

Restriction Endonuclease *Sma* I

From *Serratia marcescens* S_b

Cat. No. 10 220 566 001

1000 units (10 U/μl)

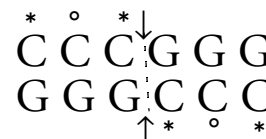
Cat. No. 10 656 348 001

5000 units (10 U/μl)

Cat. No. 11 047 639 001

5000 units, high concentration (40 U/μl)

Please see label for lot specific values.



Version July 2007

Store at -15 to -25 °C

Stability/Storage The undiluted enzyme solution is stable when stored at -15 to -25 °C until the control date printed on the label. Do not store below -25 °C to avoid freezing.
Note: The product is shipped on dry ice.

Sequence specificity *Sma* I recognizes the sequence CCC/GGG and generates fragments with blunt ends (1).

Compatible ends *Sma* I is compatible to any blunt end.

Isoschizomer The enzyme is an isoschizomer to *Cfr* 9I, *Psp* AI, *Xma* I and *Xma* CI.

Methylation sensitivity *Sma* I is not inhibited by 5-methylcytosine at the middle of the three C-residues, as indicated (*). The presence of 5-methylcytosine (*) at the other positions or of 4-methylcytosine in either position within the recognition sequence (*C°C*/GGG) is inhibiting.

Storage buffer 10 mM potassium phosphate, 300 mM NaCl, 1 mM EDTA, 5 mM Dithioerythritol, Polydocanol, 0.02% (v/v), Glycerol, 50% (v/v), pH approx. 7.0 (at 4 °C).

Incubation buffer (10x, included) 330 mM Tris-acetate, 660 mM K-acetate, 100 mM Mg-acetate, 5 mM Dithioerythritol, pH 7.9 (at 37 °C), (Δ SuRE/Cut Incubation Buffer A).

Activity in SuRE/Cut Buffer System Bold face printed buffer indicates the recommended buffer for optimal activity:

A	B	L	M	H
100%	0-10%	0-10%	0-10%	0-10%

Incubation temperature **25 °C**

Unit definition One unit is the enzyme activity that completely cleaves 1 μg λDNA in 1 h at **25 °C** in SuRE/Cut buffer A in a total volume of 25 μl.

Typical experiment

Component	Final concentration
DNA	1 μg
10 × SuRE/Cut Buffer A	2.5 μl
Repurified water	Up to a total volume of 25 μl
Restriction enzyme	1 unit

Incubate at **25 °C** for 1 h.

Heat inactivation *Sma* I can be heat-inactivated by 15 min incubation at 65 °C (tested with up to 100 μg DNA).

Number of cleavage sites on different DNAs (2):

λ	Ad2	SV40	Φ X174	M13mp7	pBR322	pBR328	pUC18
3	12	0	0	0	0	0	1

PFGE tested

Sma I has been tested in Pulsed Field Gel Electrophoresis (test system bacterial chromosomes). For cleavage of genomic DNA (*E. coli* C600) embedded in agarose for PFGE analysis, 10 units enzyme per μg DNA and approx. 4 h incubation time are recommended.

Activity in PCR buffer

Relative activity in PCR mix (Taq DNA Polymerase buffer) is 100%. The PCR mix contained λ target DNA, primers, 10 mM Tris-HCl (pH 8.3, 20 °C), 50 mM KCl, 1.5 mM MgCl₂, 200 μM dNTPs, 2.5 U Taq DNA polymerase. The mix was subjected to 25 amplification cycles.

Troubleshooting

Sma I is very temperature sensitive and the activity may drop down to only a few percent at higher temperatures [i.e. 37 °C instead of the recommended 25 °C]. A critical component is the DNA substrate. Many compounds used in the isolation of DNA e.g., phenol, chloroform, EtOH, SDS, high levels of NaCl, metals (e.g., Hg²⁺, Mn²⁺), inhibit or alter recognition specificity of many restriction enzymes. Such compounds should be removed by EtOH precipitation followed by drying, before the DNA is added to the restriction digest reaction. Appropriate mixing of the enzyme is recommended.

Quality control

See label of storage container for lot-specific values.

