



# PowerQuant™ System

*Behold the Power of Confidence*

**The Power to Solve...** *from Sample to Analysis*

# The Power to Solve... *from Sample to Analysis*

## Behold the Power of Confidence.

Accurate and sensitive DNA quantification plays a key role in ensuring successful STR results, and because many samples are precious, getting it right the first time is crucial. The PowerQuant™ System helps you get the most information from your samples, improving your chances for successful STR analysis.

- Trust your zero quantification results—*zero means zero*
- Obtain reliable quantification results with more consistent [Auto]/[Y] ratios
- Maximize your success in STR assays with a straightforward sample quality assessment
- Shorten time to results with a faster cycling time of approximately 1 hour

The PowerQuant™ System is a 5-color, 4-target probe-based qPCR assay that simultaneously quantifies the total amount of amplifiable autosomal and Y-chromosomal DNA in a single assay using the same DNA standards. Advantages of this system include the following features:

- A long autosomal target is included to assess the degree of DNA degradation.
- The level of resistance to inhibitors matches that of the latest STR systems, so there's no second guessing the DNA sample quality results.
- Laboratories have the flexibility to run a 4-point to 7-point standard curve, depending on laboratory needs.

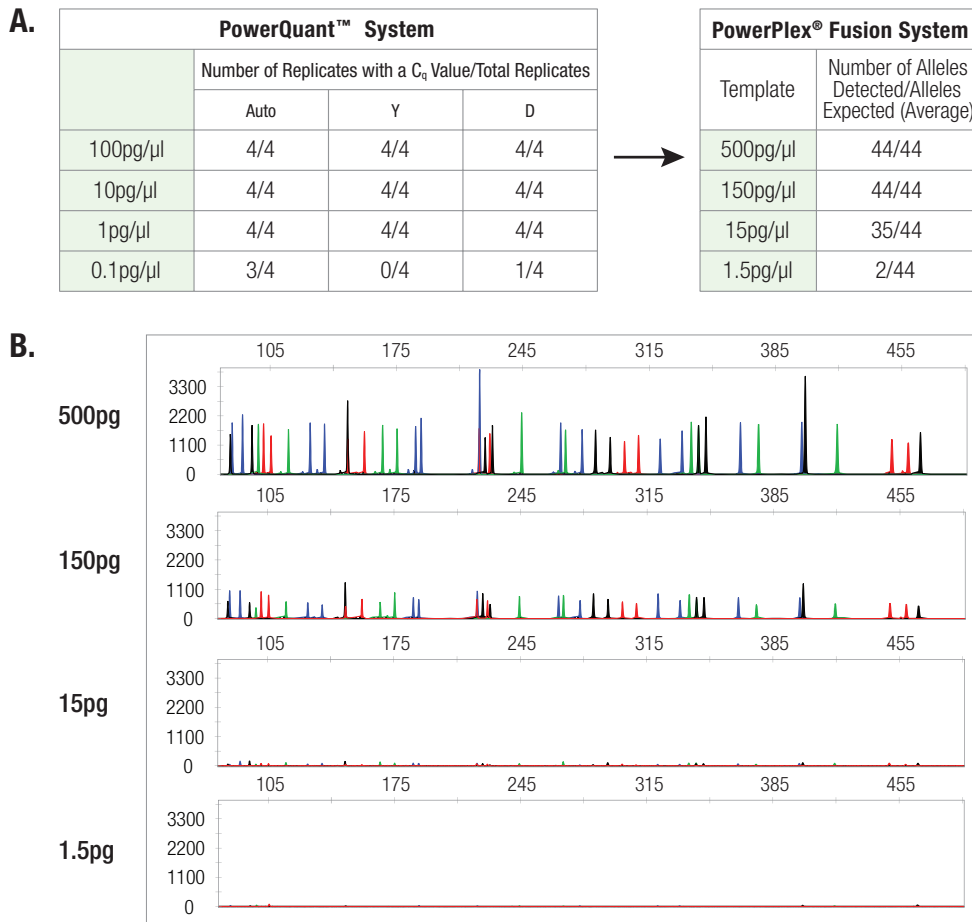
### The Power of More Information

The PowerQuant™ System eliminates guesswork about your DNA sample so that you can make the best decision about what steps to take next. It helps answer questions such as:

- *Is this a single-source or mixture sample?*
- *What volume of DNA should I use in my STR assay?*
- *Is there sufficient human DNA to proceed with STR analysis?*
- *Should I perform Y-STR or autosomal STR analysis?*
- *Is the sample degraded?*
- *Is the sample inhibited? Should I repurify before proceeding?*

## The Power of Sensitivity

The PowerQuant™ System consistently quantifies as little as 6pg of autosomal or Y-chromosomal DNA and detects <1pg/μl of DNA. If you can't detect DNA with the PowerQuant™ System, you can't obtain a usable profile with your STR system. *Zero means zero.* No need to waste valuable time or STR reagents. Trust your precious DNA samples to the PowerQuant™ System, and be confident in your DNA quantification results.



