diagenode

Innovating Epigenetic Solutions

Bioruptor® Ultrasonicator

Most cited tool for ChIP assays

Bioruptor® Plus

Bioruptor® Pico

New model for NGS library preparation and other applications

The standard for DNA and RNA shearing, chromatin shearing, cell and tissue disruption, DNA methylation studies and tissue RNA extraction.

Bioruptor® offers unsurpassed reproducibility and quality

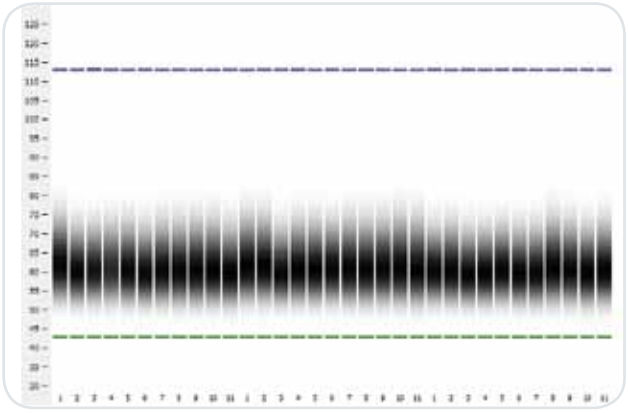
Bioruptor® ensures success for a variety of applications

Diagenode's Bioruptor® uses state-of-the-art ultrasound technology to disrupt, disperse, or shear a variety of sample types for biological, chemical, pharmaceutical, and industrial applications. The Bioruptor® is widely used in biological settings and has proven success for efficient, reproducible sonication required for applications such as DNA and RNA shearing, chromatin shearing, cell and tissue disruption, DNA methylation studies and tissue RNA extraction. Researchers have confirmed the Bioruptor® as an optimal shearing system, surpassing industry standards with high yields of superior quality material, as exemplified by over 1000 publications.

Features and benefits of the Bioruptor®

- **Unsurpassed quality, consistency, and efficiency**
  - Closed tube format prevents cross-contamination and aerosol formation
  - Variable power range efficiently and evenly disrupts samples
  - Unique cooling system retains integrity of biological complexes
  - Gentle ultrasound method preserves samples
  - Sample rotation of tubes in sonication bath ensures shearing and lysis consistency
- **Validated applications:** Chromatin Immunoprecipitation (ChIP), Library Preparation for Next-Generation Sequencing, Methylated DNA Immunoprecipitation (MeDIP), MethylCap® Assay (Methylbinding domain protein), Protein and Tissue RNA extraction
- **Control over DNA fragment size range** as distinct fragment size ranges may be required for specific applications. The Bioruptor® can easily be controlled by modifying sonication duration for the desired fragmentation range
- **Compatibility with existing lab workflows:** Uses standard microfuge and conical tubes
- **Ease of use:** Easy set-up, operation, control parameters, and maintenance ensures success
- **High-throughput capability:** Allows parallel processing of up to 12 samples
- **Scaling ability:** Interchangeable sample holders allow for microliter to milliliter quantities
- **Application flexibility:** Efficient **ACT** (Adaptive Cavitation Technique) ultrasound technology enables high yields and reproducibility across biological, chemical, pharmaceutical, and industrial applications

The Bioruptor® achieves highly consistent fragmentation



Customer Feedback

"The Bioruptor® NGS* is a robust, user-friendly sonication system that is key for both reproducible chromatin shearing and DNA shearing. The Bioruptor® NGS consistently delivered optimal DNA shearing that was critical in generating homogeneous sequencing libraries for our experiments. We also observed excellent chromatin shearing results that were crucial for our epigenetic mapping projects."

Dr. Sascha Tierling, Department of Genetics and Epigenetics, Prof. Dr. Jörn Walter's lab, Universität des Saarlandes, Germany.

