dsDNA Shearase™ Plus

Cat. Nos. E2018-50 (50 U) E2019-50 (50 U & DCC™-5, 50 preps.)
E2018-200 (200 U) E2019-200 (200 U & DCC™-5, 200 preps.)

Storage: -20 °C

ZYMO RESEARCH
The Beauty of Science is to Make Things Simple

Product Information

Highlights:

- The simplest method for generating random-ended dsDNA fragments.
- Fragment size is conveniently controlled by adjusting the enzyme concentration.
- dsDNA Shearase™ Plus-generated fragments are ideal for library construction, Next-Gen sequencing, and methylated DNA immunoprecipitation (MeDIP).

Description:
Digestion with dsDNA Shearase™ Plus is the simplest method for DNA fragmentation as it circumvents the use of otherwise costly and cumbersome mechanical shearing devices. dsDNA Shearase™ Plus is an endonuclease that cleaves phosphodiester bonds in DNA to yield oligonucleotides with 5′-phosphate and 3′-hydroxyl termini. It has a particularly strong preference for double-stranded DNA (dsDNA) and generates random-ended DNA fragments of the desired size in a single step. Sequencing data demonstrates that dsDNA Shearase™ Plus does not introduce any detectable bias in the sequencing library preparation. This enzyme is compatible with low volume inputs thus *minimizing* sample loss. Digested DNA is easily purified in ≥10 µl with recommended *DNA Clean & Concentrator*™ technology making it ideal for use in end modification (linker & adapter) procedures and other applications.

End Product:
DNA fragments generated by dsDNA Shearase™ Plus are random-ended and contain a 5′-phosphate and 3′-hydroxyl at each end.

Downstream Applications:
Random-ended, double-stranded DNA fragments can be easily end-repaired and used in end modification procedures for library construction, Next-Gen sequencing, and MeDIP.

Product Contents:
All dsDNA Shearase™ Plus products are supplied with 1 ml 5X dsDNA Shearase™ Plus Reaction Buffer (Cat. No. **E2018-1-A**).

	Cat. No. E2018-50	Cat. No. E2018-200	Cat. No. E2019-50	Cat. No. E2019-200	Storage
dsDNA Shearase™ Plus	50 units	200 units	50 units	200 units	-20°C
DNA Clean & Concentrator™ *	-	-	50 preps.	200 preps.	RT

***DNA Clean & Concentrator™ can also be ordered separately (Cat. Nos. **D4013** & **D4014**).**

Storage:
Store dsDNA Shearase™ Plus and 5X dsDNA Shearase™ Plus Reaction Buffer at -20°C for up to 12 months. Avoid repeated freeze/thawing. Prolonged storage should be at ≤-70°C.

Enzyme Concentration:
1 U/µl

Unit Definition:
One unit (U) is defined as the amount of enzyme required to convert 250 ng human DNA into DNA fragments in the range of 100 – 500 bp in 20 minutes at 42°C in a total reaction volume of 10 µl.

1X dsDNA Shearase™ Plus Reaction Buffer:
10 mM Tris-HCl, pH 7.5
25 mM $MgCl_2$
1 mM DTT

Reaction Conditions:
Add dsDNA Shearase™ Plus into 1X dsDNA Shearase™ Plus Reaction Buffer and incubate reaction mixture at 42°C for 20 minutes. Reaction conditions have been optimized based on human genomic DNA (gDNA) input. However, gDNA isolated from plants, bacteria, and yeast can also be fragmented under the same reaction conditions.

Heat Inactivation:
dsDNA Shearase™ Plus can be inactivated by incubating at 65°C for 5 minutes.

DNA Cleanup:
For DNA purification we recommend the DNA Clean & Concentrator™ kit. The DNA Clean & Concentrator™ kit is supplied with dsDNA Shearase™ Plus under Cat. Nos. **E2019-50** or **E2019-200**.

