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- Real-Time PCR
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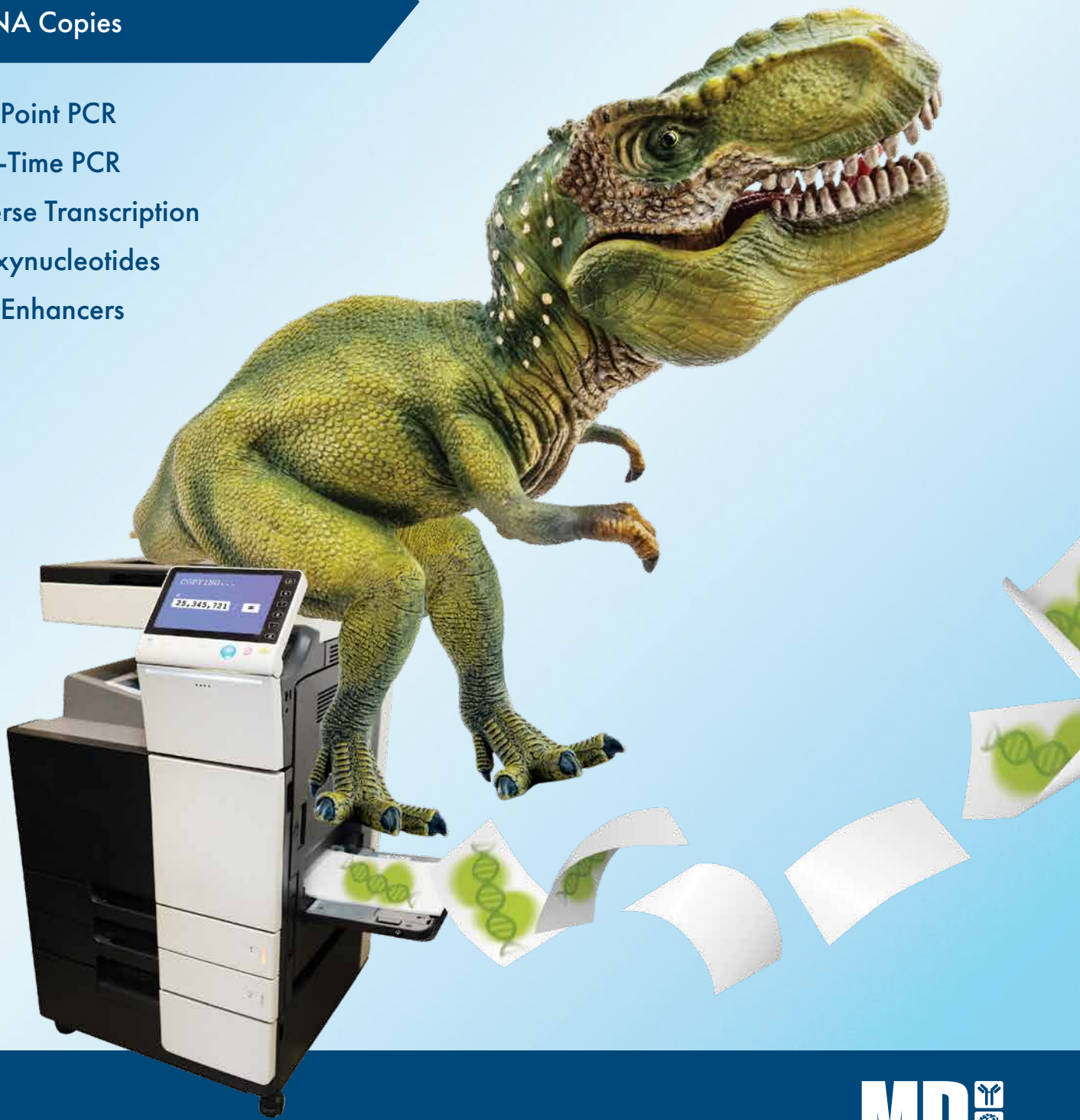
- PCR Enhancers



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Providing Expertise and Quality Research Tools in Molecular Biology

