

Microlab[®] NIMBUS Select

Featuring Ranger Technology

Electrophoresis System for NGS and other Genomics Applications

Automated Size Selection & Analytics



2014 New Product Award Recipient

Society for Laboratory Automation & Screening

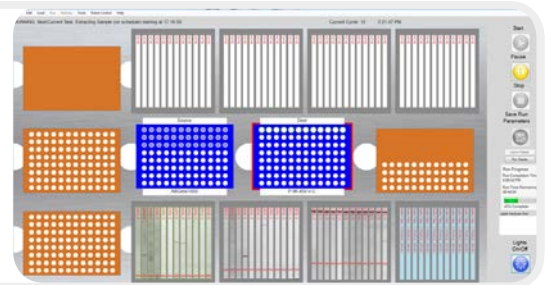

COASTAL
GENOMICS
HAMILTON 

A New Tool for NGS and Gene Synthesis

Coastal Genomics has partnered with Hamilton Robotics to port Ranger Technology for gel based electrophoresis and size selection to the Nimbus Select workstation. This solution enables accurate, high yield recovery of up to 96 DNA samples in a 2 hour run. Electropherogram characterizations of the input sample, as well as the size selected sample, are also generated by the workstation. For groups interested in analytics, the Nimbus Select can produce high resolution electropherograms for up to 192 samples in a run.

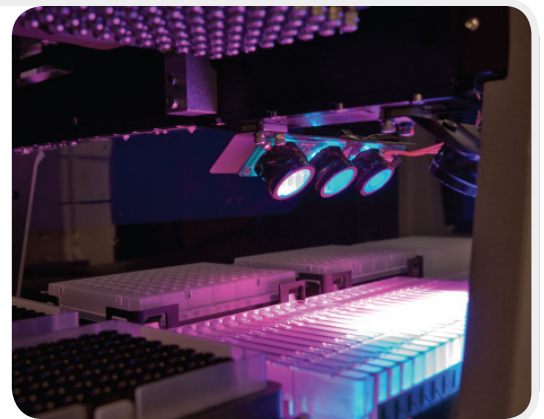
Prepare Run

1. Open cassettes, dye mix plate and load them along with DNA sample plate, tips, destination plate on to workstation
2. Identify number of samples to process and indicate target fragment lengths for recovery via Ranger Software or .csv file upload



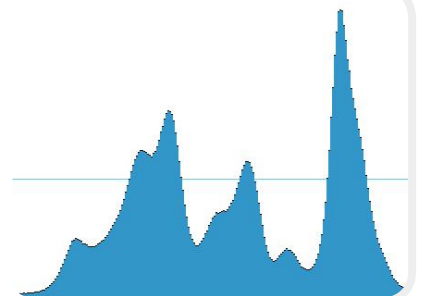
Automated Ranger Processing

1. Workstation dispenses DNA and dye mix into loading well of isolated cassette channels
2. Spike-in sizing references are identified every time with patent-pending Dual Dye technology
3. Interpolation between sizing references enables industry-leading accuracy of fragment length estimation
4. Target fragments are reformatted from cassette extraction well to destination plate



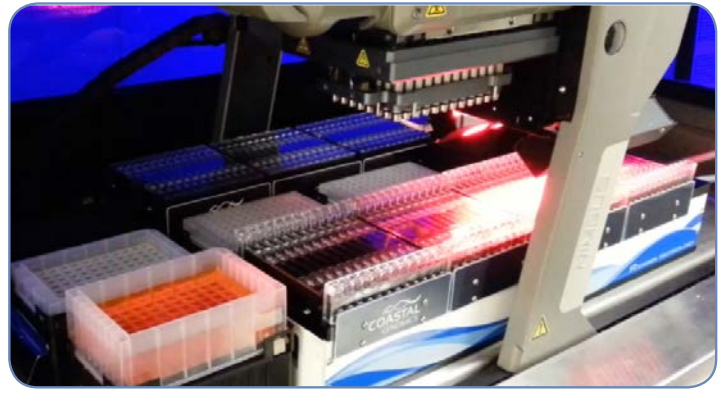
High Quality Output and QC Data

1. Hole-to-hole size selection prevents losses associated with beads, filters or gel dissolution methods
2. Dual Dye technology secures minimal inter-sample variance in accuracy
3. Real-time analysis of electrophoresis flags low-input samples
4. Electrophoresis time lapse images and traces are generated for review

