







# Performance you can count on

## High-Fidelity (HF<sup>®</sup>) Restriction Enzymes from New England Biolabs

For nearly 40 years, New England Biolabs has been developing innovative solutions for molecular biology applications. The respected leader in the field of restriction enzyme biology, NEB<sup>®</sup> has developed High-Fidelity (HF) Restriction Enzymes to address two short-comings of traditional restriction enzymes: buffer compatibility and star activity.

HF restriction enzymes have 100% activity in CutSmart<sup>™</sup> Buffer; single-buffer simplicity means more straightforward and streamlined sample processing. HF enzymes also exhibit dramatically reduced star activity. Engineered with performance in mind, HF restriction enzymes are fully active under a broader range of conditions, minimizing off-target products, while offering flexibility in experimental design.

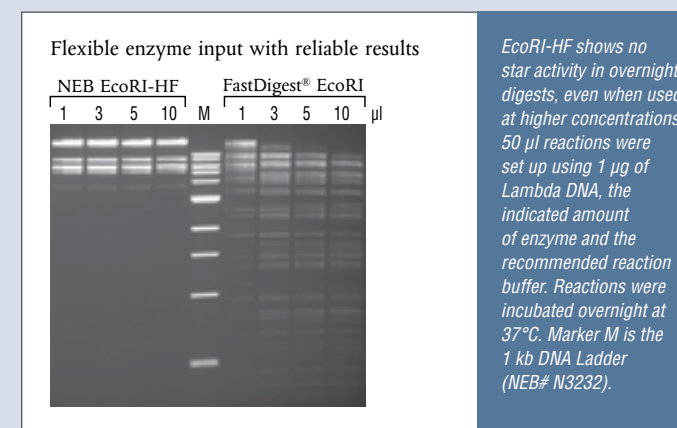
### Benefits of High-Fidelity (HF) Restriction Enzymes:

-  One buffer convenience with no loss of performance
-  Reduced star activity eliminates unwanted cleavage
-  Time-Saver qualified for 5–15-minute digests and flexible enough to digest overnight
-  Engineered for performance under a wide range of conditions
-  Added performance without added cost
-  Includes Purple Loading Dye for brighter, sharper bands and no UV shadow

# What does an HF Restriction Enzyme mean to you?

## Optimized performance for a wide range of conditions

High-Fidelity Restriction Enzymes have been engineered by exchanging functional amino acid residues and then screening for optimum mutants that perform under a wide range of conditions. Whether you are setting up digests for 5–15 minutes or overnight, or using varying amounts of enzyme, HF enzymes ensure the performance you need.

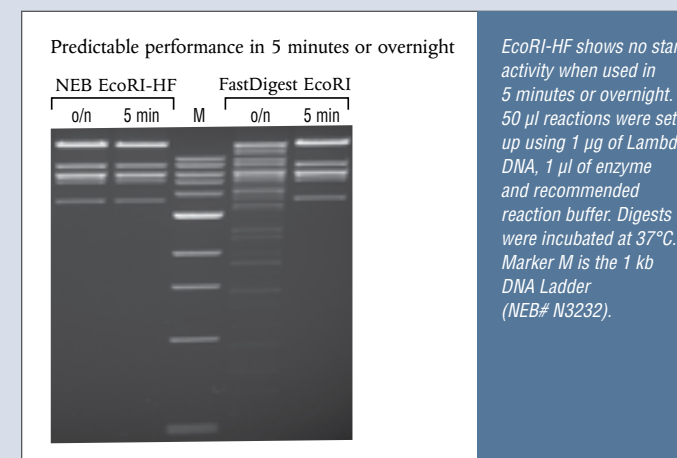


## One-buffer convenience with no loss of performance

All High-Fidelity Restriction Enzymes work optimally in CutSmart Buffer, which offers the highest level of compatibility in the NEBuffer System. In fact, over 200 restriction enzymes exhibit 100% activity in CutSmart Buffer, which is the largest number of enzymes commercially available for use with a single buffer. No more checking for buffer compatibility!

