	2342	1517	1514	1835
D3S1358	15	2250	2718	1339	1830	2541	2276	2177	2488	1454	1851	1771
	16	2180	2244	1437	1414	2185	2264	1591	1602	1610	1287	1782
D5S818	11	3897	3179	2030	2302	3506	4129	3709	3811	2415	2681	2406
D7S820	10	1948	1646	1748	1544	2299	1762	1920	1631	1346	1691	1352
	12	2407	2296	1557	1257	2140	1730	1733	1789	1664	1731	1440
D8S1179	12	1819	2245	1369	1523	2017	2320	1490	1901	1129	1025	1261
	13	1529	1676	1414	1081	1933	1916	1517	1310	1027	1516	1016
FGA	21	1578	2334	1487	1733	1958	1943	1131	1639	1027	1033	1309
	25	1816	2183	1509	1607	1356	1673	1156	1546	1226	1457	1184
PentaD	9	2075	1847	922	842	3327	2525	2487	2168	1181	1294	1427
	11	1826	1601	907	904	2465	2202	2432	1777	1031	949	1387
PentaE	7	1651	2224	1725	1270	2522	1994	1565	1621	1594	2250	2347
	11	2088	2421	1068	1195	1677	2366	1970	2126	1211	1789	1566
TH01	6	2894	2689	1870	2970	3855	3512	4023	3811	1769	1881	1984
	9.3	2555	2123	1870	2574	3172	4316	3427	3585	2395	2107	2453
TPOX	8	1556	2177	2064	1588	2477	3228	2021	1938	2004	1484	1835
	11	1814	1979	2147	1572	2960	2613	1995	2874	1747	1716	1423
vWA	17	2209	1830	1340	1789	1937	2128	1520	1819	1307	1469	1352
	19	2528	1764	1750	1946	2136	1759	1907	1686	1186	1527	1383

*Represents single use aliquot.

Table B.87: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 8 ng/μL -20 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3254	2490	2671	3090	3185	3128	3691	2792	2491	2833	2375
CSF1PO	11	3350	1757	1882	2405	4129	3598	4352	3440	2758	3380	2837
D13S317	12	2423	1216	1179	1495	1751	1774	1590	1923	1144	1061	1113
	13	1683	1180	1417	1083	1368	1516	2048	1534	1253	1158	1246
D16S539	12	3058	3053	3009	3416	4660	5201	6825	5615	2999	2535	2814
D18S51	10	2518	2089	1652	1772	2247	2336	2058	1747	1127	2652	2012
	13	1724	2027	1702	2105	2072	1785	1709	2064	1299	1764	1526
D21S11	28	2347	1793	1949	1711	1881	1707	2322	2345	1601	1645	1555
	29	2219	1870	1597	1243	1846	1721	2561	1745	1474	1374	1607
D3S1358	15	2250	1854	1922	1862	2729	2493	3045	2271	1702	1647	1577
	16	2180	2004	1283	1558	2043	2068	2731	1701	1426	1650	1588
D5S818	11	3897	2341	1893	2670	3758	3493	4045	3719	2493	2704	2383
D7S820	10	1948	1355	1702	1607	2145	1471	2161	1403	1613	1539	1361
	12	2407	1580	1380	1699	1645	1608	2497	1430	1317	1683	1944
D8S1179	12	1819	1209	1403	1746	1909	1601	1935	1632	1003	1439	1194
	13	1529	1308	1557	1920	1499	1924	1936	1443	1665	1339	937
FGA	21	1578	1265	1550	1971	1644	1535	1743	1525	1705	1413	1337
	25	1816	1680	1619	1210	1566	1313	1642	1198	1151	1026	1078
PentaD	9	2075	1106	1090	1259	2249	2704	1913	2224	1204	1119	1437
	11	1826	1101	1168	791	2146	1967	2605	2249	1212	1182	1189
PentaE	7	1651	1614	1629	1188	2282	1584	1657	2056	1774	1785	1857
	11	2088	1211	1494	1326	1695	1780	2176	2122	1176	1942	1633
TH01	6	2894	2373	1716	1608	3623	3127	3923	3913	2367	2006	1956
	9.3	2555	1961	2106	2300	3512	2707	5684	3969	2169	2100	1657
TPOX	8	1556	1449	1268	2033	2378	2551	3097	1991	2240	1747	1551
	11	1814	1606	1975	1619	2551	2080	2921	2100	2109	1834	1678
vWA	17	2209	1350	1838	1617	1937	2149	2299	1583	1556	1536	1252
	19	2528	1155	1546	2039	1514	1540	2138	2039	1538	1654	1406

