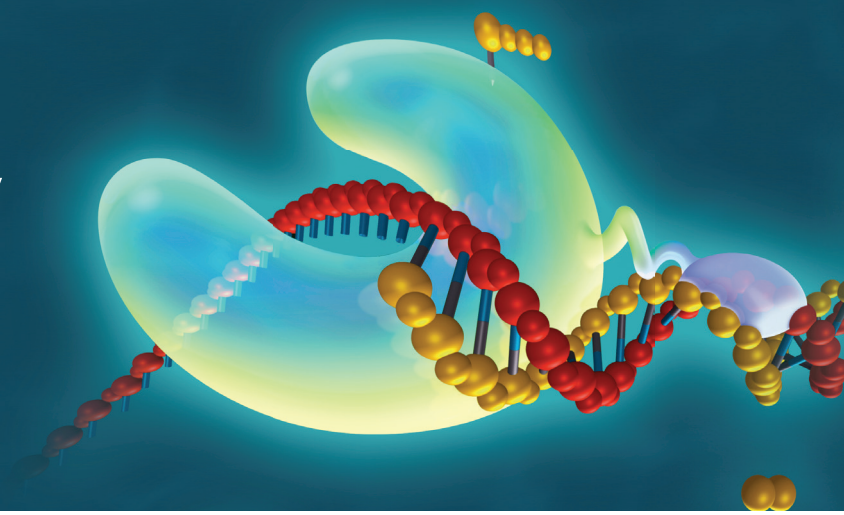
Phusion high-fidelity DNA polymerases



Favored over most other polymerases for accuracy, speed, and value

Since their introduction, Thermo Scientific™ Phusion™ high-fidelity DNA polymerases have been referenced in thousands of publications and have become the choice for even demanding applications like massively parallel high-throughput sequencing of whole genomes. The Phusion™ family of products includes over a dozen varied formats enabling high-fidelity PCR for even specialized applications.

Why use Phusion products?

In Phusion high-fidelity DNA polymerases, a DNA-binding domain is fused to a *Pyrococcus*-like proofreading polymerase. Due to this unique fusion technique, Phusion DNA polymerases generate PCR products with very high accuracy and speed. In addition, Phusion DNA polymerases are tolerant of various inhibitors, allowing for robust amplification with minimal optimization.

The processivity of Phusion DNA polymerases is ~10-fold greater than that of *Pfu* DNA polymerase and twice that of *Taq* DNA polymerase. This high processivity results in short extension times, more robust amplification, and the ability to amplify long amplicons in a fraction of the time. Phusion DNA polymerases also produce higher yields while using less enzyme than traditional proofreading polymerases.

Technical details

- **High fidelity**—up to 52x more accurate than *Taq*; up to 6x more accurate than *Pfu* DNA polymerase (Figure 1)

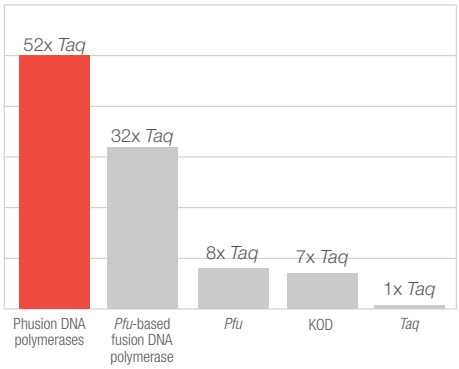


Figure 1. Relative fidelity was calculated with reference to fidelity of *Taq* DNA polymerase. Fidelity = 1/error rate. Relative fidelity was calculated with reference to fidelity of *Taq*.

- **Enhanced robustness**—fewer reaction failures and minimal optimization
- **Enhanced specificity**—unique hot-start technology with no reactivation time reduces nonspecific amplification and primer degradation (Figure 2)
- **Improved yields**—high product yields with minimal enzyme amounts (0.5–1 U/50 µL reaction)
- **High speed**—increased processivity allows shorter reaction times (extension 15–30 s/kb) (Figure 3)
- **Simplified workflows**—green buffer formats allow direct loading of PCR products onto gels

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Usage and applications

- High-fidelity PCR
- Fast PCR
- Hot-start PCR
- Long range PCR (up to 20 kb)
- High-throughput PCR

Specialized formats

We offer specific Phusion polymerases designed for high fidelity-PCR depending on your need for maximum specificity, maximum fidelity, fast PCR, PCR from bisulphite-treated or ancient DNA, or PCR from GC-rich amplicons. Go to **thermofisher.com/phusion** to choose the appropriate Phusion polymerase for your application.