CONTENTS

Taq DNA Polymerase

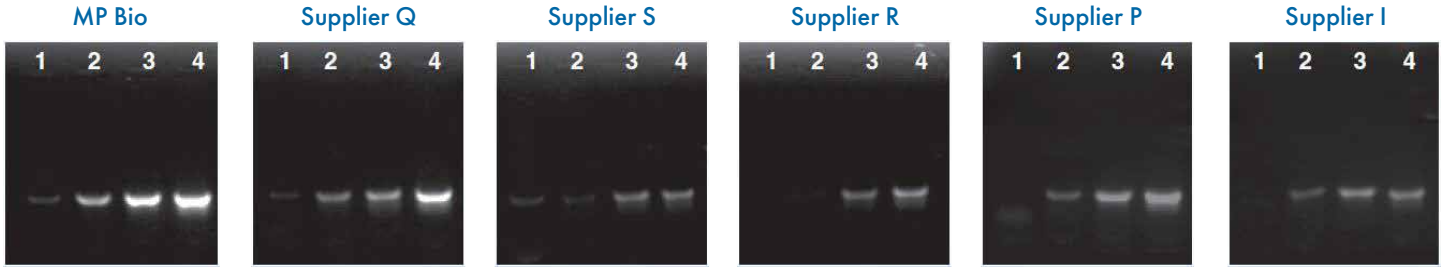
Recombinant form of the thermostable DNA Polymerase from *Thermus aquaticus*

MP Biomedicals has 30 years of experience in the research and manufacture of recombinant *Taq* DNA polymerase to ensure:

- **Lot-to-lot reproducibility**
  Strict quality control procedures guarantee the same enzyme activity for each produced batch.
  Control of contaminants such as nickases, endo/exonucleases, ribonucleases and bacterial/plasmid DNA.
- **High purity**
  Taq DNA Polymerase is highly purified to ensure the lowest possible contamination from *E. coli* DNA or plasmid DNA and thus avoid PCR-false positive results.
- **Robust PCR performance**
  Performance comparison with other *Taq* Polymerase sources show comparable or superior amplification yields.
- **Optimal flexibility**
  The unique 10x reaction buffer has been optimized for maximum stability and efficiency in any PCR reaction.
  Other buffers tailored for specific applications are available as well.
- **Convenience**
  A wide selection of pack sizes, buffers and enzyme concentrations meet the needs of every PCR application.

3 reaction buffers for greater application flexibility

- **Standard Buffer**: 10x PCR buffer with or without $MgCl_2$ at 1.5 mM final concentration.
  Used extensively for years by researchers over a broad range of reaction conditions.
- **XD Buffer**: Lacking detergent and BSA and ideally suited for automated reaction set up or HPLC systems.
  Other special applications include PCR using vegetable or beef material.
- **Direct Loading Buffer**: A PCR buffer which contains a densifying agent and red-purple dye that allows direct loading of amplifications after cycling.



Amplification of a 500 bp fragment from phage DNA with 0.5 U each *Taq* DNA polymerase.
Lane 1: 100 pg; Lane 2: 1 ng; Lane 3: 10 ng; Lane 4: 100 ng

Buffer/Reagents	*Taq* DNA Polymerase concentration	Pack Size	Cat. No.
10x Standard buffer with Mg 10x Standard buffer without Mg 25 mM $MgCl_2$	5 U/µL	1 x 250 U	11EPTQA025
		3 x 250 U	11EPTQA325
		10 x 250 U	11EPTQA925
		1 x 1000 U	11EPTQA100
		5 x 1000 U	11EPTQA105
	15 U/µL	1 x 600 U	11EPTQC060
		1 x 2000 U	11EPTQC200
10x Standard buffer with Mg	5 U/µL	1 x 250 U	11EPTQD025
		3 x 250 U	11EPTQD325
		10 x 250 U	11EPTQD925
10x XD buffer with Mg	5 U/µL	1 x 250 U	11EPTQX025
		3 x 250 U	11EPTQX325
		10 x 250 U	11EPTQX925
	15 U/µL	1 x 600 U	11EPTQX060
		1 x 2000 U	11EPTQX200
5x Direct Loading buffer with Mg 25 mM $MgCl_2$	5 U/µL	1 x 250 U	11EPTQL025
		1 x 1000 U	11EPTQL100

Taq CORE Kits

Taq DNA polymerase and dNTPs in one kit

Taq CORE Kits contain all the reagents (presented as separate items) required for amplification:

High quality recombinant *Taq* DNA polymerase	High purity dNTP mixes at 10 mM or 25 mM of each dNTP	Optimized incubation buffers with/without magnesium chloride	Separate $MgCl_2$ solution

CORE Kit Components	Pack Size	Cat. No. With dNTPs 10 mM each	Cat. No. With dNTPs 25 mM each
Taq Polymerase 5 U/µL; 10x Standard buffer with Mg; 10x Standard buffer without Mg; 25 mM $MgCl_2$; dNTP mix	1 x 250 U	11EPTQK101	11EPTQK251
	10 x 250 U	11EPTQK109	11EPTQK259
	1 x 1000 U	11EPTQK300	----------
	5 x 1000 U	11EPTQK10L	11EPTQK25L
Taq Polymerase 15 U/µL; 10x Standard buffer with Mg; 10x Standard buffer without Mg; 25 mM $MgCl_2$; dNTP mix	1 x 600 U	11EPTQKC610	11EPTQKC620
	12 x 600 U	11EPTQKD600	----------
Taq Polymerase 5 U/µL; 10x Standard buffer with Mg; dNTP mix	1 x 250 U	11EPTQKD101	11EPTQKD251
	10 x 250 U	11EPTQKD109	11EPTQKD259
Taq Polymerase 5 U/µL; 10x Direct Loading buffer with Mg; 10x Direct Loading buffer without Mg; dNTP mix	1 x 250 U	11EPTQKL101	11EPTQKL251
	5 x 250 U	11EPTQKL105	11EPTQKL255