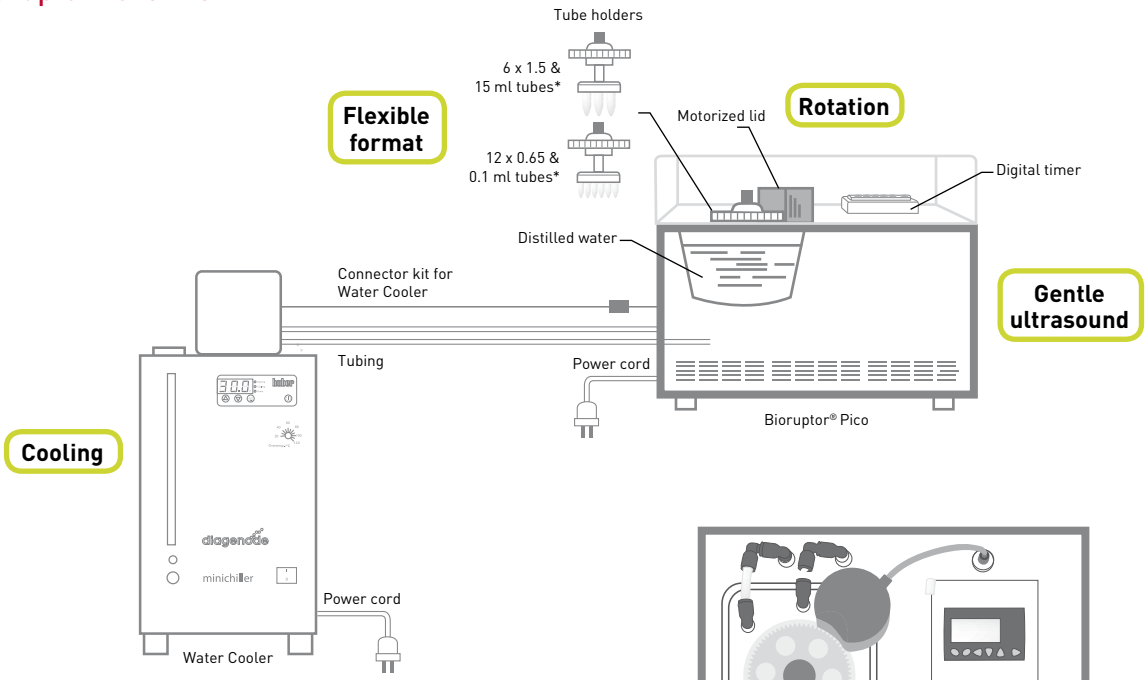
* Now Bioruptor® Pico

How the Ultrasonicator works

Some of the key design features of the Bioruptor® are the laboratory friendly format, ability to use **many sample tube types** in a water bath-based rotor, and **flexible power controls***. The walls of the sonication (water) bath reflect the ultrasound waves in a random but reproducible pattern. The samples in the adaptor are rotated through the ultrasound field to expose each sample to the same level and intensity of energy. This novel technology enables a wide range of applications for superior yields and quality.

The Bioruptor® uses **ACT** (**A**daptive **C**avitation **T**echnique) to create focused mechanical stress to shear DNA or Chromatin or to disrupt cells or tissues. The ultrasound waves pass through the sample, expanding and contracting the liquid. During expansion, negative pressures pull the molecules away from one another and form a cavity or bubble. The bubble continues to absorb energy until it can no longer sustain itself and then implodes, producing intense focused shearing forces, which disperse or break biomolecules.

Bioruptor® overview



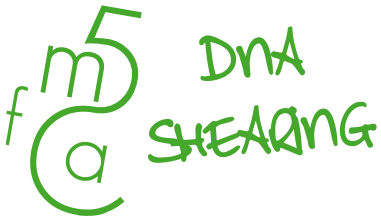
Application versatility

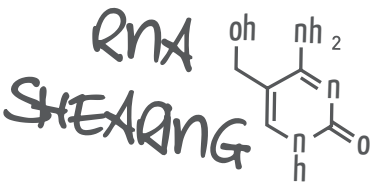
- **Chromatin shearing** (ChIP, ChIP-chip, ChIP-seq, ChIP-qPCR, ChAP, ChIRP etc.)
- **DNA and RNA shearing** (NGS library preparation, RNA-seq library preparation, MeDIP, MeDIP-seq, MethylCap, bisulfite conversion, etc.)
- **Cell and Tissue disruption** (Bacteria and yeast cell disruption, western blot, RIP, RIP-seq, MIRA-chip analysis, Fractionation, etc.)
- **Other biological applications** (Mitochondria disruption, cell dissociation, plant cell transformation, etc.)
- **Chemical, pharmaceutical and industrial applications** (Dispersion, emulsification, homogenization, sonochemistry etc.)