Absence of unspecific endonuclease activities

1 μg λDNA is incubated for 16 h in 50 μl SuRE/Cut buffer A with excess of *Sma* I. The number of enzyme units which do not change the enzyme-specific pattern is stated under "Endo".

Absence of exonuclease activity

Approx. 5 μg [³H] labeled calf thymus DNA are incubated with 3 μl *Sma* I for 4 h at 37 °C in a total volume of 100 μl 50 mM Tris-HCl, 10 mM MgCl₂, 1 mM Dithioerythritol, pH approx. 7.5. The release of radioactivity is calculated as a percentage value of liberated to input radioactivity per unit of enzyme (stated under "Exo").

Ligation and recutting assay

Sma I fragments obtained by complete digestion of 1 μg λDNA are ligated with 1 unit T4-DNA ligase (Cat. No. 10 481 220 001) in a volume of 10 μl by incubation for 16 h at 25 °C in 66 mM Tris-HCl, 5 mM MgCl₂, 5 mM Dithioerythritol, and 1 mM ATP, pH 7.5 (at 20 °C).

The percentage of ligation and subsequent recutting with *Sma* I which yields the typical pattern of λ × *Sma* I fragments is determined and stated under "Lig" and "Rec".

Changes to previous version

Editorial corrections

References

- 1 Endow, S. A. & Roberts, R. J. (1977) *J. Mol. Biol.* **112**, 521.
- 2 Kessler, C. & Manta, V. (1990) *Gene* **92**, 1-248.
- 3 Rebase The Restriction Enzyme Database:
<http://rebase.neb.com>
- 4 Benchmate: <http://roche-applied-science.com/benchmate>

Ordering Information

Roche Applied Science offers a large selection of reagents and systems for life science research. For a complete overview of related products and manuals, please visit and bookmark our home page, www.roche-applied-science.com, and our Special Interest Sites, including "Mapping & Cloning": <http://www.restriction-enzymes.com>.

The convenient RE Finder Program located on our Bench Mate website, <http://www.roche-applied-science.com/benchmate> helps you identify the enzymes that will cut your DNA sequence, and displays the names and recognition sequences of enzymes and isoschizomers as well as links to detailed information (e.g. package insert) of the selected restriction enzyme.

Product	Application	Packsize	Cat. No.
Restriction Enzymes	DNA restriction digestion	Please refer to website or catalogue	
Rapid DNA Ligation Kit	Ligation of sticky- or blunt-ended DNA fragments in just 5 min at 15 - 25 °C.	Kit (40 DNA ligations)	11 635 379 001
T4 DNA Ligase	Ligation of sticky- and blunt- ended DNA fragments.	100 U 500 units (1 U/μl)	10 481 220 001 10 716 359 001
Alkaline Phosphatase, shrimp	Dephosphorylation of 5'-phosphate residues from nucleic acids. Heat inactivation: 15 min at 65 °C.	1000 U	11 758 250 001
Alkaline Phosphatase (AP), special quality for molecular biology	Dephosphorylation of 5'-phosphate residues from nucleic acids.	1000 U (20 U/μl)	11 097 075 001
Agarose MP	Multipurpose agarose for analytical and preparative electrophoresis of nucleic acids	100 g 500 g	11 388 983 001 11 388 991 001
Agarose LE	Separation of nucleic acids in the range 0.2 - 1.5 kbp	100 g 500 g	11 685 660 001 11 685 678 001
Agarose Gel DNA Extraction Kit	For the elution of DNA fragments from agarose gels.	1 Kit (max. 100 reactions)	11 696 505 001
High Pure PCR Product Purification Kit	Purification of PCR or enzymatic modification reaction (e.g. restriction digest)	50 purifications 250 purifications	11 732 668 001 11 732 676 001
SuRE/Cut Buffer Set for Restriction Enzymes	Incubation buffers A, B, L, M and H for restriction enzymes	1 ml each (10× conc. solutions)	11 082 035 001
SuRE/Cut Buffer A	Restriction enzyme incubation	5 × 1 ml (10× conc. solution)	11 417 959 001
SuRE/Cut Buffer B	Restriction enzyme incubation	5 × 1 ml (10× conc. solution)	11 417 967 001
SuRE/Cut Buffer H	Restriction enzyme incubation	5 × 1 ml (10× conc. solution)	11 417 991 001
SuRE/Cut Buffer L	Restriction enzyme incubation	5 × 1 ml (10× conc. solution)	11 417 975 001
SuRE/Cut Buffer M	Restriction enzyme incubation	5 × 1 ml (10× conc. solution)	11 417 983 001
Water, PCR Grade	Specially purified, double-distilled, deionized, and autoclaved	100 ml (4 vials of 25 ml) 25 ml (25 vials of 1 ml) 25 ml (1 vial of 25 ml)	03 315 843 001 03 315 932 001 03 315 959 001
BSA, special quality for molecular biology	Maintaining enzyme stability	20 mg (1 ml)	10 711 454 001

