Agilent

Trusted Answers

Fast Separation. Ultra Sensitivity. One Instrument.

Agilent Femto Pulse System


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HV ON
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Small Bottles

Assess High Molecular Weight and Low Quantity Nucleic Acids

The advanced design of the Agilent Femto Pulse system provides researchers with a platform to separate high molecular weight (HMW) DNA fragments and detect nucleic acids into the femtogram range from low concentration samples. By using a pulsed-field power supply, the Femto Pulse system can separate DNA smears and fragments as large as 165,000 bp in about 1.5 hours, which is 10x faster than pulsed-field gel electrophoresis (PFGE). Ultra sensitivity kits allow for unparalleled DNA fragment detection as low as 50 fg/µL input concentration. The Femto Pulse system allows you to eliminate PFGE from long-read NGS library preparation, size bacterial artificial chromosomes (BACs), and conserve precious sample with one instrument.

Applications for the Femto Pulse system include analysis of:

- HMW genomic DNA
- Large DNA fragment libraries
- BAC clones
- Single cell genomic DNA and total RNA
- Low concentration NGS library preparation
- Cell-free DNA (cfDNA)
- FFPE nucleic acid isolates
- Single or multiple DNA fragments

Streamline Complex Workflows

The Femto Pulse system helps you streamline complex workflows without compromising data quality. From shaving days off long-read NGS library preparation to conserving precious sample, this system offers you numerous benefits for complex workflows and challenging samples.

Fast separation of high molecular weight samples

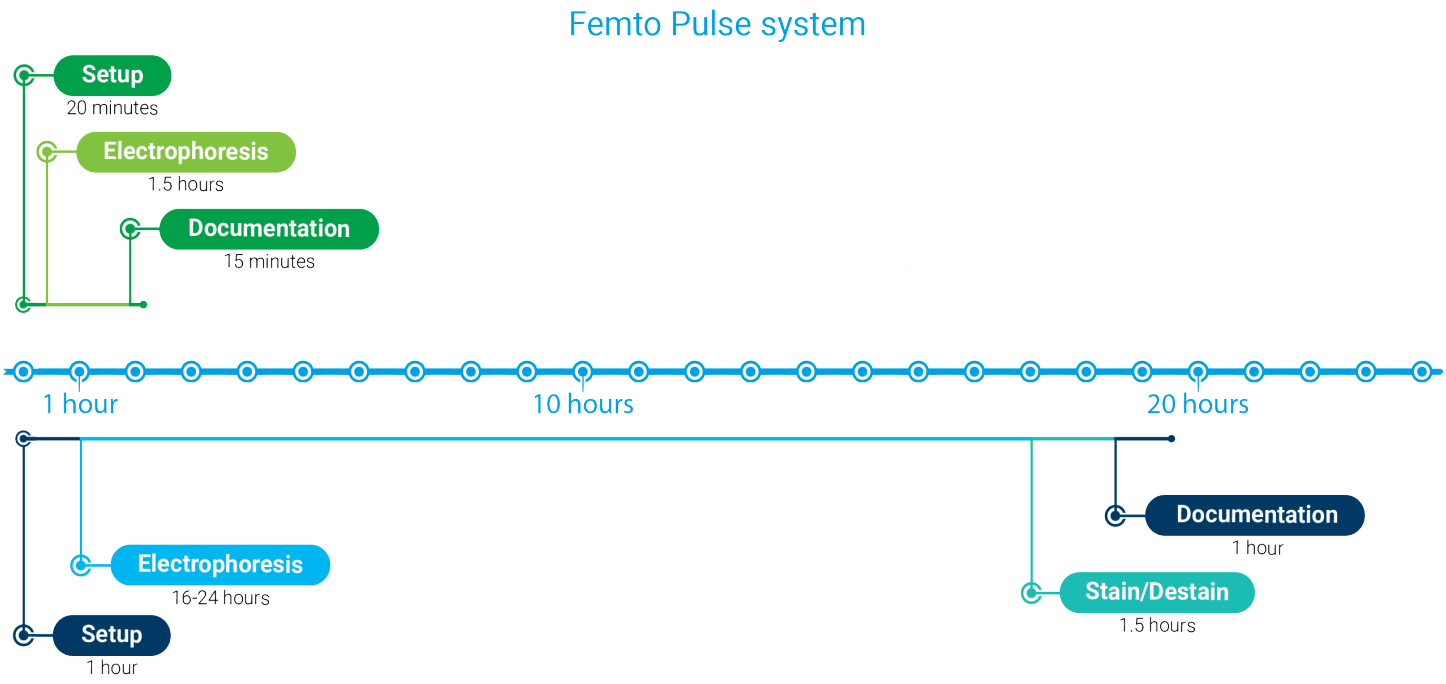
- Accurate sizing of DNA smears and fragments up to 165 kb
- Complete separations of high molecular weight samples in about 1.5 hours
- Eliminate pulsed-field gel electrophoresis from long-read NGS library preparation and BAC analysis

