HYDROSHEAR

Hydroshear Technology: For Low-Cost and Precise DNA Shearing

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Hydroshear Technology:

The Hydroshear is an automated, Point-Sink Shearer, offering a simple and easy-to-use, reproducible, and controllable method of fragmenting DNA. The Hydroshear creates and controls hydrodynamic forces that work in conjunction with its innovative shearing assembly to shear DNA. A wide range of DNA samples are compatible with the Hydroshear, and the shearing parameters can be adjusted to produce specific fragment lengths of DNA.

The Hydroshear design is optimized to reduce the volume of sample required and to speed processing time. Ninety percent of the sheared DNA fragments fall within a twofold size distribution that is highly reproducible. The Hydroshear technology is reproducible over a wide range of temperatures, DNA concentrations, and initial DNA size.

The Hydroshear cloning efficiency of the sheared DNA is excellent without and end repair. The distribution of the assembled sequences is random, and there is no sequence bias at the ends of the sheared fragments that have been cloned.

HydroShear features:

Key Benefits

- Load, run and wash in 10 minutes
- Achieve consistent results across multiple users
- Fragment DNA sample volumes as small as 40 µl
- Generate a random, representative collection of fragments

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...NA for library construction.

HYDROSHEAR Plus

Hydroshear Plus Technology:

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

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

Reagents

Available for both HydroShear and HydroShear Plus. Complete with three different wash solutions, the optimized HydroShear Wash Kit includes all reagents necessary to perform DNA shearing.

Reagents Benefits

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

HydroShear Plus 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 Hydroshear Plus software

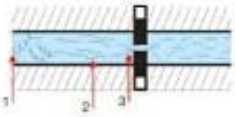
Hydroshear Plus & Hydroshear Specifications

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.

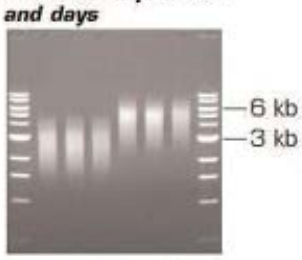


2. As it approaches the contraction, the fluid accelerates to maintain the volumetric flow rate through the smaller area of the contraction.

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



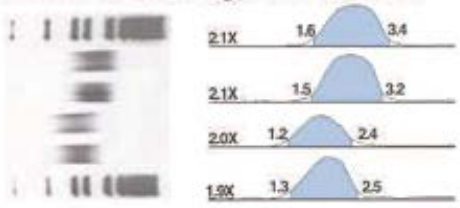
1% agarose gel run at 100V for 1 hour.
All samples taken from same stock of DNA.
Sheared samples: 2 lg/100 l of Lambda DNA.

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]

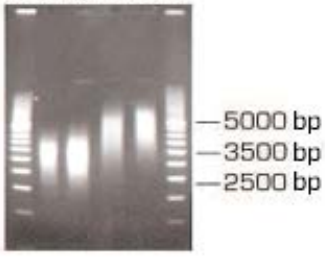


Duplicate DNA samples were sheared at two different flow rates for 20 iterations.

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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