## Faster digests with the same great results

All HF enzymes are Time-Saver<sup>™</sup> qualified and certified to be nuclease free, giving them the power to digest DNA in 5-15 minutes and the flexibility to be used in overnight digestions. Choose the reaction time that works for you. For a complete list of Time-Saver qualified enzymes, visit [www.neb.com/timesaver](http://www.neb.com/timesaver)



## Greater confidence in the accuracy of your results

Star activity, an intrinsic property of restriction enzymes, describes the unwanted cleavage and end-product degradation that occurs under sub-optimal reaction conditions. When used with an incompatible buffer or at a high enzyme concentration, off-target and degenerate products can be formed. HF enzymes have been engineered for reduced star activity, increasing accuracy and avoiding unwanted cleavage.

The table indicates the number of units of HF enzyme that can be used compared to the wild type before significant star activity is detected. The HF factor refers to the X-fold reduction in star activity that is achieved by choosing an HF enzyme, and clearly illustrates the flexibility that is offered by using an HF enzyme.

PRODUCT	RECOGNITION SITE	NEB #	BUFFER	MAXIMUM UNITS WITH NO STAR ACTIVITY*	HF FACTOR
AgeI-HF*	5'...A <sup>↓</sup> CCGGT...3'	R3552S/L	CutSmart	≥ 250	≥ 8
AgeI	3'...TGGCCA...5'	R0552	1.1	32	
BamHI-HF	5'...GGATCC...3'	R3136S/L	CutSmart	≥ 4,000	≥ 125
BamHI	3'...CCTAGG...5'	R0136	3.1	32	
BmtI-HF	5'...GCTAGC...3'	R3658	CutSmart	1,000,000	62,500
BmtI	3'...CGATCG...5'	R0658	3.1	16	
BsaI-HF	5'...GGTCTC(N) <sub>1</sub> ...3'	R3535S/L	CutSmart	≥ 8,000	≥ 250
BsaI	3'...CCAGAG(N) <sub>2</sub> ...5'	R0535	CutSmart	32	
BstEII-HF*	5'...G <sup>↓</sup> TNACC...3'	R3162	CutSmart	≥ 2,000	≥ 125
BstEII	3'...CCANTGG...5'	R0162	3.1	16	
DraIII-HF	5'...CACNN <sup>↓</sup> GTG...3'	R3510S/L	CutSmart	≥ 2,000	≥ 1,000
DraIII**	3'...GTGNNNCAC...5'	R0510	3.1	2	
EagI-HF	5'...CGGCCG...3'	R3505S/L	CutSmart	500	2
EagI	3'...GCCGGC...5'	R0505	3.1	250	
EcoRI-HF*	5'...GAATTC...3'	R3101S/L	CutSmart	16,000	64
EcoRI	3'...CTTAAG...5'	R0101	U	250	
EcoRV-HF*	5'...GATATC...3'	R3195S/L	CutSmart	≥ 64,000	≥ 64
EcoRV	3'...CTATAG...5'	R0195	3.1	1,000	
HindIII-HF	5'...AAGCTT...3'	R3104S/L	CutSmart	≥ 500,000	≥ 2,000
HindIII	3'...TTCGA...5'	R0104	2.1	250	
KpnI-HF*	5'...GGTACC...3'	R3142S/L	CutSmart	≥ 1,000,000	≥ 62,500
KpnI	3'...CCATGG...5'	R0142	1.1	16	
MfeI-HF*	5'...CAATTG...3'	R3589S/L	CutSmart	≥ 500	≥ 16
MfeI	3'...GTTAAG...5'	R0589	CutSmart	32	
NcoI-HF*	5'...CCATGG...3'	R3193S/L	CutSmart	≥ 64,000	≥ 530
NcoI	3'...GGTACC...5'	R0193	3.1	120	
NheI-HF*	5'...GCTAGC...3'	R3131S/L	CutSmart	≥ 32,000	≥ 266
NheI	3'...CGATCG...5'	R0131	2.1	12	
NotI-HF*	5'...GCGGCCGC...3'	R3189S/L	CutSmart	≥ 64,000	≥ 16
NotI	3'...CGCCGGCG...5'	R0189	3.1	4,000	
PstI-HF	5'...CTGCAG...3'	R3140S/L	CutSmart	4,000	33
PstI	3'...GACGTC...5'	R0140	3.1	120	
PvuI-HF*	5'...CGATCG...3'	R3150S/L	CutSmart	≥ 16,000	≥ 32
PvuI	3'...GCTAGC...5'	R0150	3.1	500	
PvuII-HF	5'...CAGCTG...3'	R3151S/L	CutSmart	500	32
PvuII	3'...GTCGAC...5'	R0151	3.1	16	
SacI-HF	5'...GAGCTC...3'	R3156S/L	CutSmart	≥ 32,000	≥ 266
SacI	3'...CTCGAG...5'	R0156	1.1	120	
SalI-HF*	5'...GTTCGAC...3'	R3138S/L	CutSmart	≥ 32,000	≥ 8,000
SalI	3'...CAGCTG...5'	R0138	3.1	4	
SbfI-HF	5'...CCTGCA <sup>↓</sup> GG...3'	R3642S/L	CutSmart	250	32
SbfI	3'...GGACGTCC...5'	R0642	CutSmart	8	
Scal-HF*	5'...AGTACT...3'	R3122S/L	CutSmart	250	62
Scal**	3'...TCA <sup>↓</sup> TGA...5'	R0122	3.1	4	
SpeI-HF	5'...A <sup>↓</sup> GTAGT...3'	R3133S/L	CutSmart	≥ 8,000	≥ 16
SpeI*	3'...TGATCA...5'	R0133	CutSmart	500	
SphI-HF	5'...GCA <sup>↓</sup> TGC...3'	R3182S/L	CutSmart	8,000	250
SphI	3'...CGTACG...5'	R0182	2.1	32	
SspI-HF	5'...AATAAT...3'	R3132S/L	CutSmart	500	16
SspI	3'...TAATAA...5'	R0132	U	32	
StyI-HF	5'...C <sup>↓</sup> WWGG...3'	R3500S/L	CutSmart	4,000	125
StyI	3'...GGW <sup>↓</sup> CC...5'	R0500	3.1	32	

