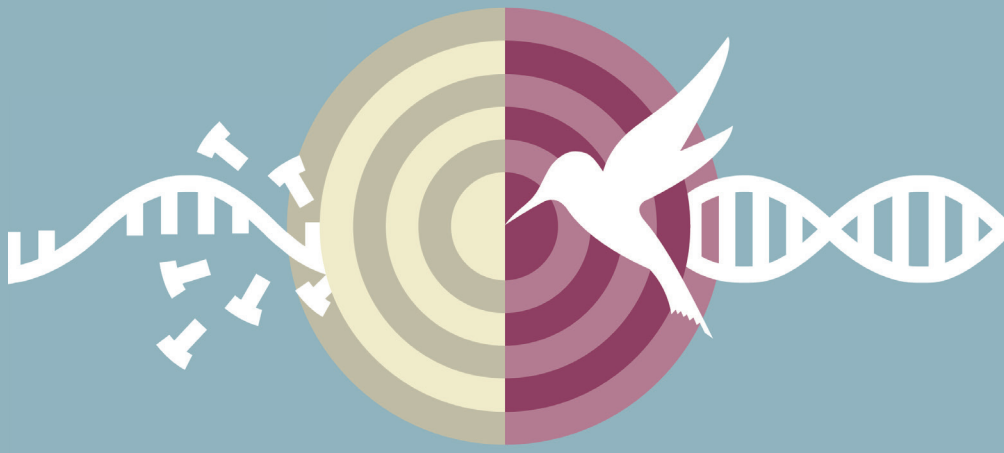
AMPLIQON
PCR ENZYMES & REAGENTS

AQ90 HIGH FIDELITY DNA POLYMERASE



AQ90 High Fidelity DNA Polymerase from Ampliqon is a proof-reading DNA polymerase with the ability to perform robust amplification of a vast range of difficult targets with high to low GC contents. The fidelity of the polymerase has been measured to be up to 50x Taq DNA Polymerase. These features of AQ90 High Fidelity DNA Polymerase have been attained by combining functional domains from two wildtype archaeal high fidelity DNA polymerases, thereby creating a unique and chimeric DNA Polymerase displaying the most desired features from both wildtype DNA Polymerases.

AQ90 is well suited for PCR experiments whose outcome is strictly dependent on amplifications with very low error rates, such as cloning/sub-cloning, NGS applications and mutagenesis.

Features:

- High Fidelity – measured up to 50x Taq fidelity
- High specificity
- Robust amplification
- Long range amplification capacity:
  8.5 kb for gDNA and ≤ 12.5 kb for λDNA

High fidelity

AQ90 High Fidelity DNA Polymerase exhibits high fidelity providing the user with low error rate PCR results. Fidelity values of AQ90 High Fidelity DNA Polymerase and Taq DNA Polymerase were measured using a next-generation-sequencing (NGS) based method. A fidelity for AQ90 High Fidelity DNA polymerase of up to 50x the fidelity of Taq DNA Polymerase was measured. Furthermore, a profile displaying the error rate across the target sequence for Taq DNA Polymerase was compared to that of AQ90 High Fidelity Polymerase (Figure 1). The profile indicates that the error rate of Taq DNA Polymerase is higher than that of AQ90 High Fidelity DNA Polymerase. Furthermore, the error rate of AQ90 High Fidelity DNA Polymerase is close to the back ground, indicating a low error rate.

Long range amplification

AQ90 High Fidelity DNA Polymerase provides the user with the ability to amplify a broad range of DNA targets from short and up to ≤ 12.5 kb for simple DNA templates such as λDNA and for more complex templates, such as human genomic DNA up to 8.5 kb (Figure 2).