The majority of commercially available *Taq* DNA polymerases are recombinant enzymes purified after overexpression in *E. coli*. Although these enzymes are expected to perform in a similar manner, controlled laboratory tests show that this is not necessarily the case.

MP Bio has 30 years of experience in the research and development of thermostable polymerases. From the collective experience built up in our protein purification laboratory, we can ensure that each batch of enzyme is rigorously purified and consistently reaches our high standards for performance. As part of our quality control procedures, we routinely perform PCR reactions for 420 and 1600 bp amplicons from human genomic DNA. To assess the amplification efficiency of MP Bio's *Taq* DNA polymerase, we ran several parallel reactions using competitors' *Taq* polymerases (from A to E). The results of such tests are shown in figures 1 and 2.

Another potential problem in the use of recombinant enzymes is contamination from endogenous *E. coli* DNA. This contamination may cause a problem for laboratories working with DNA from *E. coli*. MP Bio's *Taq* DNA polymerase is highly purified in order to obtain the lowest possible contamination from *E. coli* DNA. A PCR reaction, using oligonucleotide primers specific to the 16S RNA of *E. coli* producing a 392 bp fragment, is used to assess the level of contamination in every preparation of *Taq* DNA polymerase. Results indicate that MP Bio's *Taq* DNA polymerase has the lowest amount of contaminating DNA compared to other enzymes tested under the same conditions (figure 3).

MP Bio, as a quality manufacturer, can ensure the reproducibility and purity of each batch of this robust enzyme. MP Bio's *Taq* Polymerase is available in two concentrations: 5 U/µL and 15 U/µL. The unique l0x reaction buffer has been optimized in our laboratories for maximum stability and efficiency in any PCR reaction. We offer a comprehensive range of different pack sizes and are also able to provide custom packaging.

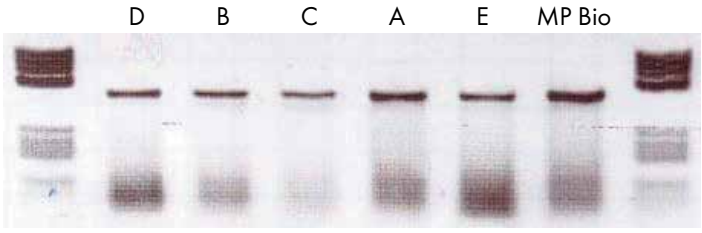


Figure 2
Amplification of a 420 bp fragment from 10 ng human genomic DNA, with 0.5 U of *Taq* polymerase. After amplification as described above, 12.5 µL of each reaction was loaded onto an agarose gel for analysis.

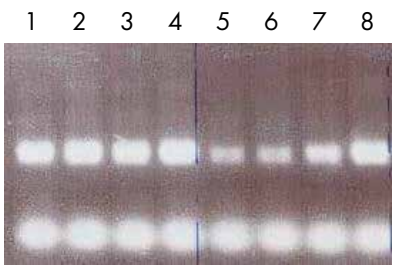


Figure 3
Level of contaminating *E. coli* genomic DNA in preparations of *Taq* DNA polymerase. Lanes 1 to 4 increasing units 1, 1.5, 2 and 5, respectively, of competitor B's *Taq* DNA Polymerase. Lanes 5 to 8 as above but MP Bio' s *Taq* DNA Polymerase.