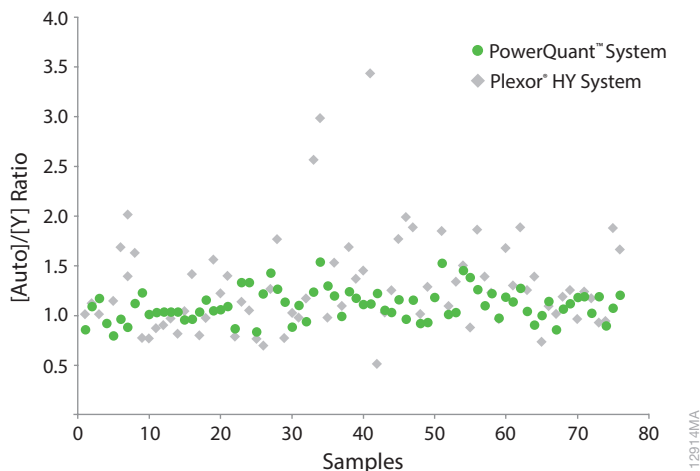
**Figure 1. DNA quantification results are predictive of STR results. Panel A.** A DNA sample was serially diluted to low template concentrations and quantified in quadruplicate using the PowerQuant™ System. Data in the PowerQuant™ System table indicate the number of replicates in which the amplification curve crossed the amplification threshold within 39 cycles divided by the total number of replicates tested. Auto = autosomal target, Y = male target, D = degradation target. These samples also were amplified in quadruplicate using the PowerPlex® Fusion System by adding the maximum input volume (15μl) per 25μl amplification reaction (except a template amount of 500ng was added for the 100pg/μl dilution). Data in the PowerPlex® Fusion System table show the average number of alleles detected in the STR reaction when analyzed using an Applied Biosystems® 3130 Genetic Analyzer and a 50RFU threshold. **Panel B.** Representative PowerPlex® Fusion data obtained with 500pg, 150pg, 15pg and 1.5pg of DNA template. At 1.5pg a few sub-threshold peaks were observed.

Zero Still  
Means Zero.

## The Power of Clarity

Casework samples often contain DNA mixtures from multiple persons. The Y-chromosomal target enables quantification of human male DNA in the sample, helping you evaluate mixtures of male and female DNA. Calculating the [Auto]/[Y] ratio helps you determine whether to proceed with autosomal or Y-STR analysis.

As illustrated in Figure 2, the PowerQuant™ System yields more consistent [Auto]/[Y] ratios than currently available DNA quantification kits, enabling improved decision making.

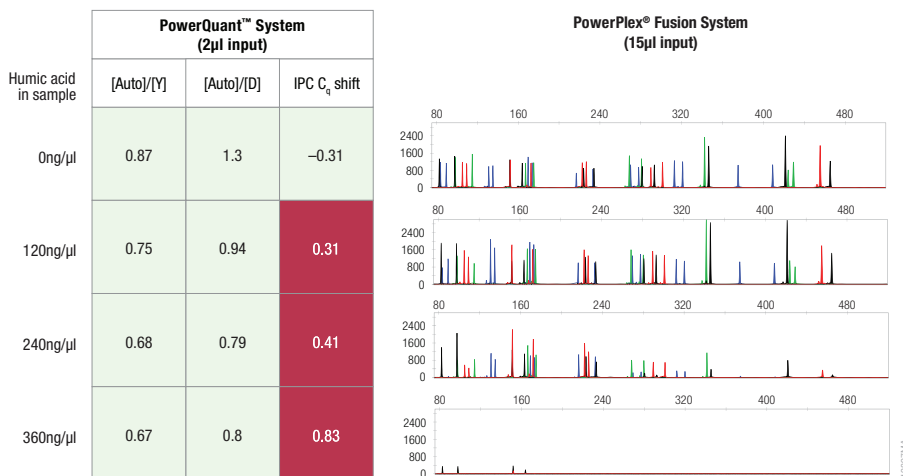


**Figure 2. Comparison of [Auto]/[Y] ratios obtained using the PowerQuant™ and Plexor® HY Systems.** [Auto]/[Y] ratios for 76 single-source male DNA samples, as determined using the Plexor® HY system (gray diamonds) and PowerQuant™ System (green circles), are shown.

