Q5® High-Fidelity DNA Polymerase

FIDELITY AT ITS FINEST

NEW ENGLAND BioLabs® Inc.

be INSPIRED
drive DISCOVERY
stay GENUINE

Fidelity at its finest.

Q5 and Q5 Hot Start High-Fidelity DNA Polymerases

Q5 High-Fidelity DNA Polymerase sets a new standard for both fidelity and performance. With the highest fidelity amplification available (~ 280X higher than *Taq* and > 5X higher than Thermo Scientific® Phusion®), Q5 DNA Polymerase results in ultra-low error rates. Q5 DNA Polymerase is composed of a novel polymerase that is fused to the processivity-enhancing Sso7d DNA binding domain, improving speed, fidelity and reliability of performance.

"Q5 works great. It was able to amplify a very difficult product, one I honestly didn't think would work. I am extremely happy with the Q5 enzyme."

SCIENTIST – VANDERBILT UNIVERSITY

Five quality features of Q5:

1. Fidelity – the highest fidelity amplification available (~280X higher than *Taq* and > 5X higher than Phusion)
2. Robustness – high specificity and yield with minimal optimization
3. Coverage – superior performance for a broad range of amplicons (from high AT to high GC)
4. Speed – short extension times
5. Amplicon length – robust amplifications up to 20 kb for simple template, and 10 kb for complex

Mandarin Ducks *(Aix galericulata)* are frequently featured in Chinese art and are regarded as a symbol of fidelity.

Visit Q5PCR.com to request a sample and to view the latest video tutorials on Q5 DNA Polymerase from NEB scientists.

Choose Q5 High-Fidelity DNA Polymerase for ALL your high-fidelity PCR needs.

Comparison of high-fidelity polymerases

PRODUCT NAME (SUPPLIER)	POLYMERASE FIDELITY (Reported by supplier)	MAXIMUM AMPLICON LENGTH[5]	EXTENSION TIME[5] (For simple templates[4])	EXTENSION TIME[6] (For complex templates[4])
Q5 High-Fidelity DNA Polymerase (NEB)	~280X *Taq*[1]	20 kb simple; 10 kb complex	10 s/kb	10 s/kb (< 1 kb) 20–30 s/kb (> 1 kb)
Phusion High-Fidelity DNA Polymerase (NEB)	39X *Taq*[1]	20 kb simple; 10 kb complex	15 s/kb	30 s/kb
Accuprime *Pfx* (Life)	26X *Taq*[2]	12 kb[3]	60 s/kb[3]	
PfuUltra II Fusion HS (Agilent)	20X *Taq*[2]	19 kb[3]	15 s/kb (< 10 kb[3]) 30 s/kb (> 10 kb[3])	
PfuUltra High-Fidelity DNA Polymerase (Agilent)	19X *Taq*[2]	17 kb simple; 6 kb complex	60 s/kb (< 10 kb) 120 s/kb (> 10 kb)	60 s/kb (< 6 kb) 120 s/kb (> 6 kb)
KOD DNA Polymerase (EMD)	12X *Taq*[1]	6 kb simple; 2 kb complex	10–20 s/kb	30–60 s/kb
Platinum *Taq* HiFi (Life)	6X *Taq*[2]	20 kb[3]	60 s/kb[3]	

1 *We continue to investigate improved assays to characterize Q5's very low error rate to ensure that we present the most accurate fidelity data possible (Potapov, V. and Ong, J.L. (2017) PLoS ONE. 12(1): e0169774).*

