

# Simplifying Next Generation Sequencing Workflows

## **SPRIworks Fragment Library System I** Fully Automated Fragment Library System for the Illumina Genome Analyzer

The emergence of second generation sequencing technologies from Roche/454\*, Illumina\* and Life Technologies\* has enabled scientists to generate vastly increased data sets from their sequencing experiments. The increase in throughput, however, is supported by workflows that are relatively complicated and labor intensive, requiring skilled labor and significant hands-on time to prepare samples for each instrument. Beckman Coulter has created a simplified automated workflow that utilizes Solid Phase Reversible Immobilization (SPRI) paramagnetic bead-based technology to create an automated system for fragment library preparation for the Illumina Genome Analyzer.

### **SPRIworks Fragment Library System I**

The SPRIworks Fragment Library System I has three components (Figure 1); The SPRI-TE Nucleic Acid Extractor, a method card that controls liquid handling, and a cartridge containing all the reagents required to prepare a single library. The SPRIworks System I has a bench-top footprint and can process up to 10 samples in parallel. With less than 5 minutes of hands on time the SPRIworks system can prepare up to 10 libraries for the Illumina Genome Analyzer in 5 hours.

### **Key Features:**

- Easy to use bench-top liquid handling system
- Reagents pre-dispensed in a disposable cartridge
- Automated purification of fragmented or sheared DNA
- Optimized size selection chemistry – no more gels or columns
- Process up to 10 samples in parallel per system in 5 hours
- Reproducible and consistent library output
- Libraries compatible with:
  - PCR<sup>†</sup>-free workflow
  - Regular fragment or paired end adaptors
- Reduced sequencing cost/sample
- Improved sequencing service turnaround time

**Genomics**  
Proteomics  
Cell Analysis  
Particle Characterization  
Centrifugation  
Lab Automation  
Bioseparation  
Lab Tools

### **SPRI-TE Nucleic Acid Extractor**



### **Method Card**



### **Cartridge**

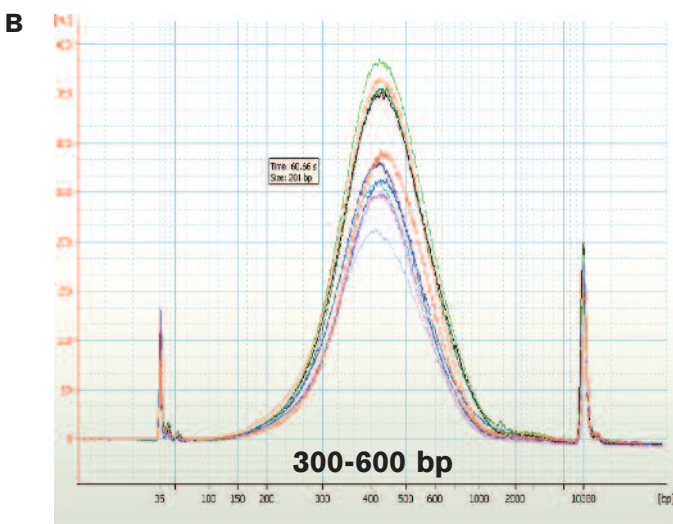
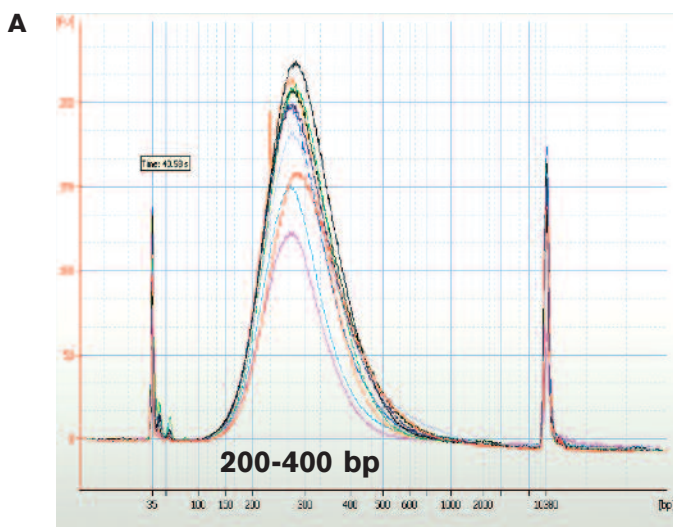


**Figure 1.** The SPRIworks Fragment Library System I has three components; The SPRI-TE Nucleic Acid Extractor, a method card that controls liquid handling, and a cartridge containing all the reagents required to prepare a single library.

## Built in SPRI Size Selection Chemistry and Cleanup

The SPRI chemistry has been optimized to purify fragmented DNA and size select the prepared library. Two different size ranges are available, as well as no size selection for processing amplicons. This feature replaces the need for gel purification and column based cleanup.

