

FEMTO *Pulse*™

Automated Pulsed-Field CE Instrument



Revolutionize Your Nucleic Acid Analysis

The FEMTO *Pulse*™ Automated Pulsed-Field CE Instrument

is breaking all the barriers in nucleic acid analysis as the only automated pulsed-field capillary electrophoresis instrument on the market.

Through an advanced instrument design, large molecular weight DNA fragments can be separated and nucleic acids detected into the femtogram range. Compared to other non-denaturing gel-based analytical instruments, the **FEMTO *Pulse*** easily achieves 10 times higher sensitivity for nucleic acid smears and up to 100 times higher sensitivity for nucleic acid fragments.

Applications for the **FEMTO *Pulse*** include analysis of single cell total RNA or genomic DNA, low quantity NGS library preparations (PCR-free), exosomes, small RNA, cfDNA, FFPE nucleic acid isolates, large DNA fragment libraries, BAC clones, detection of foreign DNA in vaccine preparations, and single or multiple DNA fragments from low concentration samples.

With the rapid changes in genomics discovery, the **FEMTO *Pulse*** is pushing the boundaries of science. What will you discover with a more sensitive instrument?

Pulsed-Field Power for Fast, Large Fragment Separations

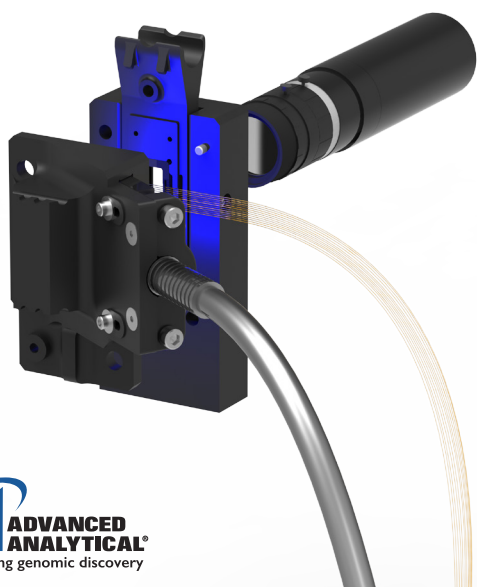
Pulsed-field electrophoresis is a powerful separation method and a proven way to separate large DNA fragments. By using a pulsed-field power supply on the **FEMTO *Pulse***, DNA smears as large as 165,000 bp can be separated in about one hour while DNA fragments as large as 200,000 bp can be separated in under two hours. Separations are directed by many factors such as:

- Alternating the voltage polarity from negative to positive.
- Regulating the oscillation frequency.
- Controlling the timing or ramping of the oscillation frequency.
- Governing the oscillation wave form.

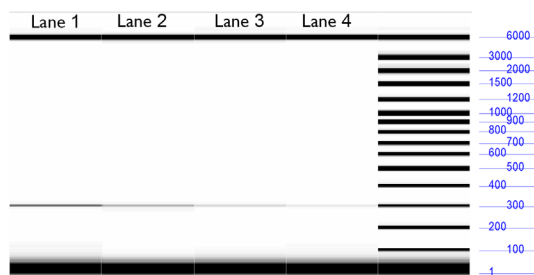
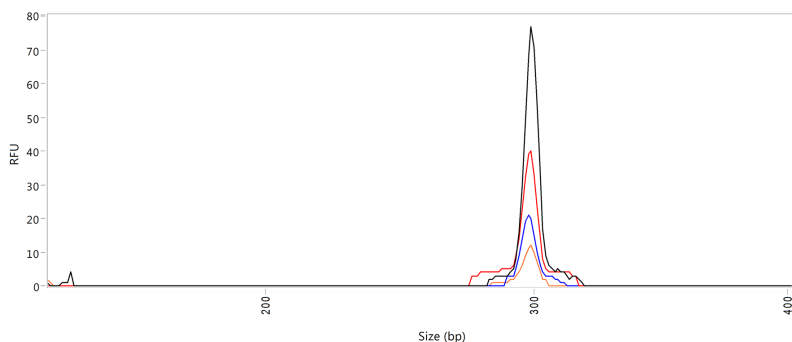
Achieve Boundary Breaking Detection Levels

To achieve the femtogram levels of sensitivity, the entire excitation and detection system on the **FEMTO *Pulse*** was redesigned.

- The power density was increased on the detection window for heightened illumination and excitation.
- New software was developed to measure and record the nucleic acids as they pass the detectors.
- Specialized gel chemistries were created to ensure the lowest possible background noise.