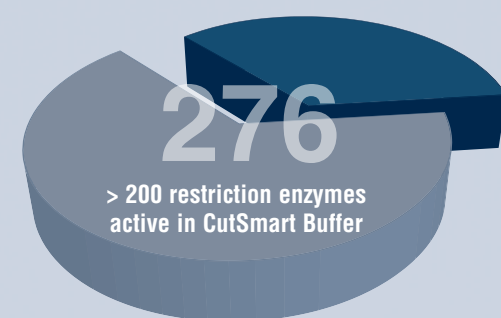
\* Indicates a RE-Mix Master Mix format is available.  
 \*\* Indicates the product is no longer available.

# Convenience you are looking for

## Single buffer simplicity

Gone are the days of buffer compatibility analyses and sub-optimal enzyme conditions! HF restriction enzymes are all 100% active in a single buffer: CutSmart Buffer. This simplifies double digest reactions and eliminates the need for setting up sequential digests. HF enzymes share the same site specificity and cleavage efficiency as their wild-type counterparts, but offer the increased flexibility and convenience that you need in your laboratory. Whether you have 5–15 minutes or want to leave your reactions overnight, restriction enzyme digests with HF enzymes produce the same, reliable results. All of our HF enzymes are supplied with Purple Gel Loading Dye, for sharper bands and no UV shadow. Set up your digests with reaction-specific enzyme concentrations, without fear of risking product integrity to star activity. HF enzymes offer added flexibility and functionality without added cost – they're available for the same price-per-unit as the native enzyme.

HF restriction enzymes from NEB – part of the largest single buffer restriction enzyme collection



New England Biolabs currently supplies 276 restriction enzymes, > 200 of which are active in CutSmart Buffer.

## Mix it up.

For added convenience, many of NEB's HF enzymes are available in RE-Mix® Master Mix format.

Visit [www.NEBREMIX.com](http://www.NEBREMIX.com) for more details.



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## Accessibility

Mobile tools for your research

Now available for the Droid™ and iPhone®. NEBTools to aid in setting up your restriction enzyme digests.



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