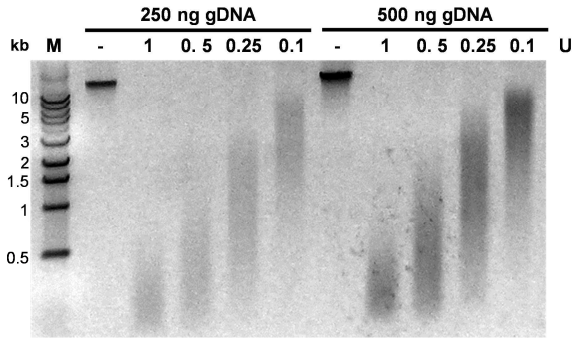
Standard Reaction Setup:
The suggested reaction setup is for 250 ng DNA using dsDNA Shearase™ Plus. The enzyme should be the last component added to the reaction. Input DNA may be adjusted but should remain proportional to the reaction volume and the dsDNA Shearase™ Plus concentration (see *Table* below).

Volume	Reagent	Final Concentration
2 µl	5X dsDNA Shearase™ Plus Reaction Buffer	1X
2.5 µl	100 ng/µl DNA	25 ng/µl
4.5 µl	Water	
1 µl	dsDNA Shearase™ Plus	1 unit
10 µl	Total Volume	

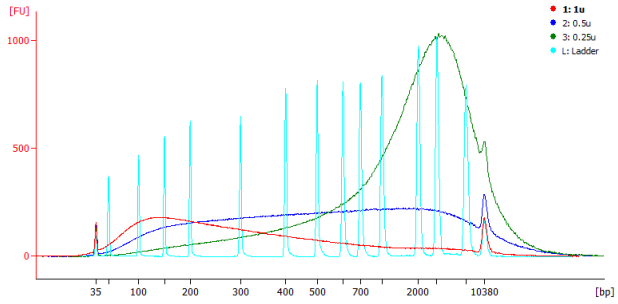
1. For the reaction setup above, add all the components then mix briefly by flicking the tube. Centrifuge for 5 seconds.
2. Incubate the reaction at 42°C for 20 minutes.
3. Stop the reaction by incubating the mixture at 65°C for 5 minutes.
4. Purify the DNA using Step 3 in the protocol from the DNA Clean & Concentrator *(Please refer to the DNA Clean & Concentrator™ kit for the complete column purification procedure)*.
5. Perform end-repair and the DNA is ready for library construction and Next-Gen sequencing.

Fragment Size Range (bp)	dsDNA Shearase™ Plus (U)
100 – 500	1
100 – 1,000	0.5
200 – 3,000	0.25
1,000 – 10,000	0.1

***Note:* Ratio of dsDNA Shearase™ Plus to Input DNA.** It is recommended to use one unit (1 µl) enzyme per 250 ng input DNA in the standard 10 µl reaction (described above). dsDNA Shearase™ Plus does not recycle; therefore, it is necessary to scale proportionally the amount of enzyme when adjusting the DNA input. The ratio of enzyme to DNA must remain at 1 unit of enzyme to 250 ng DNA.



Fragmentation of HCT116 Cell DNA Using dsDNA Shearase™ Plus. 250 ng or 500 ng of HCT116 cell gDNA was incubated with 1, 0.5, 0.25, or 0.1 U dsDNA Shearase™ Plus for 20 min at 42°C. The reaction was stopped by incubating at 65°C for 5 min. Fragmented DNA was purified with the DNA Clean & Concentrator™ kit and subsequently resolved in a 1% agarose gel.



Distribution of HCT116 Cell DNA Fragments Produced by dsDNA Shearase™ Plus Separated Using an Agilent Bioanalyzer 2100.

Related Epigenetics Products:

Product Name	Size	Cat. No.
BISULFITE TREATMENT OF DNA		
EZ DNA Methylation™ Kit	50 rxns. 200 rxns.	D5001 D5002
EZ-96 DNA Methylation™ Kit	2 x 96 rxns. 2 x 96 rxns.	D5003 D5004
EZ-96 DNA Methylation™ MagPrep	4 x 96 rxns. 8 x 96 rxns.	D5040 D5041
EZ DNA Methylation-Gold™ Kit	50 rxns. 200 rxns.	D5005 D5006
EZ-96 DNA Methylation-Gold™ Kit	2 x 96 rxns. 2 x 96 rxns.	D5007 D5008
EZ-96 DNA Methylation-Gold™ MagPrep	4 x 96 rxns. 8 x 96 rxns.	D5042 D5043
EZ DNA Methylation-Direct™ Kit	50 rxns. 200 rxns.	D5020 D5021
EZ-96 DNA Methylation-Direct™ Kit	2 x 96 rxns. 2 x 96 rxns.	D5022 D5023
EZ-96 DNA Methylation-Direct™ MagPrep	4 x 96 rxns. 8 x 96 rxns.	D5044 D5045
EZ DNA Methylation-Lightning™ Kit	50 rxns. 200 rxns.	D5030 D5031
EZ-96 DNA Methylation-Lightning™ Kit	2 x 96 rxns. 2 x 96 rxns.	D5032 D5033
EZ-96 DNA Methylation-Lightning™ MagPrep	4 x 96 rxns. 8 x 96 rxns.	D5046 D5047
EZ DNA Methylation-Startup™ Kit	50 rxns.	D5024
METHYLATED/NON-METHYLATED DNA STANDARDS		
Universal Methylated DNA Standard	1 set	D5010
Universal Methylated Human DNA Standard	1 set	D5011
Universal Methylated Mouse DNA Standard	1 set	D5012
Human Methylated and Non-methylated DNA Set	1 set	D5014
Human HCT116 DKO Non-methylated DNA Standard	5 µg	D5014-1
Human HCT116 DKO Methylated DNA Standard	5 µg	D5014-2
Bisulfite-converted Universal Methylated Human DNA Standard	1 set	D5015
E. coli Non-methylated Genomic DNA	5 µg	D5016
Methylated & Non-methylated pUC19 DNA Set™	1 set	D5017

AMPLIFICATION OF BISULFITE CONVERTED DNA		
Zymo*Taq*™ DNA Polymerase	50 rxns. 200 rxns.	E2001 E2002
Zymo*Taq*™ PreMix (2X concentrated)	50 rxns. 200 rxns.	E2003 E2004
ANTIBODIES & IMMUNOPRECIPITATION		
Anti-5-Methylcytosine Monoclonal Antibody (clone 10G4)	50 µg 200 µg	A3001-50 A3001-200
Methylated-DNA IP Kit	10 preps.	D5101
ChIP DNA Clean & Concentrator™	50 preps. 50 preps.	D5201 D5205
DNA MODIFYING ENZYMES		
CpG Methylase (M.SssI)	200 U 400 U	E2010 E2011
GpC Methylase (M.CviPI)	200 U 1000 U	E2014 E2015
5-hmC Glucosyltransferase	100 U 200 U	E2026 E2027
DNA FRAGMENTATION		
DNA Degradase™	500 U 2000 U	E2016 E2017
DNA Degradase™ Plus	250 U 1000 U	E2020 E2021
NUCLEOSOME MAPPING		
EZ Nucleosomal DNA Prep Kit	20 preps	D5220
5-HYDROXYMETHYLCYTOSINE		
5-Hydroxymethylcytosine DNA	5 µg	D5400
5-Methylcytosine & 5-Hydroxymethylcytosine DNA Standard Set	1 set	D5405
Quest 5-hmC Detection Kit™	25 rxns. 50 rxns.	D5410 D5411
Quest 5-hmC Detection Kit™-Lite	25 rxns. 50 rxns.	D5415 D5416
Quest 5-hmC™ DNA Enrichment Kit	25 rxns. 50 rxns.	D5420 D5421
Quest 5-hmC™ DNA ELISA Kit	1 x 96 rxns. 2 x 96 rxns.	D5425 D5426

Trademarks and Disclaimers:

This product is for research use only and should only be used by trained professionals. It is not intended for use in diagnostic procedures. Wear protective gloves and eye protection. Follow the safety guidelines and rules enacted by your research institution or facility.

Integrity of kit components is guaranteed for up to one year from date of purchase. Reagents are routinely tested on a lot-to-lot basis to ensure they provide maximal performance and reliability.

For Technical Assistance, please contact 1-888-882-9682 or E-mail tech@zymoresearch.com. Satisfaction of all Zymo Research products is guaranteed. If you are not satisfied with this product please call 1-888-882-9682.

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