

Primed to propel a new generation of genomics

Codex® HiFi Hot Start DNA Polymerase

The next generation of DNA polymerase is here

Codex® HiFi Hot Start DNA Polymerase is a uniquely engineered enzyme that is tailored specifically for next-generation sequencing (NGS). With Codex® HiFi Hot Start DNA Polymerase, developers of NGS library preparation kits or custom workflows can incorporate amplification steps with industry-leading replication fidelity and uniformity of coverage, even for sequences at the extremes of GC content (i.e. <30% or >70%), without compromising on yield, specificity and other key metrics. Users of kits containing Codex® HiFi Hot Start DNA Polymerase will be more confident in sequencing results, which require fewer total reads to achieve the same target mean depth of coverage compared to alternative high fidelity DNA polymerases.

The enzyme engineering and formulation development was guided by established NGS metrics rather than surrogate methods, resulting in performance enhancements that are specifically relevant for NGS workflows. It is also formulated with a proprietary aptamer to deliver exceptional hot-start performance.

The Codex® HiFi Hot Start DNA Polymerase is available for custom OEM supply as a standalone enzyme or fully formulated into a 2X NGS Mix, requiring only the addition of DNA template and primers.

Industry-leading fidelity

Codex® HiFi Hot Start DNA Polymerase delivers the high-fidelity needed when applications demand exceptionally accurate DNA sequences.

- ~400X higher fidelity than wild-type Taq polymerase
- ~2.5X higher fidelity than market-leading high-fidelity DNA polymerase

400-fold increase in fidelity compared to Taq polymerase

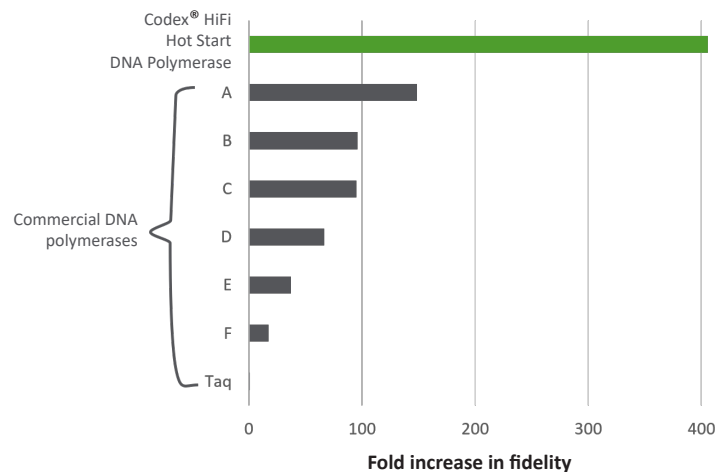


Figure 1. Fidelity was assessed using a high-resolution genetic reporter assay, analogous to blue/white colony screening, and quantified using high-throughput flow cytometry. The reporter gene was amplified according to each supplier’s recommended protocol and high-fidelity buffers. Comparisons are expressed as fold-increase relative to a wild-type Taq polymerase (“Taq”) with fidelity defined as 1. The results reported for each of the alternative polymerases correlate well with the self-reported fidelity of each respective supplier.

Unparalleled fidelity and coverage uniformity for exceptional performance

- 400X higher fidelity than Taq polymerase – greater base call accuracy, important for NGS and other applications
- Higher uniformity of coverage in GC-extreme regions – improved genomic representation with fewer total reads
- Aptamer-based hot-start activity – minimal non-specific amplification
- High quality sequencing data – efficient library amplification, low duplication rates and more

Codex® HiFi Hot Start DNA Polymerase

Greater coverage provides better sequence representation with fewer reads

Codex® HiFi Hot Start DNA Polymerase is engineered for high processivity even through challenging GC-rich and GC-poor (AT-rich) regions, resulting in higher coverage at GC extremes. This means better sequence representation from complex libraries with fewer total reads.