Conserve samples with femtogram level sensitivity

- DNA fragment input concentrations as low as 50 fg/µL
- Save rare or limited samples for critical downstream analyses
- A single dilution of sample is all that is needed before running on the system

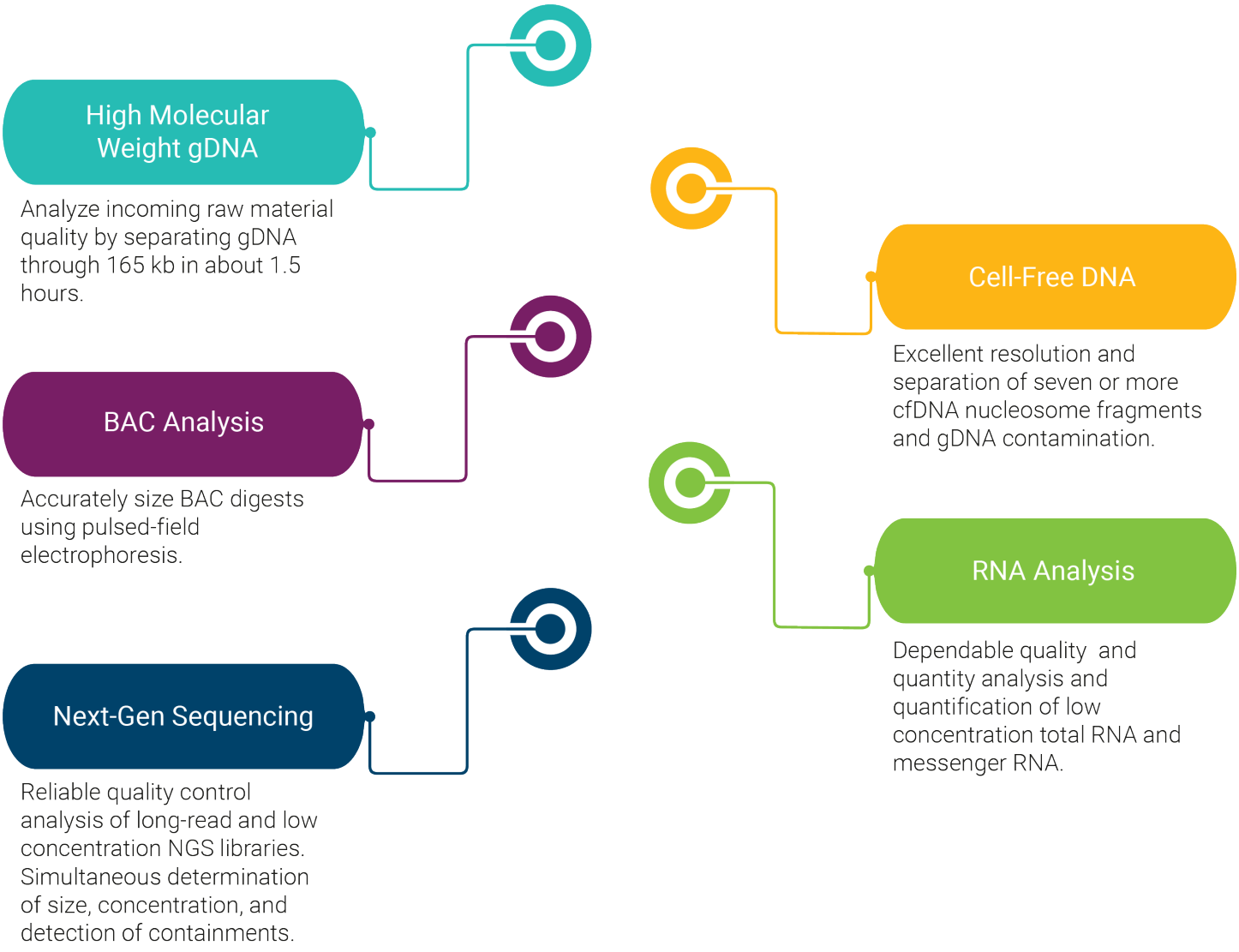
Results in a fraction of the time

In just around two hours, the Femto Pulse can provide results that used to take over 20 hours to achieve.



Solutions for Challenging Samples

The Femto Pulse system uses quantitative and qualitative kits to assess challenging DNA and RNA samples in a wide range of applications. These kits enable the analysis of high molecular weight genomic DNA, BACs, RNA, and low concentration nucleic acid samples. With markers and calibrated ladders, these kits enable the accurate sizing and quantification of DNA and RNA samples.



Assess Challenging Nucleic Acid Samples with the Femto Pulse System

