

EXAMINATION OF DNA MIXTURE PROPORTION VARIABILITY USING MULTIPLE STR TYPING KITS AND NIST STANDARD REFERENCE MATERIAL[®] 2391c COMPONENT D

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Standard Reference Material[®] 2391c (SRM 2391c) PCR-based DNA Profiling Standard is the third renewal of this SRM, originally released in 1995 (see <http://www.nist.gov/srm/index.cfm>). SRM 2391c consist 6 components labeled A through F. Components A through D are supplied as genomic DNA solutions with component A as a single source female; component B as a single source male; component C as a single source male: and component D as a mixture of components A and C. Components E (single source female) and F (single source male) are cells deposited on 903 and FTA papers respectively, two 6 mm punches per component. Inclusion of two kinds of storage paper will enable laboratories to test direct PCR methods. The components of SRM 2391c are from different sources than used in SRM 2391, SRM 2391a, and SRM 2391b. Certified or Reference short tandem repeat (STR) genotypes for 68 loci (51 autosomal and 17 Y-STRs) across the six components are supplied. In order to avoid any potential null alleles, the SRM 2391c components were tested with twenty-two different genotyping kits: Applied Biosystems (Profiler, Profiler Plus, Profiler Plus ID, COfiler, Identifiler, Identifiler Plus, NGM, NGM Select, SGM Plus, SEfiler, MiniFiler, and Yfiler), Promega (PP 16, PP 16HS, PP ESX 17, PP ESI 17, PP ES, PP S5, PP Y, and FFFL), Qiagen (ESSplex and IDplex), plus additional primer sets developed by our group at NIST. Component D is a mixture prepared as a 3 parts component A and 1 part component C. This component has been tested with 20 of these kits. Estimates of the mixture ratio for Component D have been evaluated through the use of the DNA quantitation data, peak height, peak area data and the True Allele software.

Renewal of this SRM is critical for the forensic DNA human identification testing laboratories that adhere to the FBI issued Quality Assurance Standards of Forensic DNA testing (2009) Section 9.5.5. "The laboratory shall check its DNA procedures annually or whenever substantial changes are made to a procedure against an appropriate and available NIST standard reference material or standard traceable to a NIST standard." [1,2]

References:

1. Quality Assurance Standards for DNA Databasing Laboratories. (2009). http://www.fbi.gov/about-us/lab/codis/qas_databaselabs
2. Quality Assurance Standards for Forensic DNA Testing Laboratories. (2009). http://www.fbi.gov/about-us/lab/codis/qas_testlabs