Printed Materials You can view the following manuals on our website:

Laminated Buffer Chart
Lab FAQs "Find a Quick Solution"
Restriction Enzyme FAQs and Ordering Guide
Molecular Weight Markers for Nucleic Acids
Poster "Rec. Sequences of Restriction Enzymes"

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Commonly used bacterial strains

Strain	Genotype
BL21	<i>E. coli</i> B F ⁻ <i>dcm ompT hsdS(r_B⁻ m_B⁻) gal</i> (Studier, F.W. et al (1986) <i>J. Mol. Biol.</i> , 189 , 113.)
C600 ^e	<i>supE44 hsdR2 thi-1 thr-1 leuB6 lacY1 tonA21</i> ; (Hanahan, D. (1983) <i>J. Mol. Biol.</i> 166 , 557.)
DH5α	<i>supE44 Δ(lacU169 (φ80d/lacZΔM15) hsdR17 recA1 endA1 gyrA96 thi-1 relA1</i> ; (Hanahan, D. (1983) <i>J. Mol. Biol.</i> 166 , 557.)
HB101	<i>supE44 hsdS20 recA13 ara-14 proA2 lacY1 galK2 rpsL20 xyl-5 mtl-1</i> ; (Hanahan, D., (1983) <i>J. Mol. Biol.</i> 166 , 557.)
JM108	<i>recA1 supE44 endA1 hsdR17 gyrA96 relA1 thi Δ(lac-proAB)</i> ; (Yanisch- Perron, C. et al., (1985) <i>Gene</i> 33 , 103.)
JM109	<i>recA1 supE44 endA1 hsdR17 gyrA96 relA1 thi Δ(lac-proAB) F[traD36proAB⁺, lacI^q lacZΔM15]</i> ; (Yanisch- Perron, C. et al., (1985) <i>Gene</i> 33 , 103.)
JM110	<i>rpsL (Str^r) thr leu thi-1 lacY galK galT ara tonA tsx dam dcm supE44 Δ(lac-proAB) F[traD36proAB⁺, lacI^q lacZΔM15]</i> ; (Yanisch- Perron, C. et al., (1985) <i>Gene</i> 33 , 103.)
K802	<i>supE hsdR gal metB</i> ; (Raleigh, E. et al., (1986) <i>Proc.Natl. Acad.Sci USA</i> , 83 , 9070.; Wood, W.B. (1966) <i>J. Mol. Biol.</i> , 16 , 118.)
SURE ^f	<i>recB recJ sbc C201 uvrC umuC::Tn5(kan^r) lac, Δ(hsdRMS) endA1 gyrA96 thi relA1 supE44 F[proAB⁺ lacI^q lacZΔM15 Tn10 (tet^r)]</i> ; (Greener, A. (1990) <i>Stratagies</i> , 3 , 5.)
TG1	<i>supE hsd Δ5 thi Δ(lac-proAB) F[traD36proAB⁺, lacI^q lacZΔM15]</i> ; (Gibson, T.J. (1984) <i>PhD Theses. Cambridge University, U.K.</i>)
XL1-Blue ^f	<i>supE44 hsdR17 recA1 endA1 gyrA46 thi relA1 lac F[proAB⁺, lacI^q lacZΔM15 Tn10 (tet^r)]</i> ; (Bullock et al., (1987) <i>BioTechniques</i> , 5 , 376.)

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