When you are working with precious samples, running QC can be challenging. Traditional methods require a large portion of sample, significantly reducing the amount available for downstream applications. The Femto Pulse system allows you to use as little as 50 fg/ul input concentration of a DNA fragment, conserving your precious samples.

Diverse kit offerings allow the Femto Pulse system to assess various challenging samples.

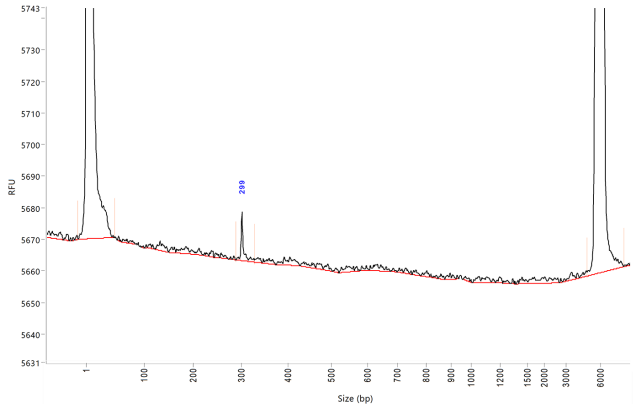


Figure 1. 300 bp fragment diluted down to 60 pg/µL was analyzed using the Ultra Sensitivity NGS kit (p/n FP-1101). The fragment is clearly defined above the baseline demonstrating the ultra sensitivity capabilities of the Femto Pulse system.

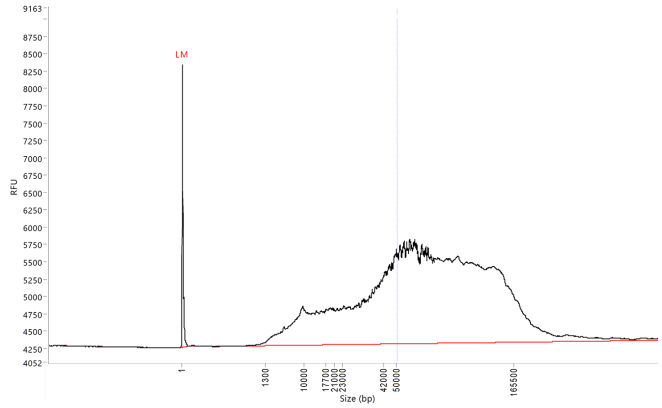


Figure 2. High molecular weight gDNA extraction was separated using the Genomic DNA 165 kb kit (p/n FP-1004) (Extended Pulsed-Field Method) demonstrating the Femto Pulse system's ability to provide superior sizing and quantification of HMW smears.