- 1- Short Fragments 200-400 bp
- 2- Long Fragments 300-600 bp
- 3- No Size Selection



**Figure 2.** Size selection range for short (A) and long (B) fragment sizes (Agilent high sensitivity DNA chip).

## Consistent and Reproducible Fragment Size Selection and Sequencing Performance

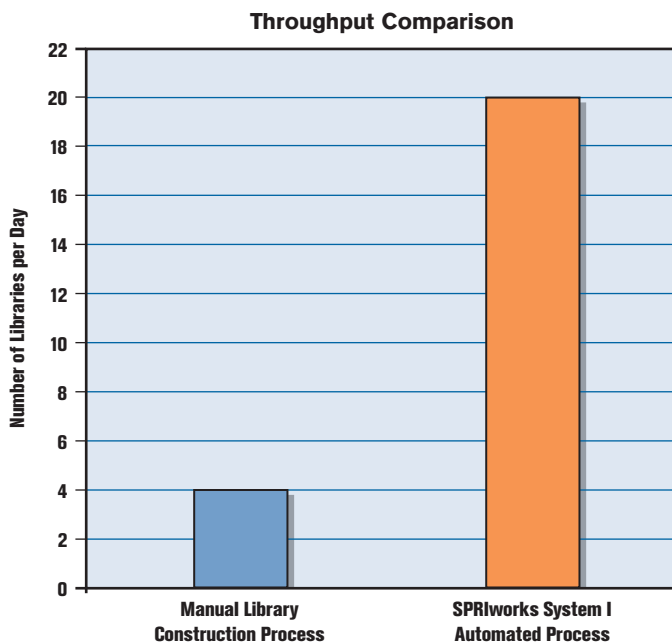
Data shown in Figure 2 is representative of the libraries created from sheared *E.coli* DNA. The libraries were then sequenced on the Illumina Genome Analyzer. Sequencing output and data quality metrics are shown in Table 1.

## Maximizing Sequencing Workflow

On average, it would take a highly qualified scientist one day to prepare up to four libraries manually. The SPRIworks System I enables the user to prepare up to 20 libraries in a working day, a significant increase in throughput with a corresponding decrease in labor (Figure 3).

Sample Name	Read Length	Total Sequence	Sequence Mapped	Unique Mapped	Reads per Startpoint (avg)
SPRIworks-short size selection	36	17,162,237	13,988,940	12,491,985	2.09
SPRIworks-short size selection	36	15,762,523	13,068,205	11,844,183	2.02
Control: PhiX	36	25,040,301	22,092,804	20,283,538	1894.06
SPRIworks-long size selection	51	29,019,872	21,120,729	17,558,880	2.78
SPRIworks-long size selection	51	28,273,819	21,431,987	18,237,102	2.82
Control PhiX	51	14,963,699	14,070,370	13,674,331	1276.66

**Table 1.** SPRIworks libraries sequencing data generated on Illumina GAI.

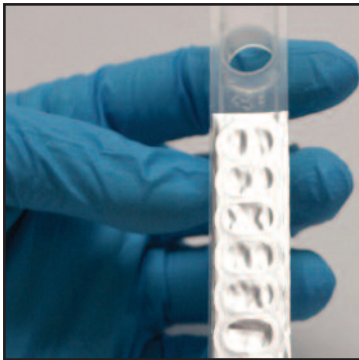


**Figure 3.** SPRIworks Fragment Library System I throughput vs. manual library construction process for Illumina Genome Analyzer (one day process).

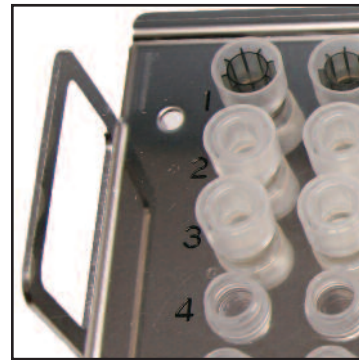
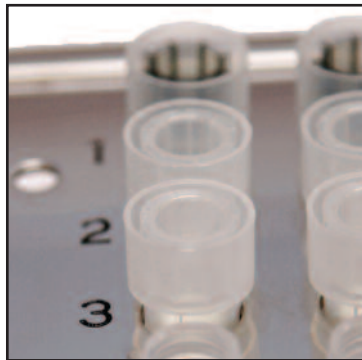
## Four Simple and Easy Basic Setup Steps

The setup process to prepare up to 10 libraries takes less than 5 minutes. The SPRIworks end-user provides input DNA and adaptors. All other reagents and consumables are included in the SPRIworks Fragment Library Kit I.