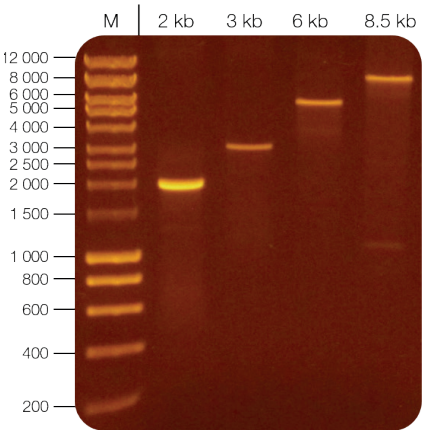


Figure 2: AQ90 enables amplification of large amplicons. Four different targets of human genomic DNA ranging from 2 kb and up to 8.5 kb was used for this study. Amplicon size are indicated at the top of the gel. Marker M is High Range DNA Ladder from Ampliqon (A610141).

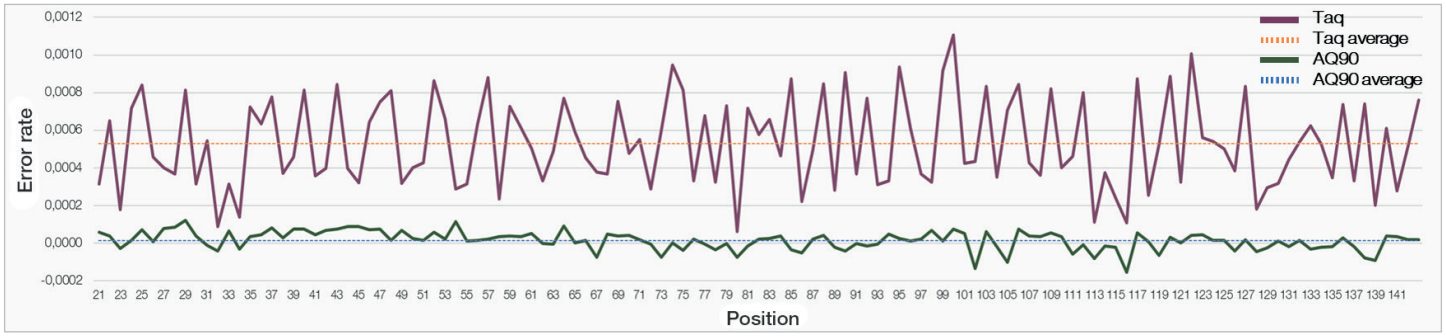


Figure 1. Error rate diagram. A PCR was performed with both Taq DNA Polymerase and AQ90 High Fidelity DNA Polymerase, followed by NGS sequencing of the PCR products. The error rate of each polymerase was then calculated in each PCR target position and plotted in this graph. The error rate calculation includes substitution errors, deletions and insertions in each position. The dotted lines show the average error rate for each graph.

AQ90 HIGH FIDELITY DNA POLYMERASE

Robust amplification of GC-rich DNA targets

AQ90 DNA High Fidelity DNA Polymerase provides the user with robust and specific amplification of a variety of DNA targets with GC contents ranging from ~ 30 – 80 %. The 10x AQ90 Buffer provided with the enzyme is recommended for highest fidelity and specificity. For DNA targets with a high GC content, more complex secondary structures or longer DNA targets, the addition of 1 - 2 M Betaine Enhancer Solution is recommended.

The PCR performance of AQ90 High Fidelity DNA Polymerase was compared to that of high fidelity DNA polymerases from three well recognized competitors (Figure 3). PCR was performed on nine different human genomic targets, with GC contents ranging from ~ 30 – 80 %. Robust amplification was observed using AQ90 High Fidelity DNA Polymerase on the nine human genomic targets. In contrary, none of the three leading high fidelity DNA polymerases were able to provide the same level of robust amplification on the DNA targets with the higher GC content, under the conditions tested here.