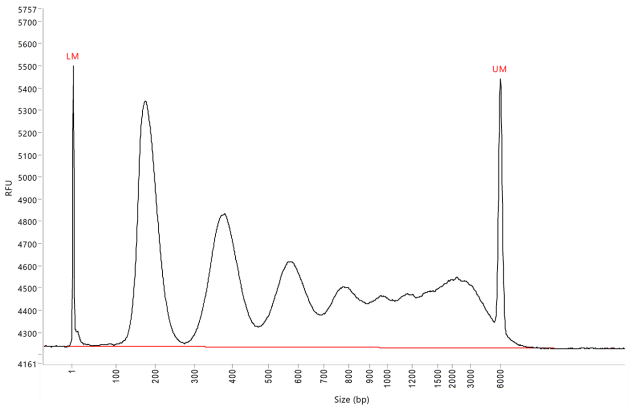


Figure 3. Extracted cfDNA was analyzed using the Ultra Sensitivity NGS kit (p/n FP-1101) at an input concentration of 250 pg/µL. The ultra sensitivity and resolution of the Femto Pulse system allows detection beyond the three major cfDNA nucleosomes along with contaminating gDNA.

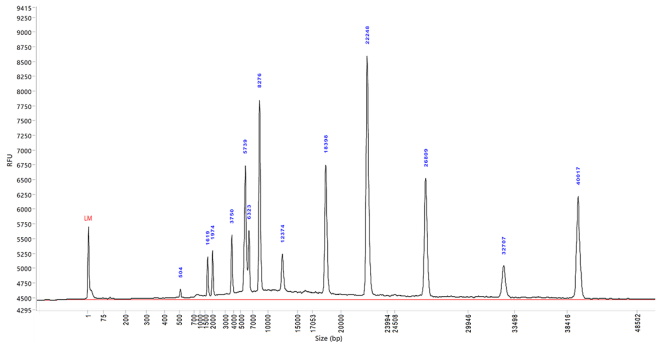


Figure 4. A restriction digest was analyzed on the 55 kb BAC kit (p/n FP-1003). This pulsed-field method increases resolution and peak sharpness allowing accurate sizing and quantification of higher molecular weight fragments.

Features of the Femto Pulse System

Understanding the challenges researchers face with precious samples, the Femto Pulse system was built on the Fragment Analyzer system platform and given features to address those challenges. The addition of a pulsed-field power supply, flexibility in run programming, and the automation of key steps combine to help you analyze low-concentration, high molecular weight nucleic acids faster.

Powerful separation

Pulsed-field capillary electrophoresis allows the separation of DNA through 165 kb.

Flexible throughput automation

Load and program the separation of up to 288 nucleic acid samples for unattended analysis.

Versatile sample analysis

Use up to two gel types to automate the separation of different sample types without user intervention.

The Power Behind the Femto Pulse System

Pulsed-field electrophoresis is a powerful separation method and a proven way to separate large DNA fragments. By using a pulsed-field power supply and a redesigned detection system, DNA smears as large as 165,000 bp can be separated in about 1.5 hours.

Pulsed-field power for fast, large fragment separations

Separations are achieved by:

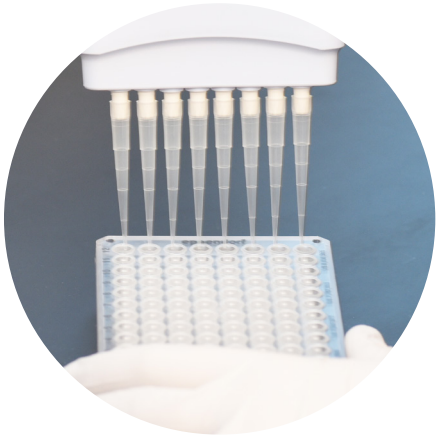
- Alternating the voltage polarity from negative to positive
- Regulating the oscillation frequency
- Controlling the timing or ramping of the oscillation frequency
- Governing the oscillation wave form

Enhanced detection levels:

- The power density has been 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 detector
- Specialized gel chemistries were created to ensure the lowest possible background noise