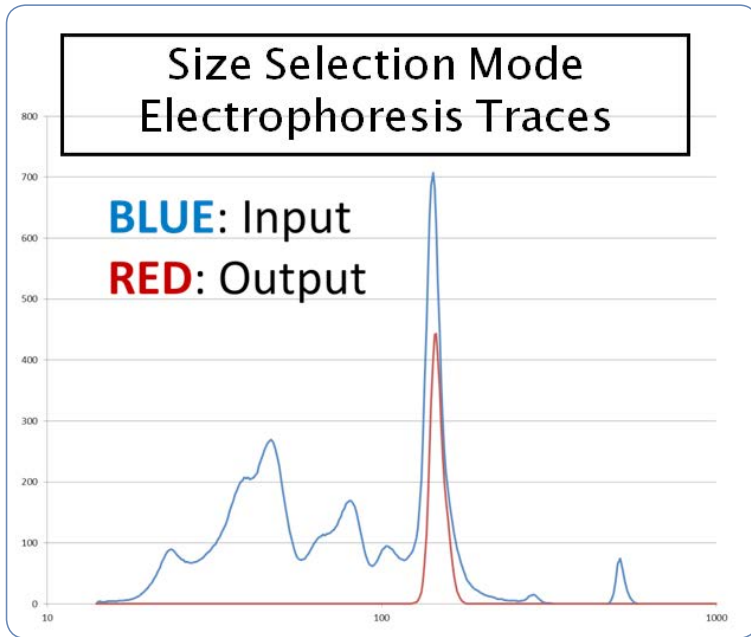
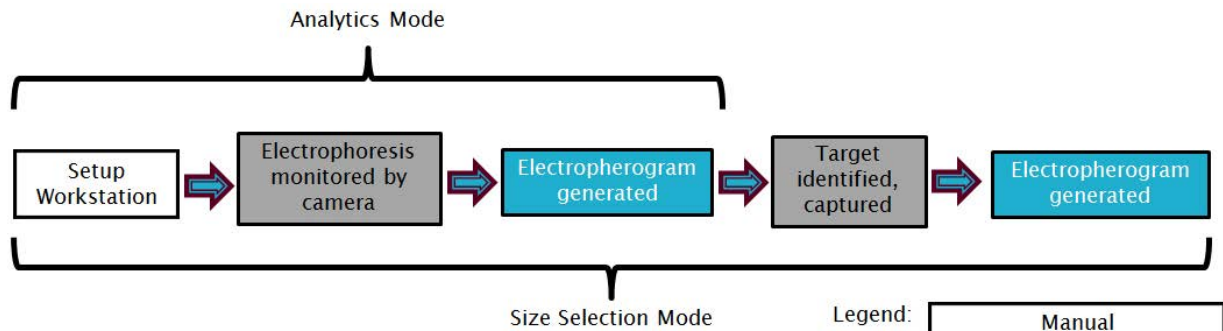


Workstation

The Nimbus Select is a 96 channel liquid handling workstation that has been retrofitted with Ranger Technology. A gantry-mounted camera captures images of DNA, which is illuminated by a lighting stage with non-UV wavelengths. Electrophoresis is driven by modular pedestals that apply voltage to each sample-loaded agarose cassettes.



Size Selection and Analytics Functionality



Two functionalities are available on the Nimbus Select. Size Selection Mode extracts a target from an input sample, and produces electrophoretic traces of both the input sample and the extracted output. In Analytics Mode, the workstation automates the setup of the assay plate, loads the sample into the agarose cassettes and electrophoreses the sample. A single trace is developed and can be used for quality control purposes.