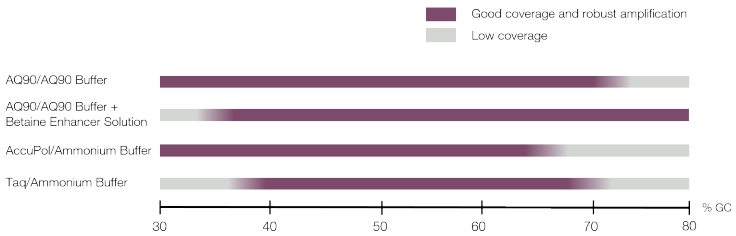
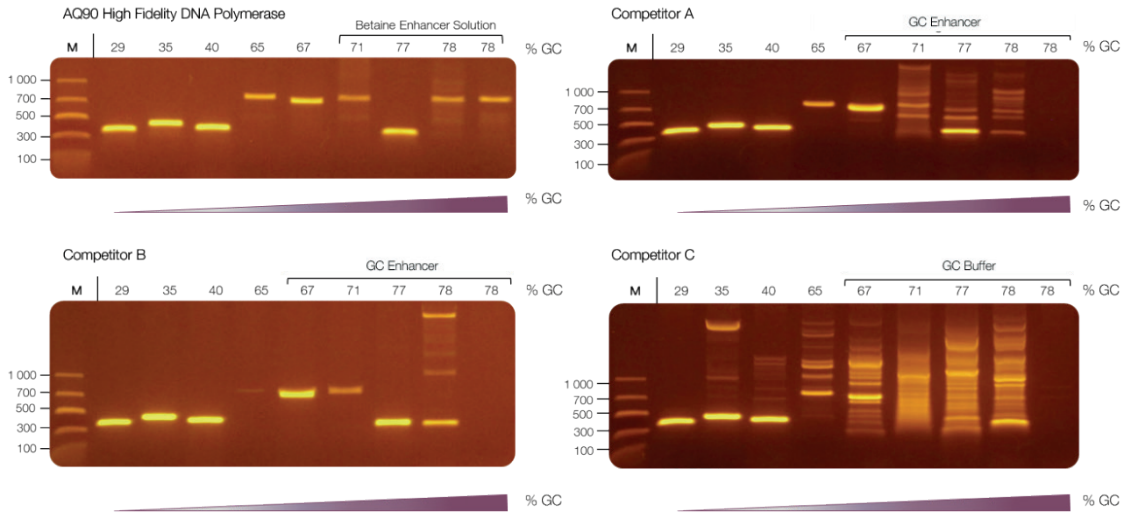


Figure 4. Illustration of the coverage of AQ90. 10x AQ90 Buffer supports robust amplification of DNA targets with a GC content ranging from ~ 30 – 70 %. The addition of 2 M Betaine Enhancer solution supports amplification of DNA targets with higher GC content. The coverage of AQ90 High Fidelity DNA Polymerase is illustrated against the coverage of AccuPol DNA polymerase from Ampliqon and Taq DNA Polymerase when using the 10x Ammonium Buffer.



% GC	bp
29	396
35	459
40	416
65	788
67	737
71	777
77	381
78	779
78	790

Figure 3. Robust amplification of AQ90 High Fidelity DNA Polymerase. The performance of AQ90 High Fidelity was compared to three leading high fidelity DNA Polymerases (A, B and C). Nine different human genomic DNA targets, 400 – 800 bp in length and with GC contents ranging from 29 – 78 %, were amplified. Amplification studies were set up, as recommended by the manufactures. T_m Calculators of the respective competitors were used to calculate optimal annealing temperatures for primers. When amplifying GC-rich targets, 2 M Betaine Enhancer Solution (AQ90 DNA Polymerase), GC enhancer (Competitor A and B) or GC-rich specific PCR Buffer (competitor C) were included in the reaction mix.

Applications:

- Cloning/sub-cloning
- Mutagenesis
- Gene expression
- Construction of libraries
- NGS applications

Ordering information

Product	Size	Cat #
AQ90 High Fidelity DNA Polymerase	100 Units	A457401
	500 Units	A457403
	1000 Units	A457404
	2500 Units	A457406
AQ90 High Fidelity DNA Polymerase 2x Master Mix	100 Reactions	A470701
	500 Reactions	A470703
	2500 Reactions	A470706
	5000 Reactions	A470707
Betaine Enhancer Solution 5 M	5 x 1 ml	A351104

For more info please visit: **www.ampliqon.com**

Reagents for in vitro laboratory use only.
Ampliqon is ISO 9001:2015 certified.

AMPLIQON
PCR ENZYMES & REAGENTS