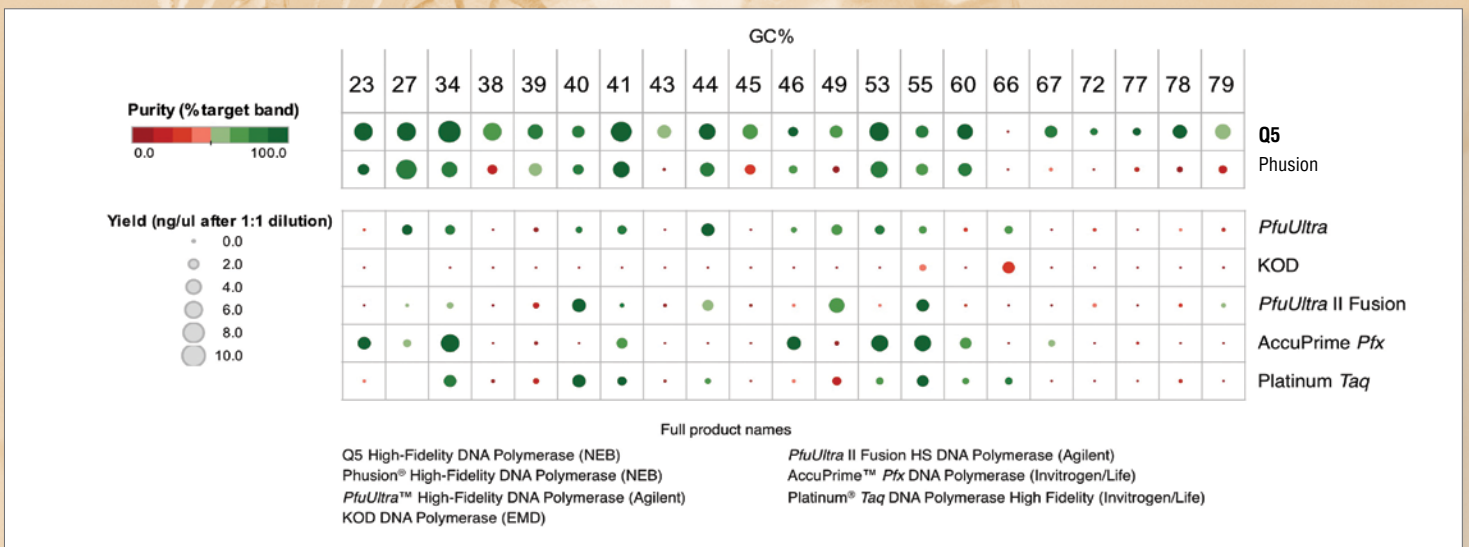
2 *PCR-based mutation screening in lacZ (NEB), lacI (Agilent) or rpsL (Life).*

3 *Template not specified.*

4 *Simple templates include plasmid, viral and E. coli genomic DNA. Complex templates include plant, human and other mammalian genomic DNA.*

5 *Values provided by individual manufacturers.*

Q5 provides superior amplification performance across a wide range of genomic targets



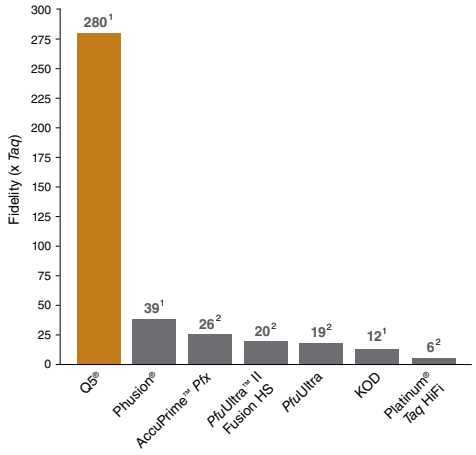
PCR was performed with a variety of amplicons, with GC content ranging from high AT to high GC, with Q5 and several other commercially available polymerases. All polymerases were cycled according to manufacturers' recommendations, including use of GC Buffers and enhancers when recommended. Yield and purity of reaction products were quantitated and represented, as shown in the figure key, by dot color and size. A large dark green dot represents the most successful performance. Q5 provides superior performance across the range of GC content.

The five quality features of Q5

1. Highest fidelity DNA amplification available

At ~280X higher than *Taq*, Q5 offers unparalleled fidelity for your most important samples, but with a protocol and pricepoint that makes it accessible for routine amplifications.