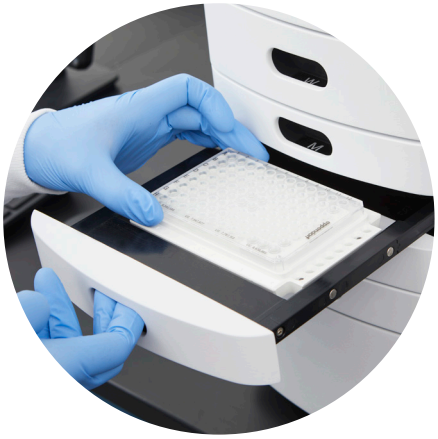
Simple Preparation, Intuitive Operation

The Femto Pulse system excels where legacy agarose PFGE fails. The simple sample preparation, ease-of-use, and fast separation times improve your efficiency on all fronts. You will experience decreased sample requirements and faster separations of high molecular weight DNA samples.



Step 1: Prepare instrument

Load gel and conditioning solution, change inlet buffer, and empty waste draw/bottle.

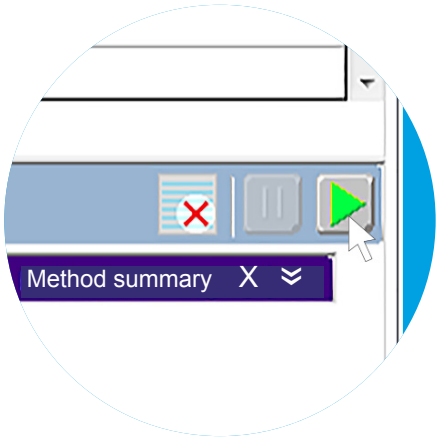


Step 2: Load sample

Load your runs with just a single dilution and 2 µL of sample per well.

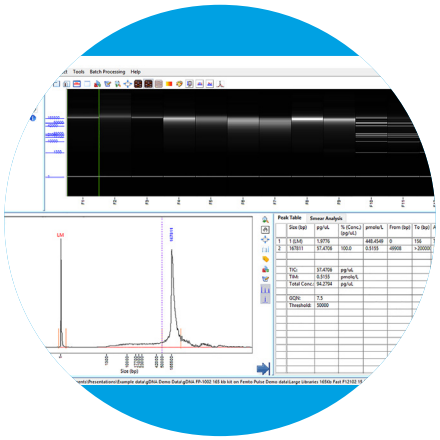
Step 3: Choose method

Select your method from the dropdown menu and enter any notes for the run.



Step 4: Start runs

Queue up to 288 samples and walk away.