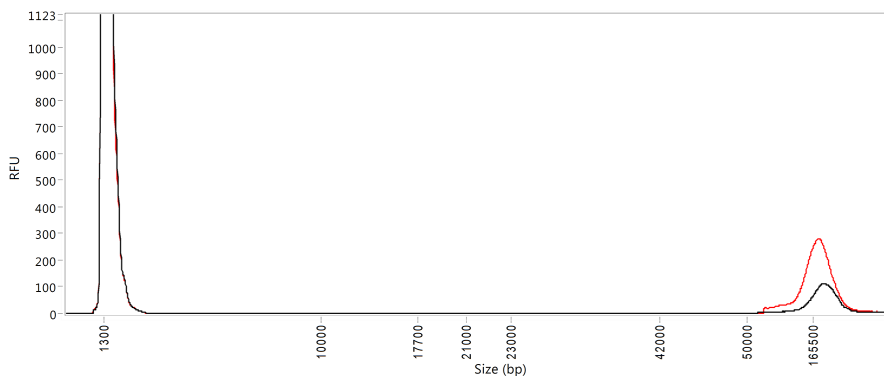


Detect DNA Fragments Down to 5 fg/μL



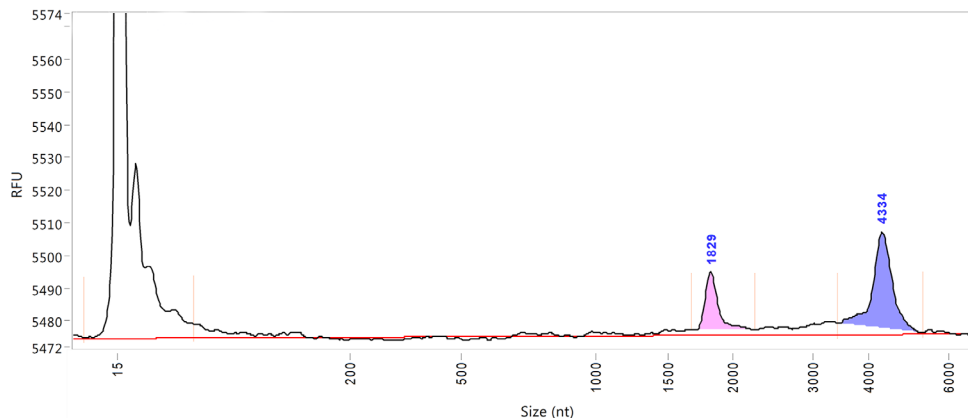
A serial dilution of a 300 bp fragment was electrophoresed under standard conditions, depicted in the accompanying electropherogram and gel image. Final fragment concentrations used for this study are 39 fg/μL (black trace, lane 1), 19.5 fg/μL (red trace, lane 2), 9.7 fg/μL (blue trace, lane 3), 4.8 fg/μL (orange trace, lane 4). In the gel image, the ladder is shown in lane 5. The lowest concentration represents approximately 15,000 molecules of the 300 bp fragment.

Separate and Quantify a Single Cell's Worth of Genomic DNA



In 10 μL of a diluent solution, 16 pg (red) and 8 pg (black) of high molecular weight genomic DNA were diluted and separated using pulsed-field electrophoresis conditions. Final concentrations of each genomic sample used in this study are 1.6 pg/μL (red trace) and 0.8 pg/μL (black trace). The superior sensitivity and resolution of the FEMTO Pulse sized the single cells genomic content to approximately 175,000 bp.

Total RNA Separation From a Single Cell



RNA Property Summary

RNA Concentration (pg/μL)	5.7
28S/18S	2.3
RNA Quality	9.9

Total RNA was extracted from mouse cells and separated under standard conditions for this application. In this example, 2 μL of total RNA at 5 pg/μL was mixed with 18 μL of a diluent marker solution for a final concentration of 500 fg/μL. Under these conditions, this represents approximately a single cell's worth of total RNA. The electropherogram displays high quality RNA without degradation products. A high RQN value was calculated for this sample and shown in the call out box.



Features and Benefits

- **Ultra-High Sensitivity Detection**
Detect nucleic acid fragments and smears into the femtogram level. Analyze the total RNA or genomic DNA from a single cell.
- **Separate High Molecular Weight DNA**
With pulsed-field power accurately size large fragments from BACs and genomic DNA or large fragment library preparations with confidence.
- **Reduce Sample Input Quantity**
With extraordinary detection sensitivity, use less precious sample for QC and retain more for critical data analyses or operations.
- **Separate Samples in Parallel**
Separate 12 samples at the same time, reducing time to results and increasing sample throughput in your lab.
- **Automated Operation**
Use of an award winning instrument design allows samples to run continuously without human intervention, increasing laboratory efficiency.
- **User-Friendly Software**
Intuitive data analysis software includes functions to calculate smear ranges, fragment flagging, customized report generation, and batch data processing.

Specifications

Max. Sample Throughput: 12 samples per run

Max. Unattended Sample Capacity: 288 samples

Minimum Sample Volume: 20 µL of liquid for injection

Resolution: Gel dependent

Sizing Accuracy: Typically 5% or better

Detection Sensitivity: As low as 5 fg/µL for fragments and 200 fg/µL for a smear (in well concentration)

Light Source: 2 x 700 mA, 10 W LED, 470 nm excitation wavelength

Detector: High sensitivity CCD; 500-600 nm emission wavelength

Software: FEMTO Pulse Operational Software, PROSize® Data Analysis Software

Data Export Format: CSV, PDF, flexible numerical or binary output options

Environmental Conditions: Indoor use, normal laboratory environment 20-23°C

Relative Humidity Range: < 80% (non-condensing)

Electrical: 100-200 VAC; 50-60 Hz; 15 A (alternate configurations available)

Instrument Dimensions: Fully configured 61 cm H x 38 cm W x 51 cm D (24 x 14 x 20 in)

Instrument Weight: 40 Kg (88 lbs)



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