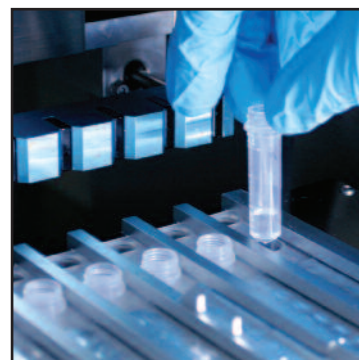
### 1 – Load SPRIworks Fragment Library Kit I Cartridge into the Rack



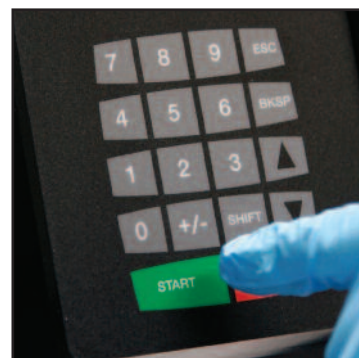
### 2 – Transfer Input Sample: Sheared DNA, cDNA or Amplicons



### 3 – Load SPRI-TE with Cartridges, Input Samples, Adaptors and Labware



### 4 – Insert Method Card and Press START



## SPRIworks Fragment Library System I (For Illumina Genome Analyzer)



### Ordering Information

In the United States and Canada call **+1 800 526 3821**

#### Product

**SPRIworks Fragment Library System I** (For Illumina Genome Analyzer)

**Product #**

A88267

Includes:

#### SPRI-TE instrument

#### SPRIworks Accessories Kit

- Utility Card
- SPRI-TE Operator Manual CD
- SPRI-TE Step Feeler Gauge
- 1 mL Piercing Tips and Sheaths
- 200 µL Piercing Tips and Sheaths
- Elution Tubes
- Empty Reagent Cartridges
- SPRI-TE Operator Manual

#### SPRIworks Fragment Library Kit I (For Illumina Genome Analyzer)

- 10 cartridges for the preparation of 10 libraries
- SPRIworks Nebulization Buffer
- 1 mL Piercing Tips and Sheaths
- 200 µL Piercing Tips and Sheaths
- Elution Tubes
- Empty Reagent Cartridges

#### SPRIworks Method Card Kit for Fragment Library System I (For Illumina Genome Analyzer)

#### Instructions For Use

Accessories	Size	Product #
<b>SPRIworks Adapter I</b> (For Illumina Genome Analyzer)		A84879
Adaptor Tube- 10 Adaptors		
Forward Primer Mix Tube		
Reverse Primer Mix Tube		
<b>SPRIworks Nebulizer Kit</b>	10	A84871
10 SPRIworks nebulizers each suitable for a single nebulization		
<b>SPRIworks Nebulizer Kit</b>	50	A84872
50 SPRIworks nebulizers each suitable for a single nebulization		
<b>SPRIworks Fragment Library Kit I</b> (For Illumina Genome Analyzer)	10	A84801
10 cartridges for the preparation of 10 libraries		
<b>SPRIworks Fragment Library Kit I</b> (For Illumina Genome Analyzer)	50	A84803
50 cartridges for the preparation of 50 libraries		

† The PCR process is covered by patents owned by Roche Molecular Systems, Inc., and F. Hoffman-La Roche, Ltd.

\* All trademarks are property of their respective owners.

Beckman Coulter, the stylized logo, SPRI, SPRI-TE and SPRIworks are registered trademarks of Beckman Coulter, Inc.

Australia, Gladesville (61) 2 9844 6000 Austria, Vienna (43) 1 291 01 241 Canada, Mississauga (1) 905 819 1234  
China, Shanghai (86) 21 3865 1000 Croatia, Zagreb (38) 51 489 9003 Czech Republic, Prague (420) 272 01 73 32  
Eastern Europe, Middle East, North Africa, South West Asia: Switzerland, Nyon (41) 22 365 3707 France, Villepinte (33) 1 49 90 90 00  
Germany, Krefeld (49) 2151 33 35 Hong Kong (852) 2814 7431 India, Mumbai (91) 22 3080 5000 Italy, Cassina de' Pecchi, Milan (39) 02 953921  
Japan, Tokyo (81) 3 5530 8500 Korea, Seoul (82) 2 404 2146 Latin America (1) (305) 380 4709 Malaysia, Kuala Lumpur (60) 3 5621 4793  
Mexico, Mexico City (001) 52 55 9183 2800 Netherlands, Woerden (31) 348 462462 Poland, Warszawa (48) 22 366 0180 Puerto Rico (787) 747 3335  
Singapore (65) 6339 3633 South Africa/Sub-Saharan Africa, Johannesburg (27) 11 564 3203 Spain, Madrid (34) 91 3836080  
Sweden, Bromma (46) 8 564 85 900 Switzerland, Nyon (41) 0800 850 810 Taiwan, Taipei (886) 2 2730 2500 Turkey, Istanbul (90) 216 570 17 17  
UK, High Wycombe (44) 01494 441181 USA, Brea, CA (1) 800 352 3433, (1) 714 993 5321