



## CERTIFICATE OF ANALYSIS

# FastDigest<sup>®</sup> KpnI

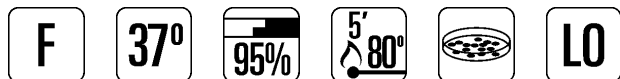
**#FD0524**      300 µl (for 300 reactions)

**Lot:**                      **Expiry Date:**



Supplied with:      1 ml of 10X FastDigest<sup>®</sup> Buffer

**Store at -20°C**



In total 2 vials.

BSA included: Lot# BSA62-313P



## Description

FastDigest<sup>®</sup> enzymes are an innovative formulation of Fermentas restriction enzymes for target DNA digestion in only 5 minutes. All FastDigest<sup>®</sup> enzymes work in the same buffer, which permits convenient and rapid double and multiple DNA digestions.

FastDigest<sup>®</sup> enzymes are conveniently formulated: 1 µl of enzyme can completely digest up to 1 µg of DNA.

## Features

- All FastDigest<sup>®</sup> enzymes work in the same reaction conditions
- Single and double digestion of DNA in only 5 min
- No star activity in prolonged incubations
- Enhanced performance in one-hour DNA cleavage reactions

Visit [www.fermentas.com](http://www.fermentas.com) for an updated list of FastDigest<sup>®</sup> enzymes and protocols related to their use.

## ENZYME PROPERTIES

### Unit Definition

One FastDigest<sup>®</sup> Unit (FDU) is the amount of the enzyme required to cleave 1 µg of lambda DNA-BamHI fragments in 5 min at 37°C in 1X FastDigest<sup>®</sup> Buffer.

### Concentration

1 FDU/µl

### Recommended Reaction Conditions

1X FastDigest<sup>®</sup> Buffer  
Incubation at 37°C

## Methylation Effects on Digestion

Dam: never overlaps – no effect.

Dcm: may overlap – no effect.

CpG: may overlap – no effect.

EcoKI: never overlaps – no effect.

EcoBI: never overlaps – no effect.

## Number of Recognition Sites in DNA

$\lambda$	$\Phi$ X174	pBR322	pUC57	pUC18/19	pTZ19R/U	M13mp18/19
2	0	0	1	1	1	1

## Thermal Inactivation

FastDigest<sup>®</sup> KpnI is inactivated by the incubation at 80°C for 5 min.

## Digestion of Plasmid DNA

1  $\mu$ l of FastDigest<sup>®</sup> KpnI digests up to 1  $\mu$ g of plasmid DNA in 5 min.

## Digestion of PCR Products

1  $\mu$ l of FastDigest<sup>®</sup> KpnI digests ~0.2  $\mu$ g of PCR product in 5 min.

## Digestion of Genomic DNA

1  $\mu$ l of FastDigest<sup>®</sup> KpnI digests 1  $\mu$ g of genomic DNA in 5 min, or 5  $\mu$ g of genomic DNA in 30 min.

## QUALITY CONTROL ASSAY DATA

### Functional Activity Test

1  $\mu$ g of lambda DNA-BamHI fragments was completely digested with 1  $\mu$ l of the enzyme in 5 minutes at 37°C in 20  $\mu$ l of reaction mixture.

### Ligation/Recutting Assay

After overdigestion with 1  $\mu$ l of FastDigest<sup>®</sup> KpnI for 1 hour, more than 95% of DNA fragments can be ligated and recut.

### Labeled Oligonucleotide (LO) Assay

No detectable degradation of single-stranded or double-stranded oligonucleotides occurred during incubation with 1  $\mu$ l of FastDigest<sup>®</sup> KpnI for 1 hour.

### Prolonged Incubation / Star Activity Assay

No detectable degradation of 1  $\mu$ g of lambda DNA due to nuclease contamination or star activity occurred during incubation with 1  $\mu$ l of FastDigest<sup>®</sup> KpnI for 16 hours.

### Blue/White Cloning Assay

pUC57 was incubated with 1  $\mu$ l of FastDigest<sup>®</sup> KpnI for 5 hours. After religation and transformation, the background level of white colonies was 0.3%.

