# LightNing® RsaI

REF: EG24503S






Isoschizomers*: AfaI
Neoschizomers*: Csp6I, CviQI, RsaNI

*Neoschizomers produce distinct ends, and isoschizomers/neoschizomers may exhibit different sensitivities to various methylation modifications.

## Storage Condition

Store at -20℃ for 2 years.

## Components

| Components | Amount |
|---|---|
| LightNing® RsaI (10 U/μl) | 100 μl (1000 U) |
| 10× CutOne® Buffer | 1 ml |
| 10× CutOne® Color Buffer | 1 ml |

## Description

LightNing® enzymes are a series of engineered restriction enzymes that are capable of fast DNA digestion. All LightNing® enzymes show superior activity in the universal CutOne® and CutOne® Color Buffer, and are able to digest DNA in 5~15 minutes. This enables any combination of restriction enzymes to work simultaneously in one reaction tube and eliminates the need for sequential digestions. LightNing® enzymes have passed multiple strict quality controls, and can be used to digest plasmid, genomic and viral DNA as well as PCR products.

CutOne® Color Buffer includes a density reagent along with red and yellow tracking dyes that allow for direct loading of the reaction mixtures on a gel. The red dye of the CutOne® Color Buffer migrates with 2.5 kb double-strand DNA fragments in a 1% agarose gel, and the yellow dye migrates with 10 bp double-strand DNA fragments in a 1% agarose gel.

## Recommended Reaction Conditions

1× CutOne® Buffer;
Incubate at 37℃ ;
Refer to "Protocol for Fast DNA Digestion" for reaction setup.

## Heat Inactivation

This enzyme can not be heat inactivated. Please purify the digested product by phenol/chloroform treatment or column-based purification kit.

## Quality Control

**Functional Test**

A 20 μl reaction in CutOne® Buffer containing 1 μg of λDNA and 1 μl of LightNing® RsaI incubated for 15 minutes at 37℃ results in complete digestion as determined by agarose gel electrophoresis.

**Prolonged Incubation / Star Activity Assay**

A 20 μl reaction in CutOne® Buffer containing 1 μg of λDNA and 1 μl of LightNing® RsaI incubated for 3 hours at 37℃ results in a DNA pattern free of detectable nuclease degradation as determined by agarose gel electrophoresis. Longer incubation may result in star activity.

**Ligation and Recuting**

After 10-fold over-digestion with LightNing® RsaI at 37 ℃ , >75% of the DNA fragments can be ligated with T4 DNA Ligase at 22℃ . Of these ligated fragments, >90% can be recut with LightNing® RsaI as determined by agarose gel electrophoresis.

## Icon Descriptions

- This enzyme will digest unit substrate in 5~15 minutes under recommended reaction conditions.
- The enzyme's optimum reaction temperature is 37℃ .
- Cleavage with this restriction enzyme may be blocked or impaired when the substrate DNA is methylated by the CpG methylase.
- The enzyme can not be thermal inactivated.
- 3 hours incubation do not show star activity, but longer incubation may result in star activity.

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# Method of application

## 1. Protocol for Fast DNA Digestion

① Combine the following reaction components on ice in the order indicated:

| | Plasmid DNA | PCR product | Genomic DNA |
|---|---|---|---|
| $ddH_2O$ | 15 μl | 16 μl | 30 μl |
| 10× CutOne® Buffer or 10× CutOne® Color Buffer | 2 μl | 3 μl[a] | 5 μl |
| DNA | 2 μl (up to 1 μg) | 10 μl (~0.2 μg) | 10 μl (5 μg) |
| LightNing® RsaI | 1 μl | 1 μl | 5 μl |
| Total | 20 μl | 30 μl | 50 μl |

a. For purified PCR products. If the PCR products are not purified, amount of 10× CutOne® Buffer should be reduced to 2 μl due to the remaining metal ions in the unpurified PCR products. We recommend to purify PCR products before digestion if it will be used for cloning, because the exonuclease activity of some DNA polymerases may alter the end of cleaved DNA.

② Mix gently and spin down;
③ Incubate at 37℃ for 15 minutes (plasmid DNA) or for 15~30 minutes (PCR product) or for 30~60 minutes (genomic DNA);
④ Optional: Phenol/chloroform treatment or column based purification;
⑤ If the CutOne® Color Buffer was used in the reaction, load an aliquot of the reaction mixture directly on a gel.

## 2. Double and Multiple Digestion of DNA

① Use 1 μl of each enzyme and scale up the reaction conditions appropriately;
② The combined volume of the enzymes in the reaction mixture should not exceed 1/10 of the total reaction volume;
③ If the enzymes require different reaction temperatures, start with the enzyme that requires a lower temperature, then add the second enzyme and incubate at the higher temperature.

## 3. Scaling up Plasmid DNA Digestion Reaction

| DNA | 1 μg | 2 μg | 3 μg | 4 μg | 5 μg |
|---|---|---|---|---|---|
| LightNing® RsaI | 1 μl | 2 μl | 3 μl | 4 μl | 5 μl |
| 10× CutOne® Buffer or 10× CutOne® Color Buffer | 2 μl | 2 μl | 3 μl | 4 μl | 5 μl |
| Total | 20 μl | 20 μl | 30 μl | 40 μl | 50 μl |

Note: Increase the incubation time if the total reaction volume exceeds 20 μl.

# Number of Recognition Sites in DNA

| λDNA | ΦX174 | pBR322 | pUC57 | pUC18/19 | SV40 | M13mp18/19 | Adeno2 |
|---|---|---|---|---|---|---|---|
| 113 | 11 | 3 | 3 | 3 | 12 | 19 | 83 |

# Methylation Effects on Digestion

| Dam | Dcm | CpG | EcoKI | EcoBI |
|---|---|---|---|---|
| No effect | No effect | Impaired | No effect | No effect |

# Activity in Different Buffers*

| | CutOne® Buffer | Thermo Scientific FastDigest Buffer | NEB rCutSmart™ Buffer | Takara QuickCut™ Buffer |
|---|---|---|---|---|
| Activity | 100% | 25% | 100% | 25% |

*The activity data come from the functional test described above.

# Activity of DNA Modifying Enzymes in CutOne® and CutOne® Color Buffers

| | |
|---|---|
| EG15208S Alkaline Phosphatase (Fast) | 100% |
| EG15205S T4 DNA Ligase (Fast)* | 100% |

*ATP is required for T4 DNA Ligase activity.


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