* depending on the model

The shearing device of choice for library preparation and chromatin preparation for ChIP

- Fast, with small and large volume shearing (5 µl - 2 ml)
- Optimized for:
  - Next-Generation Sequencing (5 - 100 µl)
  - Chromatin shearing (10 µl - 2 ml)
  - RNA shearing





Bioruptor® Pico (Sonication device 1 + Water cooler 2 + Single Cycle Valve 3)

The **Bioruptor® Pico** is the shearing device of choice for sequencing applications, providing optimal yields, lengths, and consistency. Different fragment size ranges are frequently required for downstream applications (e.g. bridge amplification) for sequencing. Moreover, the Bioruptor® Pico is the optimal device for chromatin shearing for ChIP-seq applications. The Bioruptor® Pico can be easily programmed to modify duration of sonication for optimal fragmentation and produces:

- Simultaneous sonication of 12 samples
- Cost effective solution
- Compatible with all current Next-Generation Sequencing systems
- Desired narrow size distribution crucial for sequencing accuracy
- High yields of double-stranded DNA needed for effective sequencing results

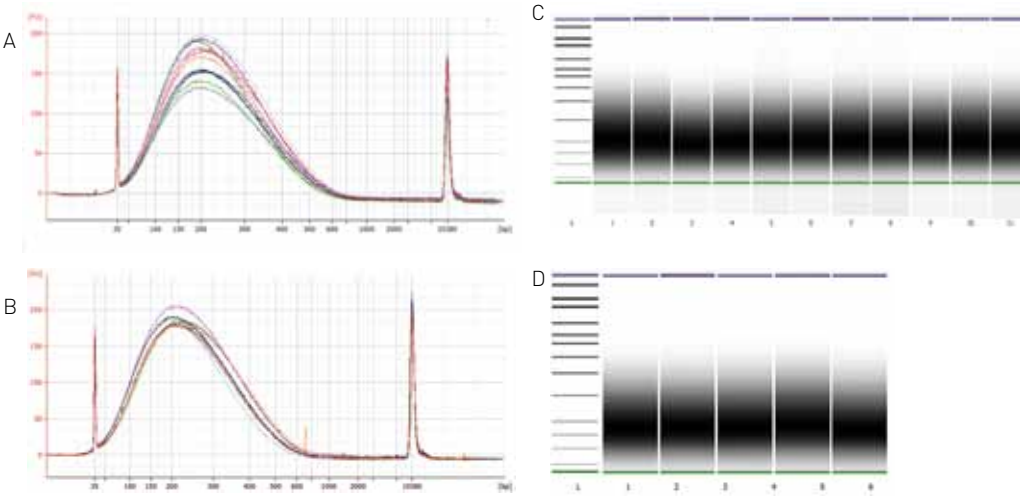
Life Technologies recommends the Bioruptor® system to generate DNA libraries for the Ion Personal Genome Machine (PGM™)

ion torrent by life technologies™ | ion compatible

The Bioruptor® is the instrument of choice

High precision and flexible sample volume with Bioruptor® technology

1 DNA shearing from 10 to 100 µl sample volume*

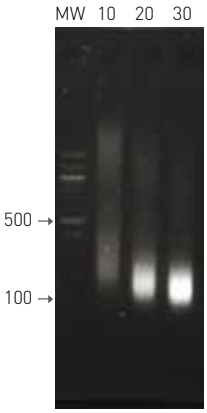


Shearing conditions:
Sample volume: **100 µl**
Microtubes: **0.65 ml**
Sonication cycles:
13 cycles (30 sec ON/OFF)
Average size:
204 bp; CV%: 1.89%