Ranger Technology	Analytics Mode	Size Selection Mode
Maximum Capacity	192 Samples	96 Samples
Average Run Time	45 Minutes	2 Hours
Functional Range	10 bp - 30 kbp	100 bp - 20 kbp



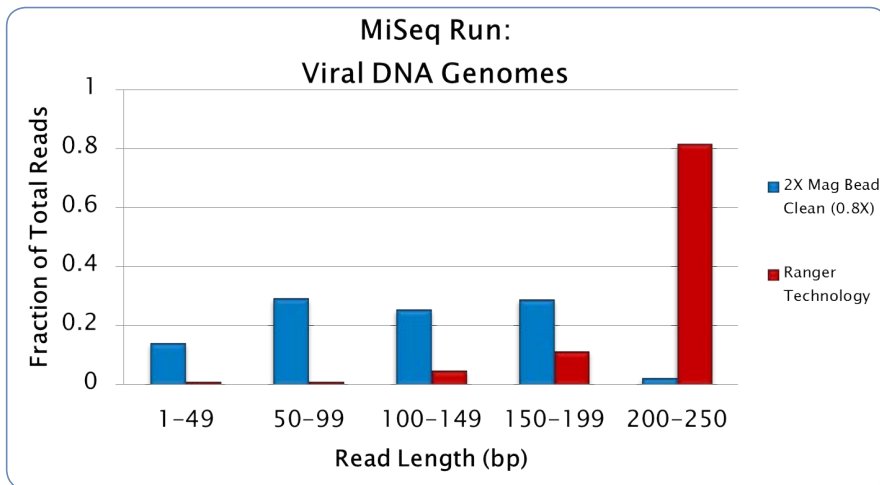
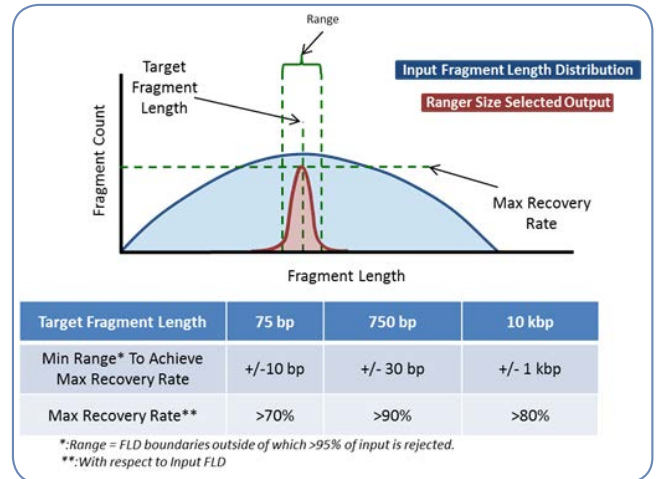
Technology Impact

Next Generation Sequencing

NGS groups can now fully automate agarose gel size selection with control over the target fragment lengths on a per-sample basis with the Nimbus Select. This solution can recover tightly-defined DNA fragment lengths while achieving high recovery yields. Sample preparation with the Nimbus Select rejects off-target fragment lengths and improves both read alignment and cluster generation to boost the value of sequencing pipelines.

Benefits

- ▶ Elimination of closely-sized primers, adapters
- ▶ Consolidation of electrophoretic analyses and size selection into one process
- ▶ Improved normalization for sequencing



