

THE APPLIED BIOSYSTEMS™ GLOBALFILER™ IQC PCR AMPLIFICATION KIT: A 24-PLEX STR CASEWORK KIT ENHANCED BY THE ADDITION OF AN INTERNAL QUALITY CONTROL SYSTEM

Angela Chen, Matthew Ludeman, Robert Green, Vivian Nguyen, Robert Eardley, Marc Short and Julio Mulero

Thermo Fisher Scientific Inc.

The GlobalFiler™ kit, first introduced in 2012 and now widely used in forensic DNA genotyping analysis, is a six-dye 24-plex optimized for the analysis of forensic casework samples that includes 21 autosomal STR loci plus three Y-chromosome markers (Y-indel, Amelogenin and DYS391). A useful new feature that has been included in other more recently-developed Applied Biosystems STR kits, such as the NGM Detect™ and VeriFiler™ Plus kits, is an Internal Quality Control system (IQC). The IQC system consists of two synthetic markers (IQC Small and IQC Large), which are amplified with FAM dye-labeled PCR primers from a synthetic DNA template added to the Primer Mix kit component. These IQC markers are designed to bracket the read region at the small and large molecular weight ends (approximately 70 bp and 450 bp) of the electropherogram, and provide a positive signal that confirms proper amplification and electrophoresis in non-compromised human DNA-positive or human DNA-negative samples. Additionally, the IQC system is a sensitive indicator for the presence of PCR inhibitors that allows for the peak-height ratio of the IQC Large to the IQC Small marker to be used to distinguish between normal reactions, reactions with residual PCR inhibitors and those with degraded DNA. To leverage this new form of enhanced functionality, we have modified the original GlobalFiler kit to include the IQC system. We report here results from our development and validation of the resultant new GlobalFiler IQC kit. This kit will complement the existing GlobalFiler kit, providing the same multiplex STR functionality and power of identity with the added enhancement of an IQC system.