Step 5: Analyze results

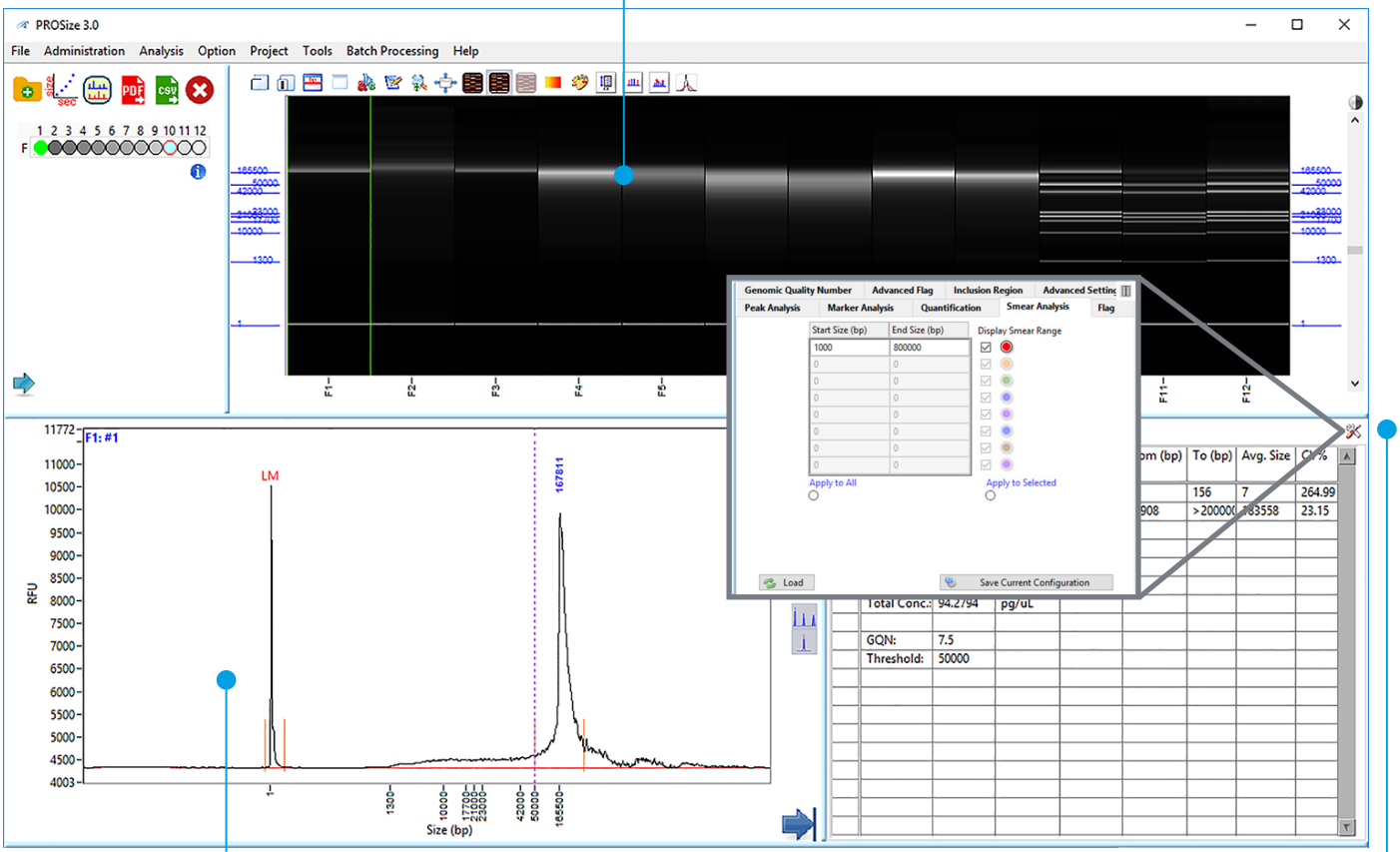
Process separation data with ProSize data analysis software.

All-In-One Analysis with Powerful Software

Femtogram level sensitivity and the capacity for high molecular weight DNA separations need to be supported with intuitive software that can capture the data and analyze the results. ProSize data analysis software is a robust, validated software package that simplifies the identification and analysis of nucleic acid fragments and offers you three ways to visualize separation data: a digital gel image, electropherogram, and a data table. Designed with researchers in mind, ProSize software automatically calculates fragment size and quantification, and reduces subjective assessment for certain DNA and RNA samples with custom quality metrics.

Digital gel image

Data represented as an interactive digital gel image with tools for basic adjustments.