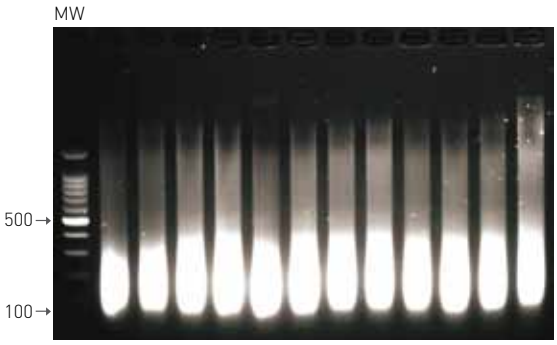
Shearing conditions:
Sample volume: **10 µl**
Microtubes: **0.1 ml**
Sonication cycles:
20 cycles (30 sec ON/OFF)
Average size:
215 bp; CV%: 6.6%

Panel A and B: peak electropherogram view. **Panel C and D:** virtual gel view

2 Consistent and highly reproducible chromatin shearing from 10 µl to 2 ml sample volume*

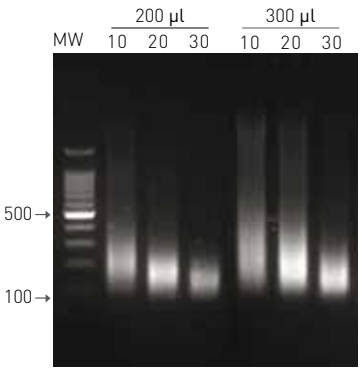


A: 10 µl volume

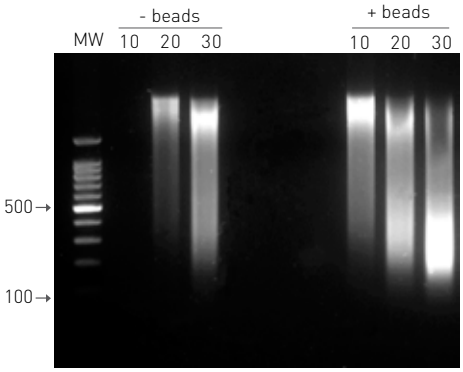


B: 100 µl volume

HeLa cells are fixed with 1% molecular grade formaldehyde (8 min at room temperature). Nuclei isolation is performed using buffers and reagents of Diagenode's Chromatin Shearing Optimization kit - Low SDS (Cat. No. AA-001-0100). 1x10e6 cells are then resuspended in 100 µl Shearing Buffer prior to chromatin shearing.



C: 200 and 300 µl volume



D: 2 ml volume

* depending on the model

A flexible selection of Bioruptor® models suits your needs

	Bioruptor® Standard	Bioruptor® Plus	Bioruptor® Pico
Applications	• **Chromatin Shearing** • **DNA Shearing** • **Cell and Tissue disruption**	• **Chromatin Shearing** • **DNA Shearing** • **Cell and Tissue disruption**	• **DNA Shearing** (e.g. NGS library preparation) • **RNA Shearing** • **Chromatin Shearing**
Description Summary	Standard, basic model with reliable performance across applications. Includes timing control.	Upgrade of Bioruptor® Standard with timing and temperature control.	Provides high-throughput ability and processes up to 12 samples simultaneously with timing and temperature control.
Troughput and multiplexing	**Tube size** / **# of tubes processed** 0.5 ml / 12 1.5 ml / 6 10 ml / 6 15 ml / 6 50 ml / 3	**Tube size** / **# of tubes processed** 0.5 ml / 12 1.5 ml / 6 10 ml / 6 15 ml / 6 50 ml / 3	**Tube size** / **# of tubes processed** 0.1 ml / 12 0.65 ml / 12 1.5 ml / 6 15 ml / 6
Sound-proofing	Metal soundproof box	Metal soundproof box	Not applicable
Monitoring ability and control systems	Includes overheat shutdown protection	Control system for regulated water flow between Bioruptor® and Water Cooler. Includes overheat shutdown protection.	Control system for regulated water flow between Bioruptor® and Water Cooler.
Consumables	- 0.5 ml Bioruptor® Microtubes - 1.5 ml TPX Microtubes - 10 ml Tube - 15 ml TPX Tubes	- 0.5 ml Bioruptor® Microtubes - 1.5 ml TPX Microtubes - 10 ml Tube - 15 ml TPX Tubes	- 0.1 ml Bioruptor® Microtubes - 0.65 ml Bioruptor® Microtubes - 1.5 ml Bioruptor® Microtubes - 15 ml Bioruptor® tubes and sonication beads