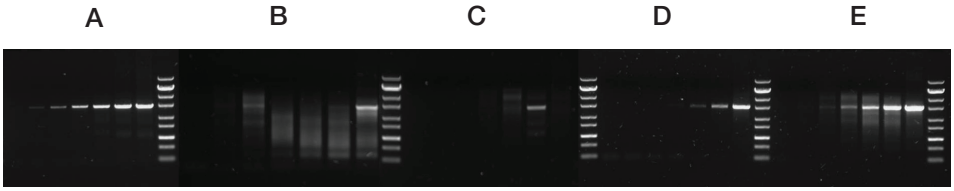

Figure 2. High sensitivity and specific PCR amplification. (A) Thermo Scientific™ Phusion™ Green Hot Start II High-Fidelity DNA Polymerase and proofreading hot-start DNA polymerases from other suppliers: **(B)** KOD™ (Millipore Sigma) **(C)** PfuUltra™ (Agilent Technologies) II **(D)** HiFi™ (KAPA Biosystems) and **(E)** PrimeSTAR™ Max (Takara) hot start DNA polymerases were used to amplify a 0, 0.08, 0.4, 2, 10, 50, or 250 ng of a kb fragment from human genomic DNA. Phusion Green Hot Start II High-Fidelity DNA Polymerase provided high yields of specific products, whereas other enzymes delivered low yields, with some also amplifying nonspecific products.

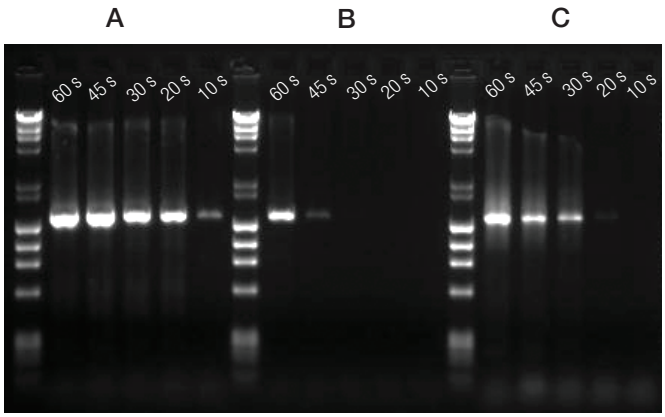

Figure 3. High speed and yields with Thermo Scientific™ Phusion™ Flash High-Fidelity PCR Master Mix. A 1.5 kb human cathepsin K gene was amplified with **(A)** Thermo Scientific™ Phusion™ Flash II DNA Polymerase and polymerases from other suppliers **(B)** PfuUltra II Fusion (Agilent) and **(C)** Qiagen™ Fast Cycling 2X Mix using varying extension times (10–60 seconds). Only Phusion Flash High-Fidelity PCR Master Mix containing Phusion Flash II DNA Polymerase was able to amplify the 1.5 kb gene with very short extension times of 10 and 20 seconds. It also produced superior yields of specific product compared to other enzymes tested.

Ordering information

Product*	Size	Cat. No.
Phusion High-Fidelity DNA Polymerase	100 units	F-530S
Phusion Green High-Fidelity DNA Polymerase	100 units	F-534S
Phusion High-Fidelity PCR Master Mix with HF Buffer	100 reactions	F-531S
Phusion Hot Start II DNA Polymerase	100 reactions	F-549S
Phusion Hot Start II High-Fidelity PCR Master Mix	100 reactions	F-565S
Phusion Green Hot Start II High-Fidelity PCR Master Mix	100 reactions	F-566S
Phusion U Hot Start DNA Polymerase	100 reactions	F-555S

* Additional product formats and sizes are available.

Find out more at **thermofisher.com/phusion**

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