Table B.88: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 8 ng/μL -60 °C su* 3 kV 3 s		Days Stored										
Marker	Allele	0	6	34	62	90	117	149	174	256	342	349
		Peak Height (rfu)										
AMEL	X	3254	2915	2728	2576	2861	3611	3956	3364	3040	3253	2537
CSF1PO	11	3350	1730	1375	1411	2631	3912	2755	2450	1763	3126	2434
D13S317	12	2423	1360	1344	1025	1124	1818	1526	1424	957	1204	1005
	13	1683	1107	983	974	963	2123	1282	1454	1037	1254	980
D16S539	12	3058	2735	2257	1846	4077	4350	4125	4879	2275	2677	2048
D18S51	10	2518	1946	1764	1016	1529	1488	2258	1712	830	1420	1871
	13	1724	1700	1471	1191	1499	1974	1485	1766	1118	2083	1448
D21S11	28	2347	1734	1236	1444	1267	1547	1916	2148	1899	1411	1323
	29	2219	1210	1456	975	1146	1870	1784	1853	1784	1510	1176
D3S1358	15	2250	1599	1513	1351	1678	2549	1681	1904	1546	1686	1435
	16	2180	1610	1427	1325	1562	2541	1458	1770	1747	1034	1157
D5S818	11	3897	1910	1972	1707	2719	3831	3364	3219	2211	2428	1925
D7S820	10	1948	1128	1082	914	1093	1119	1390	1342	1255	1450	1112
	12	2407	1174	1470	1188	1164	1647	1651	1310	1590	1254	1333
D8S1179	12	1819	1497	1479	1316	1838	2398	1740	1896	1455	1396	1141
	13	1529	1879	1506	1002	1487	2864	1942	2163	1425	1603	1251
FGA	21	1578	2101	1730	1405	1297	2584	1154	1562	1585	1563	1323
	25	1816	1693	1441	1814	1571	1904	1687	1616	1713	1413	1576
PentaD	9	2075	976	961	873	1521	1601	1961	1917	1110	1264	1144
	11	1826	1118	624	777	1733	2072	1896	1704	960	1193	876
PentaE	7	1651	1413	1386	757	1323	1164	1969	1609	1513	1095	1274
	11	2088	1032	919	824	1437	1929	1711	1721	1581	2186	1308
TH01	6	2894	1549	1368	1542	2466	2547	2759	3452	2413	1838	1444
	9.3	2555	1933	1500	1875	2089	3609	2963	3228	2763	1573	1571
TPOX	8	1556	1788	1621	1275	1981	3522	3570	2918	2348	1824	1870
	11	1814	2138	1827	1803	2180	3081	2205	2982	2824	1773	1541
vWA	17	2209	1621	1864	1405	1890	2460	2781	2308	2160	1255	1124
	19	2528	1742	1761	1348	1588	2403	2021	1902	1865	1511	1706

*Represents single use aliquot.

Table B.89: PowerPlex® 16 HS alleles and associated peak heights present at each time point for the specified markers.

Water 8 ng/μL -60 °C 3 kV 3 s		Days Stored										
		0	6	34	62	90	117	149	174	256	342	349
Marker	Allele	Peak Height (rfu)										
AMEL	X	3254	2626	2184	2883	3642	3487	3607	3414	3493	2903	2164
CSF1PO	11	3350	1756	1541	1654	3292	3308	3373	3250	2859	3302	2117
D13S317	12	2423	977	987	1093	1831	1670	1686	1567	1205	1217	896
	13	1683	1127	1040	1100	1730	1250	1538	1801	985	1196	765
D16S539	12	3058	1980	1914	2376	3733	3811	5627	4430	3314	2577	1809
D18S51	10	2518	1759	1383	1248	2018	1741	2035	1544	1724	1613	1879
	13	1724	1340	1389	1385	2091	1720	1314	1368	2324	2034	1259
D21S11	28	2347	1564	1410	1315	2134	1562	2012	1844	1108	1390	1319
	29	2219	1387	973	2002	1763	1671	2292	1383	1514	1395	1232
D3S1358	15	2250	1689	1265	1567	1962	1750	2557	2545	1599	1393	1048
	16	2180	1500	1317	1319	2031	1872	2057	1719	1147	1104	1324
D5S818	11	3897	2154	1684	1477	3061	3071	3917	3398	2363	2129	1896
D7S820	10	1948	1001	1019	1142	1580	1227	1602	1408	1171	1023	1159
	12	2407	1401	860	1439	1431	1004	1564	1501	1589	1546	1127
D8S1179	12	1819	1732	1221	1828	1842	1453	1833	2010	1301	1507	1113
	13	1529	1581	869	1526	1726	1598	1937	1627	1337	1222	1049
FGA	21	1578	2007	1735	1837	1439	1349	1887	2025	1386	1522	934
	25	1816	1583	1807	1599	1722	1390	1894	1722	1445	1359	1409
PentaD	9	2075	896	1029	802	1517	1927	1751	1863	1780	1675	812
	11	1826	600	929	660	1768	1339	1578	1857	1127	1074	1008
PentaE	7	1651	1421	968	1021	1673	1690	1946	1638	1802	1613	1272
	11	2088	1329	922	1302	1667	1115	1228	1598	1977	1421	1083
TH01	6	2894	1331	1345	1733	2216	2714	2977	2820	1415	1892	1125
	9.3	2555	1980	1273	1784	2971	2180	3307	3268	1925	1407	1616
TPOX	8	1556	1726	2070	1653	2436	2423	2934	2980	1925	1716	1620
	11	1814	1933	1513	1444	2605	2184	2815	2645	1995	1903	1542
vWA	17	2209	1787	1219	1938	1929	1930	2074	2105	1140	1571	1245
	19	2528	2005	1131	1762	2060	1922	2318	2022	1337	1325	1172