# NEXTGENSHEAR

Next Generation Shearing

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## Fragment DNA for Library Construction

### NEXTGEN SHEAR Technology

The NextGen Shear replaces the manual valve in the HydroShear with an automated multi-port valve, allowing for automation of multiple washeds, and eliminates the need to manually operate the sample and wash valve.

The NextGen Shear offers the same high performance as the HydroShear, and is software driven with command prompts designed for ease of use. The software also has the ability to store specific protocols for shearing different size DNA strands.


### Reagents

Available for NextGen Shear, as well as legacy HydroShear systems (HydroShear and Hydroshear Plus. Complete with three different wash solutions, the optimized washkit includes all reagents necessary to perform DNA shearing.

- Eliminates contamination due to sample carryover
- Minimizes batch-tobatch solution variation
- Saves valuable time

### NextGen Shear Features

Key Benefits

- Automated multi-port valve to allow hands-free multiple washing
- Integrated holder for three wash solutions and waste
- Integrated holder for sample vial
- Optional netbook with pre-loaded NextGen Shear software

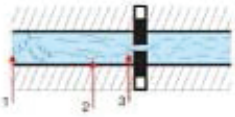
## NextGen Shear and Legacy Hydroshear Specifications

| | |
|---|---|
| Dimensions Plus: | W 8.5" x D 12.1" x H 15.2" (W 0.22m x D 0.31m x H 0.38m) [Depth increases to 19.84" when door is open] |
| Dimensions: | W 5" x D 10" x H 12" (W 0.13 m x D 0.25 m x H 0.30 m) |
| Fragment Size: | 1 - 9 kb with standard assembly; 650 bp - 40 kb with custom assemblies [sold separately] |
| DNA Concentration: | No effect on fragment size |
| Sample Volume: | 40 µl - 500 µl |

## *Data **

### The Mechanism

1. DNA in solution is passed through a tube with an abrupt contraction.

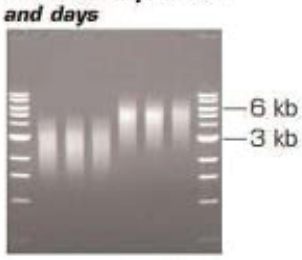



2. As it approaches the contraction, the fluid accelerates to maintain the volumetric flow rate through the smaller area of the contraction.

3. During this acceleration, drag forces stretch the DNA until it snaps. The DNA fragments until the pieces are too short for the shearing forces to break the chemical bonds. The flow rate of the fluid and the size of the contraction determine final DNA sizes.

*Shearing examples shown are pre-cloning data

### *Consistency of shearing across multiple users and days*



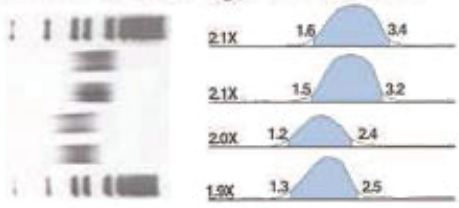

1% agarose gel run at 100V for 1 hour.
All samples taken from same stock of DNA.
Sheared samples: 2 lg/100 l of Lambda DNA

| Lane | Speed | User | Day |
|---|---|---|---|
| 2 | 10 | A | X |
| 3 | 10 | B | Z |
| 4 | 10 | C | X |
| 5 | 14 | A | X |
| 6 | 14 | B | Z |
| 7 | 14 | C | X |

1,8 1 kb ladder

Users
A: Experienced User X: Day 1
B: Intermediate User Z: Day 2
C: First Time User

### *Size distribution is tight and consistent* [1]

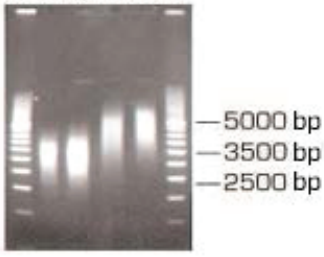



Duplicate DNA samples were sheared at two different flow rates for 20 iterations.

size ratio = upper size range / lower size range

[1]Thorsteinson, Y., Hunicke-Smith, S., Oefner, P., Davis, R. 1998 An Automated Hydrodynamic Process for Controlled, Unbiased DNA Shearing. Genome Research, 8, 848-855.

### *Effect of DNA concentration on fragment size*




| Lane | Speed | Lambda DNA |
|---|---|---|
| 2 | 10 | 2 µg/200 µl |
| 3 | 10 | 50 µg/200 µl |
| 4 | 14 | 2 µg/200 µl |
| 5 | 14 | 50 µg/200 µl |

1,6 500 bp ladder

1% agarose gel run at 105V for 1 hour
Loaded 0.125 µg of sample per lane
Sample source: Lambda DNA

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