Quality authorized by:

 Jurgita Zilinskiene

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## Protocol for Fast Digestion of DNA

① Combine the following reaction components at room temperature in the order indicated:

	Plasmid DNA	PCR product	Genomic DNA
<b>Water*, nuclease-free</b> (#R0581)	15 $\mu$ l	17 $\mu$ l	30 $\mu$ l
<b>10X FastDigest<sup>®</sup> buffer</b>	2 $\mu$ l	2 $\mu$ l	5 $\mu$ l
<b>DNA*</b>	2 $\mu$ l (up to 1 $\mu$ g)	10 $\mu$ l (~0.2 $\mu$ g)	10 $\mu$ l (5 $\mu$ g)
<b>FastDigest<sup>®</sup> enzyme</b>	1 $\mu$ l	1 $\mu$ l	5 $\mu$ l
Total volume:	20 $\mu$ l	30 $\mu$ l	50 $\mu$ l

② Mix gently and spin down.

③ Incubate at 37°C in a heat block or water thermostat for 5 min.

④ Inactivate the enzyme by heating for 5 min at 80°C (optional).

## Double and Multiple Digestion of DNA

FastDigest<sup>®</sup> enzymes allow simultaneous digestion of DNA with two or more enzymes in one digestion reaction.

- Use 1  $\mu$ l of each enzyme and scale up the reaction conditions appropriately.
- The combined volume of all added enzymes should not exceed 1/10 of the total reaction volume.

## Reaction Set-up for Digestion of Multiple DNA Samples

① Pipette 2  $\mu$ l of DNA\* samples into tubes

② Prepare a master mix for n+1 samples

Example of master mix (for 10 samples of plasmid DNA):

<b>Water*, nuclease-free</b> (#R0581)	(10+1) x 15 $\mu$ l = 165 $\mu$ l
<b>10X FastDigest<sup>®</sup> buffer</b>	(10+1) x 2 $\mu$ l = 22 $\mu$ l
<b>FastDigest<sup>®</sup> enzyme</b>	(10+1) x 1 $\mu$ l = 11 $\mu$ l

③ Add 18  $\mu$ l of master mix\* into tubes containing DNA.

\* The volume of DNA can be scaled up to 10  $\mu$ l or down to 0.5  $\mu$ l depending on the DNA concentration. The volume of water and master mix should be corrected to keep the indicated total reaction volume.

## Scaling up DNA Digestion Reaction

<b>DNA</b>	1 µg	2 µg	3 µg	4 µg	5 µg
<b>FastDigest® enzyme</b>	1 µl	2 µl	3 µl	4 µl	5 µl
<b>10X FastDigest® buffer</b>	2 µl	2 µl	3 µl	4 µl	5 µl
Total volume:	20 µl	20 µl	30 µl	40 µl	50 µl

### Important Notes

- Always check the sensitivity of enzyme to DNA methylation (*see* **Methylation Effects on Digestion**).
- The context of the target sequence may affect DNA cleavage efficiency. Prolonged incubation time is recommended to achieve complete digestion.
- PCR additives such as DMSO or glycerol may affect the cleavage efficiency or cause star activity.
- When introducing restriction enzyme sites into primers for subsequent digestion and cloning of a PCR product, refer to the Table “Cleavage efficiency close to the termini of PCR fragments” ([www.fermentas.com](http://www.fermentas.com)) to define the number of extra bases required for efficient cleavage.
- For cloning applications, purification of PCR products prior to digestion is highly recommended to remove the active thermophilic DNA polymerase still present in PCR mixture. DNA polymerases may alter the ends of the cleaved DNA and reduce the ligation yield.
- Increase the incubation time by 3-5 min if total reaction volume exceeds 20 µl. Air thermostats are not recommended due to slow heat transfer to the reaction mixture.

### **PRODUCT USE LIMITATION**

This product is developed, designed and sold exclusively *for research purposes and in vitro use only*. The product was not tested for use in diagnostics or for drug development, nor is it suitable for administration to humans or animals.

Please refer to [www.fermentas.com](http://www.fermentas.com) for Material Safety Data Sheet of the product.