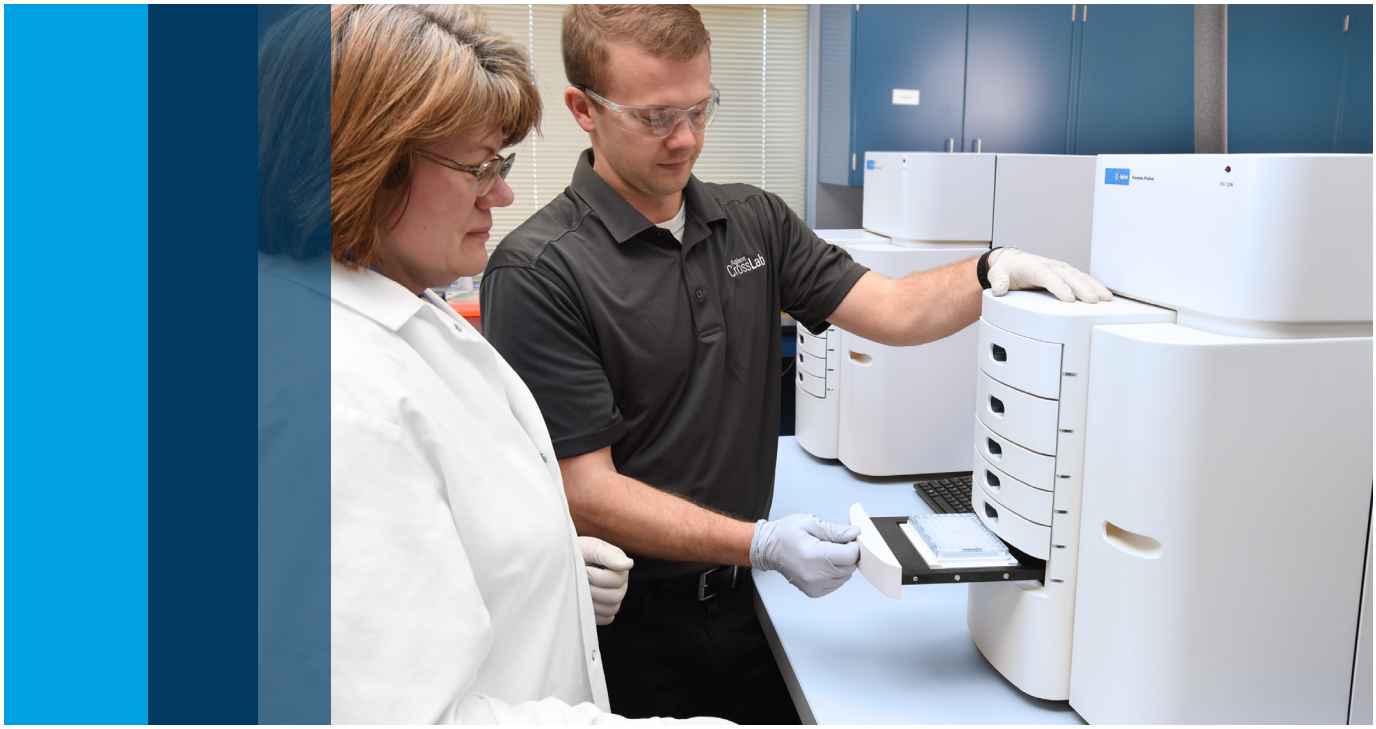


Electropherogram

Data represented as an interactive electropherogram with tools for basic adjustments.

Individual parameter

Set specific parameters to customize sample analysis, aid in evaluating challenging samples, and expedite quality control decisions.



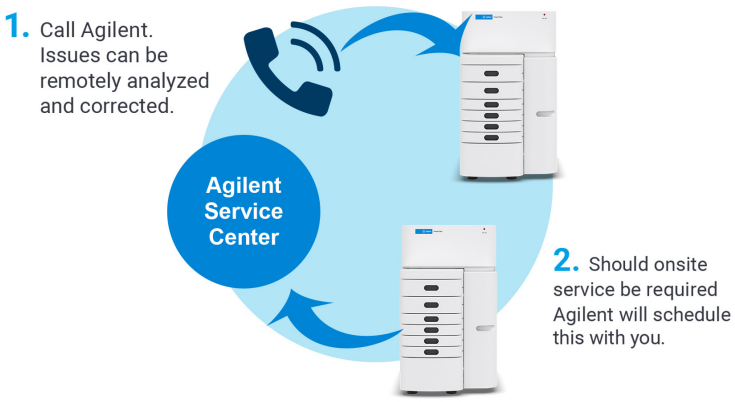
Support Services for the Femto Pulse System

Get peace of mind through comprehensive instrument and assay familiarization

Agilent offers an onsite startup service to familiarize you with the instrument and software, as well as an assay of your choice. You can also choose from additional service options to suit your lab's specific service-level needs.

Additional support services

A one-year standard warranty is included with all Femto Pulse systems. This warranty may be upgraded to CrossLab Silver level and extended to cover up to five years total warranty time. This premium service includes travel, labor, parts, onsite repair, and an annual system preventative maintenance service.



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