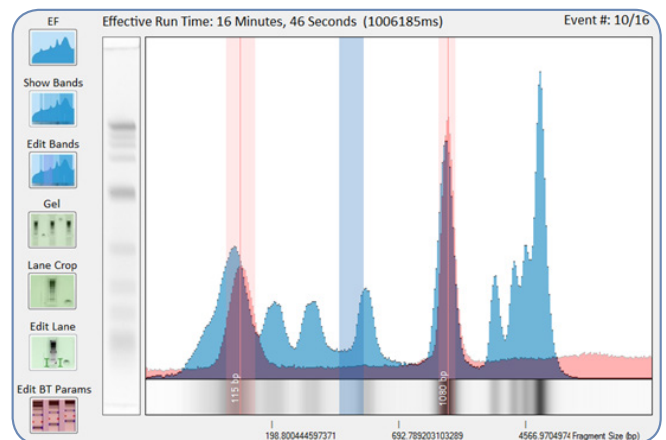
Reliable elimination of short fragments ensures more sequence reads are full-length in nature. Analysis of six samples prepared with both the prescribed magnetic bead based size exclusion and the Nimbus Select revealed that the percentage of 200-250 bp reads from an Illumina MiSeq was considerably improved with the Nimbus Select. The increased fraction of long reads resulted in sequence outputs that were >50% higher.

DNA Fragment Length Analysis

Quality control of DNA relies on electropherogram analysis of fragment lengths. The Nimbus Select is able to load samples, analyze DNA and export data for review. A broad range of sample types including PCR constructs, libraries, oligonucleotides and restriction digests can be rapidly processed.

Benefits

- ▶ High throughput – 192 sample capacity
- ▶ Low cost consumables
- ▶ Flexible solution for a wide range of input sizes and resolution requirements

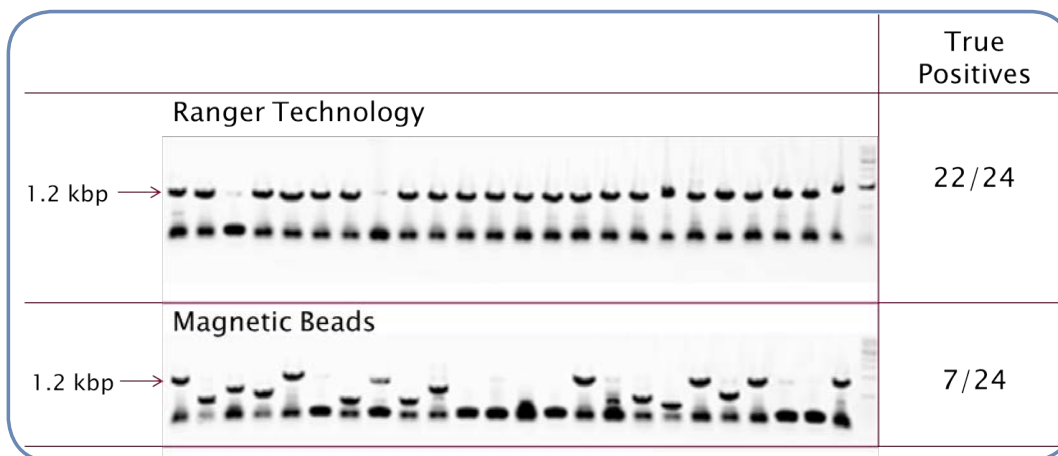
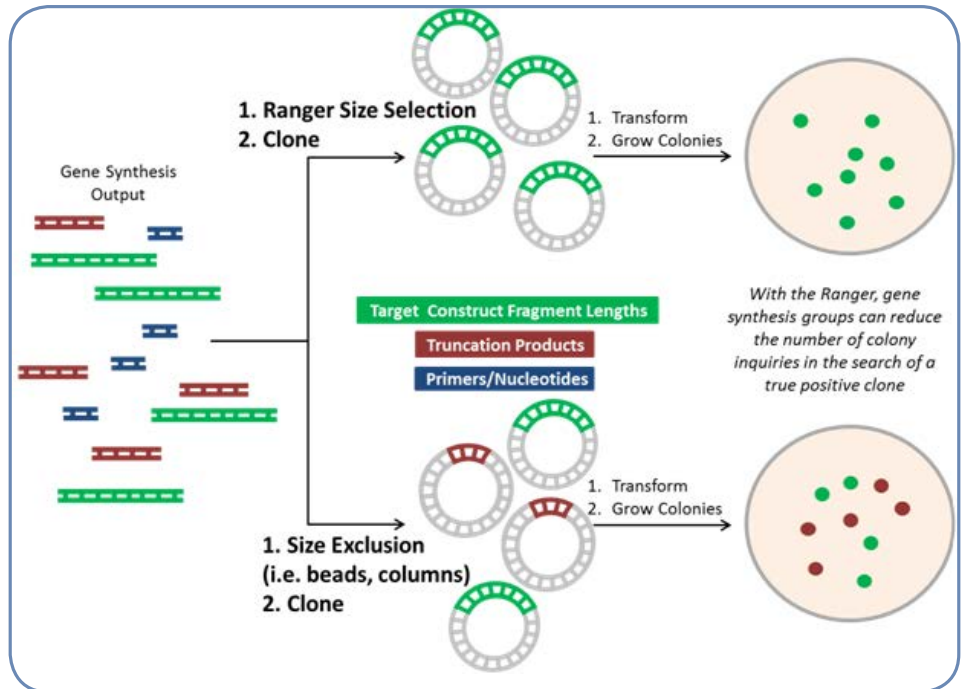