## Reliably Detect PCR Inhibitors

The PowerQuant™ System also allows you to make better decisions when faced with a partial or failed STR amplification by differentiating between PCR inhibition and DNA degradation.

Reliable detection of inhibitors that can affect quantification and downstream STR assays is a key feature of the PowerQuant™ System. The Internal PCR Control (IPC) has roughly the same level of sensitivity to inhibitors as downstream STR assays, allowing you to determine if a sample is appropriate for amplification or if additional processing is required.

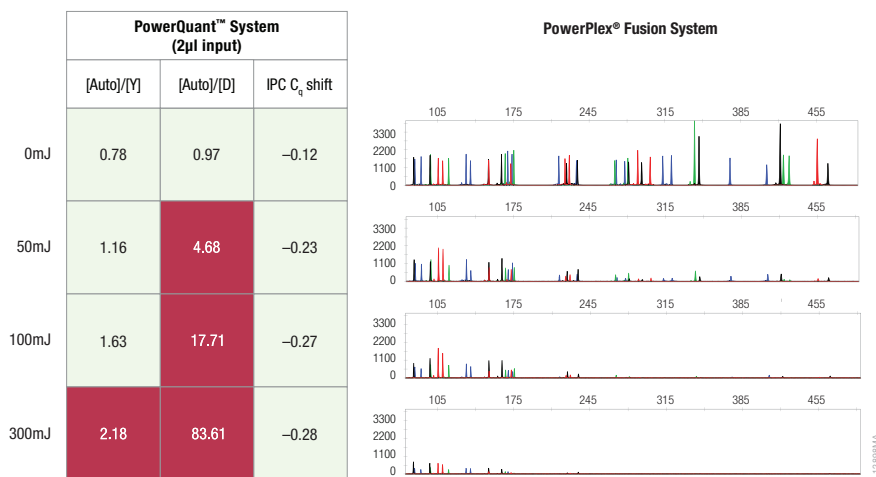


**Figure 3. IPC C<sub>q</sub> shift predicts downstream STR inhibition.** Two microliters of 2800M DNA with 0, 200ng/µl, 400ng/µl and 600ng/µl humic acid (HA) was amplified using the PowerQuant™ System to determine the IPC C<sub>q</sub> shift and [Auto]/[D] ratios. Fifteen microliters of each sample was amplified using the PowerPlex® Fusion System, detected using the Applied Biosystems® 3130x Genetic Analyzer and analyzed using GeneMapper® ID-X software. With increasing concentration of inhibitor in the sample, the shift in IPC C<sub>q</sub> increases and samples concomitantly show an increasingly significant reduction in STR peak heights in the PowerPlex® Fusion System electropherograms. In this example, the [Auto]/[D] ratios are not affected at these HA concentrations. This illustrates that the IPC is more sensitive to inhibitors than the degradation target, enabling distinction between sample inhibition and degradation.

# PowerQuant™ System

## Assess the Integrity of Your DNA Sample

The system amplifies short amplicons that are similar in size to mini-STRs and a long autosomal target. The PowerQuant™ Analysis Tool calculates the ratio of DNA concentrations for the shorter and longer amplicons. This degradation ratio helps you determine if a DNA sample is degraded, rather than inhibited, allowing you to determine the most appropriate downstream processing workflow.



**Figure 4. The [Auto]/[D] ratio distinguishes between DNA degradation and inhibition.** 2800M Control DNA (10ng/µl) was exposed to the indicated levels of UV-C energy to induce DNA degradation and then quantified using the PowerQuant™ System. The DNA was amplified using the PowerPlex® Fusion System. DNA samples with elevated [Auto]/[D] ratios yielded partial STR profiles. This illustrates that the [Auto]/[D] ratio is more sensitive to sample integrity than the IPC, enabling you to distinguish between sample degradation and inhibition.

## Product Information

Each PowerQuant™ System contains sufficient PowerQuant™ 2X Master Mix, PowerQuant™ 20X Primer/Probe/IPC Mix, PowerQuant™ Male gDNA Standard, PowerQuant™ Dilution Buffer and Water, Amplification Grade, for 200 or 800 reactions of 20µl each. Custom kit sizes are available for larger and routine orders. Contact your local Promega representative for more information.

The reagents are optimized for use with the Applied Biosystems 7500 Real-Time PCR System.


## Ordering Information

Product	Size	Concentration	Cat.#
PowerQuant™ System	200 reactions		PQ5002
	800 reactions		PQ5008
PowerQuant™ Calibration Kit	1 each		DS1221
PowerQuant™ Male gDNA Standard	150µl	50ng/µl	DD3021

## The Power to Solve



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