Selected Bioruptor® references

The Bioruptor® has been cited in over **1000 publications**, and is trusted by leading researchers in epigenetics, ChIP, methylation studies, and for library preparation in Next-Generation Sequencing.

Library preparation for Next-Generation Sequencing

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Ross JP, Shaw JM, Molloy PL, **Identification of differentially methylated regions using streptavidin bisulfite ligand methylation enrichment (SuBLiME), a new method to enrich for methylated DNA prior to deep bisulfite genomic sequencing**, *Epigenetics,2013-01-01,8,113-127*

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Ordering information

Description	Cat. No.
Bioruptor® Models	
Bioruptor® Standard (only available in the US)	B01010004 for 1.5 ml tube holder B01010005 for 1.5 and 15 ml tube holder B01010006 for 0.65 ml tube holder
Bioruptor® Plus	B01020001 for 1.5 ml tube holder B01020002 for 1.5 and 15 ml tube holder B01020003 for 0.65 ml tube holder
Bioruptor® Pico	B01060001 for 0.65 ml tubes
Cooling System	
Water cooler	**Old** Cat. No. BioAcc-Cool; **New** Cat. No. B02010002, 230V; B02010003, 115V; B02010004, 100V
Single Cycle Valve for Bioruptor® Plus and Pico	B02020004
Tube Holders	
0.1 ml tube holder and tube adaptors for Bioruptor® Pico	B01200041
1.5 ml tube holder for Bioruptor® Pico	B01200040
15 ml sonication accessories for Bioruptor® Pico	B01200016
0.5/0.65 ml tube holder for Bioruptor® Standard and Plus	**Old** Cat. No. UCD-pack 0.5; **New** Cat. No. B01200010
1.5 ml tube holder for Bioruptor® Standard and Plus	**Old** Cat. No. UCD-pack 1.5; **New** Cat. No. B01200011
10 ml tube holder for Bioruptor® Standard and Plus	**Old** Cat. No. UCD-pack 10; **New** Cat. No. B01200012
15 ml tube holder for Bioruptor® Standard and Plus	**Old** Cat. No. UCD-pack 15; **New** Cat. No. B01200013
50 ml tube holder for Bioruptor® Standard and Plus	**Old** Cat. No. UCD-pack 50; **New** Cat. No. B01200014

Description	Cat. No.
Consumables for Bioruptor® Standard and Plus	
0.5 ml Bioruptor® Microtubes for DNA Shearing	**Old** Cat. No. WA-004-0500; **New** Cat. No. C30010013
1.5 ml TPX Microtubes	**Old** Cat. No. M-50050 or M-50001; **New** Cat. No. C30010010-50 or -1000
15 ml TPX Microtubes	**Old** Cat. No. M-UN-15; **New** Cat. No. 30010009-50 or -1000
Consumables for Bioruptor® Pico or former model Bioruptor® NGS	
0.1 ml Bioruptor® Microtubes	C30010015
0.65 ml Bioruptor® Microtubes	**Old** Cat. No. WA-005-0500; **New** Cat. No. C30010011
1.5 ml Bioruptor® Microtubes wit Caps	C30010016
15 ml Bioruptor® Tubes and sonication beads	C01020031

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Wolflabs

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Pricing on any accessories shown can be found by keying the part number into the search box on our website.

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