Cloning & Gene Synthesis

The Nimbus Select with Ranger Technology is ready to transform sample preparation for DNA cloning. The workstation efficiently rejects gene synthesis constructs truncated by even a single 100 bp oligonucleotide block.

Benefits

- ▶ Remove off-target products
- ▶ Automated flagging of low-input targets
- ▶ Analytics exported in LIMS-compatible formats



The gel image to the left illustrates two sets of 24 colony PCR reactions. Use of the Nimbus Select with Ranger Technology ensured the desired 1.2 kbp construct was cloned at a frequency that led to 22 of 24 queried colonies returning true positive results. Truncation products of the gene synthesis reaction were not

efficiently removed with the standard magnetic bead based size exclusion method, leading to only 7 of the 24 colonies being found to have the desired 1.2 kbp construct size.

Applications

Fragment length distribution analysis

Cloning

miRNA-SEQ, RNA-SEQ, DNA-SEQ, CHIP-SEQ

Kits Coming Soon:

Protein kits

RNA kits

Genotyping analytics kit (384 capacity)

Specifications

System:

Reagents:

Reagents	Agarose Gel Cassettes*: 0.5%, 1.0%, 1.5%, 2.0%, 3.0% Dual Dye Loading Mix*: Ladder 1 Ladder 2 Ladder 3 *: Contact Coastal Genomics for details on ladders and cassette resolution/accuracy
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Workstation:

96 Channel Liquid Handling Manifold	Range 1 μ L - 1000 μ L
Power	Input: 100-250 VAC, 50-60 Hz, 5A
Physical	Length: 41.0 in (104.1 cm) Width: 28.0 in (71.1 cm) Height: 34.5 in (87.6 cm) Weight: 223 lbs (101.2 kg)

Ranger Control Computer:

Computer Input	Input: 100-250 VAC, 50-60 Hz, 5A
Monitor Input	100-240 VAC, 50-60Hz, 1.6A

Ranger Imaging Hardware:

Camera Resolution	1280 x 960 pixels
Lighting Power Rating	8 Watts per color channel

System Includes:

Nimbus 96 Workstation	
Ranger Control Computer	
Coastal Genomics' Ranger Software	Hamilton Robotics' Microlab INSTINCT software
Hardware Package	1 Electrophoresis Pedestal Ranger Tech Illumination and Imaging Assemblies

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HAMILTON 

Web: www.hamiltonrobotics.com

USA: 800-648-5950

Email: infoservice@hamiltonrobotics.com

United States
Tel: +1-775-858-3000

United Kingdom & Ireland
Tel: +44 (0)121-717-0199

Brazil
Tel: +55 (11) 2364-1694

China
Tel: +86-21-6164-6567

France
Tel: +33 (01) 69751616

Italy
Tel: +39-39-689-33-93

**Denmark, Norway,
Sweden, Finland**
Tel: +45-70-26-4499

**Germany, Switzerland,
Austria, Benelux**
Tel: +49 (089) 552649-0

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