The highest fidelity amplification available



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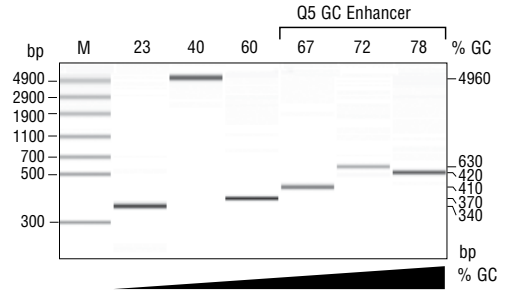
2 PCR-based mutation screening in lacZ (NEB), lacI (Agilent) or rpsL (Life).

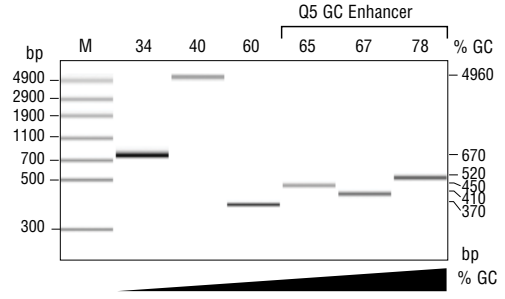
2. Robust amplification with minimal optimization

High specificity and yield are absolute requirements for today's molecular biology techniques. Q5 delivers both for a wide range of templates.

Q5 High-Fidelity DNA Polymerase



Q5 Hot Start High-Fidelity DNA Polymerase

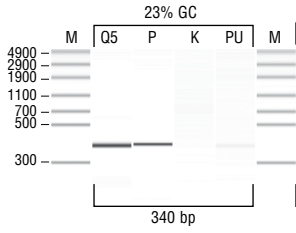


Robust amplification with Q5 and Q5 Hot Start High-Fidelity DNA Polymerases, regardless of GC content: Amplification of a variety of human genomic amplicons from low to high GC content using either Q5 or Q5 Hot Start High-Fidelity DNA Polymerase. Reactions using Q5 Hot Start were set up at room temperature. All reactions were conducted using 30 cycles of amplification and visualized by microfluidic LabChip® analysis.

3. Superior cover

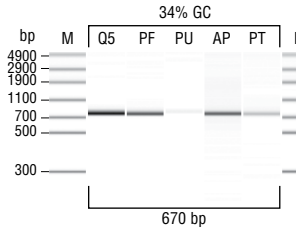
While other DNA polymera
superior performance for a

Q5 High-Fidelity DNA Polym



Q5 = Q5 High-Fidelity DNA Polymerase (NEB)
P = Phusion® High-Fidelity DNA Polymerase (

Q5 Hot Start High-Fidelity D



Q5 = Q5 Hot Start High-Fidelity DNA Polymera
PF = Phusion Hot Start Flex DNA Polymerase

4. Shorter PCR p

Achieve precision without s
design incorporating the SS
domain enables shorter exte
10 seconds per kb. Additio
requires no initial denaturat

"Q5 DNA Polymeras
on the first shot."