- Greater library complexity
- More unique reads
- Fewer total reads required to achieve a target mean depth of coverage

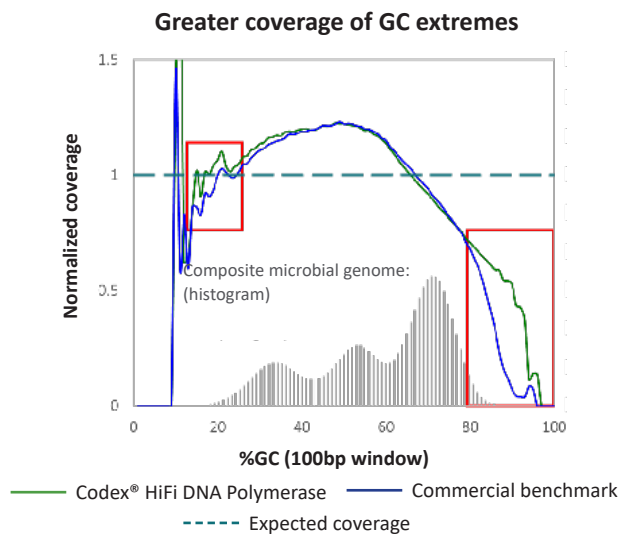


Figure 2. A single, prepared DNA library was equally divided, and then amplified with either Codex® HiFi Hot Start 2X NGS Mix (green) or a commercial benchmark 2X NGS amplification master mix (blue) according to the supplier's protocol. These libraries were then sequenced on an Illumina® MiSeq using 2x150 sequencing. The uniformity of coverage was calculated using Picard. The libraries were generated from a composite of three unique microbial genomes to enable testing across a very broad range of GC composition (grey histogram). The red boxes highlight data that demonstrate greater coverage at the %GC extremes by Codex® HiFi Hot Start DNA Polymerase vs. the commercial benchmark.

High-quality sequencing data

Codex® HiFi Hot Start DNA Polymerase delivers exceptional sequencing performance.

	Codex® HiFi DNA Polymerase	Commercial benchmark
Down-sampled reads	~11.2 million	~11.2 million
Depth	69.4x	69.4x
Duplicate reads	0.012%	0.015%
Chimeras	0.15%	0.16%

Table 1. A comparison of the performance metrics from the sequencing described in Figure 2.

High specificity and yield

Codex® HiFi DNA Polymerase is engineered to deliver the high specificity and yield that are critical for applications with minimal starting sample and workflows such as hybrid capture.

Specificity and yield comparable to commercial benchmark

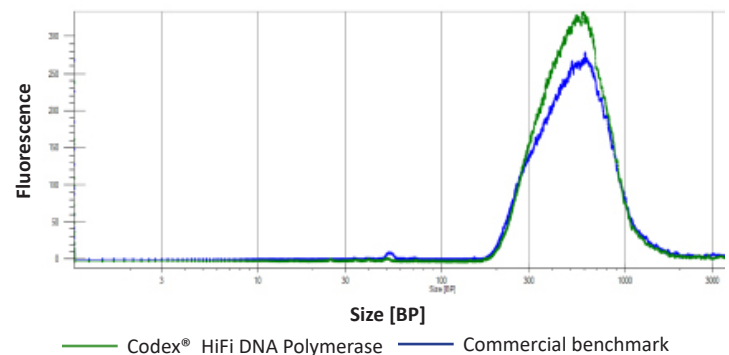


Figure 3. Capillary electrophoresis traces for the libraries described in Figure 2.

Learn more at codexis.com/codex-hifi-dna-polymerase

Ordering information:

Codex® HiFi Hot Start 2X NGS Mix

Fully formulated NGS mix with hot start enzyme and dNTPs

Codex® HiFi Hot Start DNA Polymerase

Hot start enzyme and reaction buffer provided separately, dNTPs not included

CODEXIS®

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