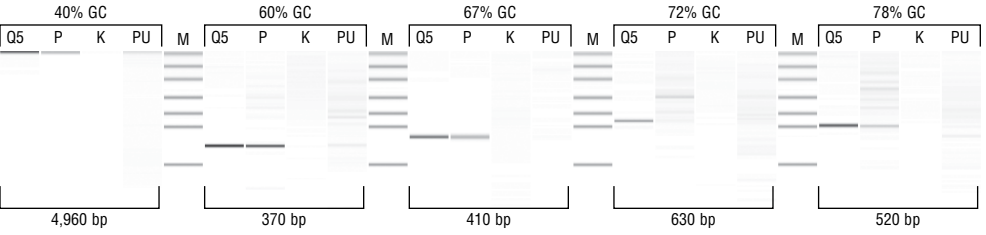
RESEARCH TECHNOLOGIST — UN

High Fidelity DNA Polymerase

rage for a broad range of amplicons, regardless of GC content

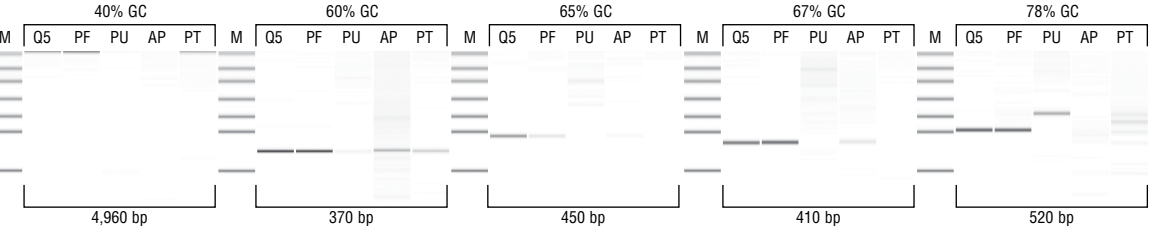
ases can have difficulty amplifying high-GC or high-AT amplicons, Q5 DNA Polymerase displays wide range of templates.

nerase



K = KOD DNA Polymerase (EMD)
NEB) PU = *PfuUltra*™ High-Fidelity DNA Polymerase (Agilent)

NA Polymerase



ase (NEB) PU = *PfuUltra* II Fusion HS DNA Polymerase (Agilent) PT = Platinum® *Taq* DNA Polymerase High Fidelity (Invitrogen/Life)
(NEB) AP = AccuPrime™ *Pfx* DNA Polymerase (Invitrogen/Life)

Amplification of a variety of human genomic amplicons from low to high GC content demonstrates the broad performance of Q5 High-Fidelity DNA Polymerase. All reactions were conducted using 20 ng of input template and included 30 cycles of amplification. Results were visualized by microfluidic LabChip® analysis. Competitor polymerases were cycled according to manufacturer's recommendations. For the 67%, 72% and 78% GC amplicons, GC Buffers or enhancers were used when supplied with the polymerase.

protocols

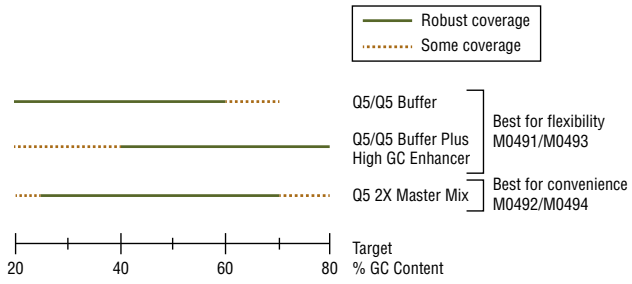
acrificing speed. Q5's unique o7d processivity-enhancing ension times, as low as nally, aptamer-based hot start ion step.

e gave me wonderful results

NIVERSITY OF NEBRASKA MEDICAL CENTER

5. Templates up to 20 kb

With Q5, you can reliably amplify simple templates up to 20 kb. Complex templates up to 10 kb can also be amplified with a high degree of confidence.



The stand-alone enzyme comes with a reaction buffer that supports robust amplification of high AT to routine targets. Addition of the High GC Enhancer allows amplification of GC rich and difficult targets. For added convenience, the master mix formats allow robust amplification of a broad range of targets with a single formulation.

For more information, visit **Q5PCR.com**

Choose from a Selection of Standalone Enzymes, Master Mixes and Kits

For your high-fidelity PCR needs.

PRODUCT	NEB #	SIZE
Q5 High-Fidelity DNA Polymerase	M0491S/L	100/500 units
Q5 High-Fidelity 2X Master Mix	M0492S/L	100/500 reactions
Q5 Hot Start High-Fidelity DNA Polymerase	M0493S/L	100/500 units
Q5 Hot Start High-Fidelity 2X Master Mix	M0494S/L	100/500 reactions
Q5 High-Fidelity PCR Kit	E0555S/L	50/200 reactions
Q5 Site-Directed Mutagenesis Kit (With or Without Competent Cells)	E0554S/E0552S	10 reactions
NEBNext® Ultra II Q5 Master Mix	M0544S/L	50/250 reactions

Request a free sample of Q5 High-Fidelity DNA Polymerase at Q5PCR.com

Featured Online Tools

PCR Selector

For help with choosing the best polymerase for your PCR, try our PCR selector at **PCRselector.neb.com.**

Tm Calculator

For help with calculating annealing temperatures, try our Tm Calculator at **TmCalculator.neb.com.**

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