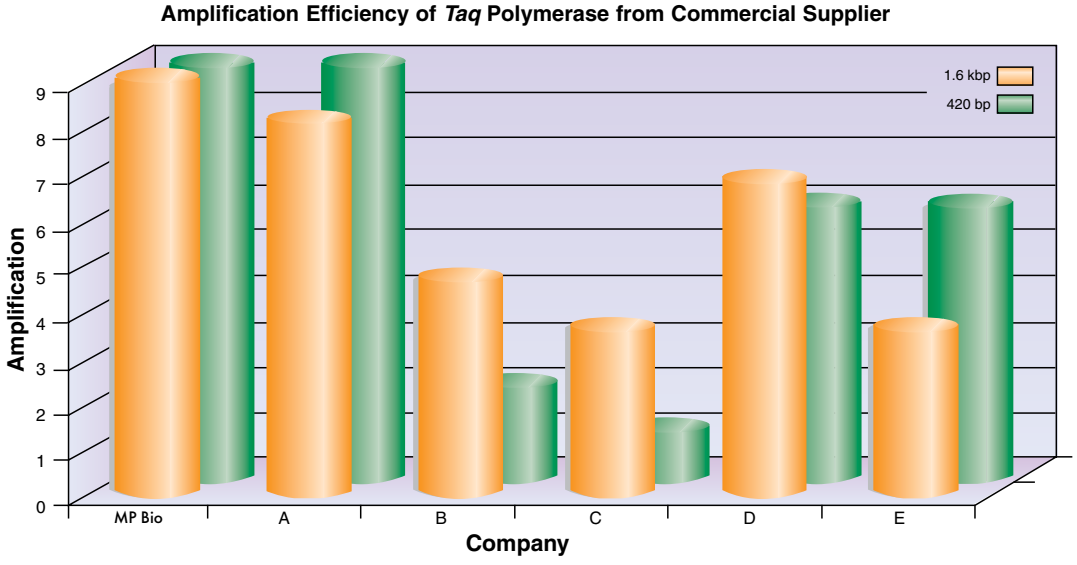


Figure 1
Human genomic DNA (10 ng) was amplified using varying quantities of *Taq* DNA polymerase, in the supplied buffers, from several commercial suppliers (A-E). Amplification conditions produce either a 420 or a 1600 bp fragment using the following conditions:

420 bp: 5' 93°C, 1' 91°C, 1' 62°C, 1'30" 72°C, 30 cycles.

1600 bp: 5' 93°C, 1' 91 °C, 1' 62°C, 2' 70°C, 37 cycles.

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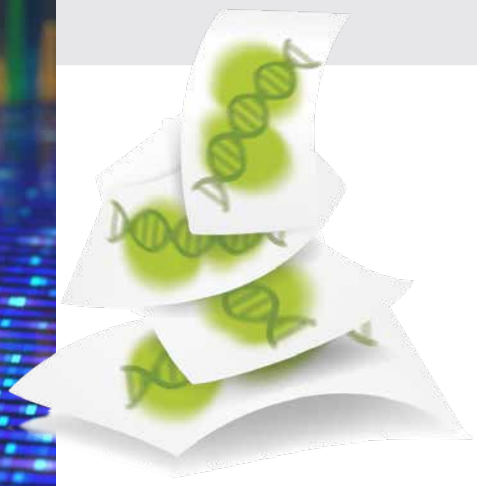


Taq DNA Polymerase Mastermix - *Taq*-&GO

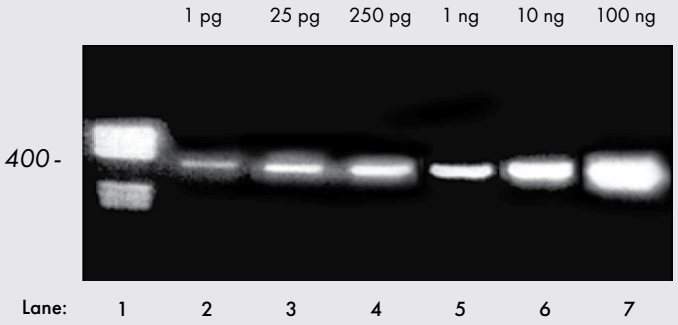
Ready-to-use PCR mastermix

Taq-&GO is an optimized reaction mix for PCR containing high quality *Taq* DNA polymerase, ultra-pure dNTPs and incubation buffer with magnesium chloride.

Simply add 10 µL of *Taq*-&GO to a 40 µL template-primers solution...*and GO!*

- Optimized for highly efficient PCR
- Significant savings in preparation time
- Reduced pipetting errors and cross-contamination
- Highly reproducible results
- Stable at 4°C for over one year
- Colorless mix compatible with direct fluorescence/absorbance readings

HIGH REPRODUCIBILITY



Amplification of a 400 bp fragment of human ß-globin with *Taq* DNA polymerase. Varying amounts of human ß-globin, 1 pg to 100 ng, were amplified under the following conditions: 50 µL reaction; 50 pmoles each specific primer, 300 µM each dNTP, 1 U *Taq* DNA polymerase, $MgCl_2$ 1.5 mM.

Lane 1: Marker pBR322/HaeIII; Lane 2: 1pg; Lane 3: 25 pg; Lane 4: 250 pg; Lane 5: 1 ng; Lane 6: 10 ng; Lane 7: 100 ng of template DNA, respectively.

Description	Volume	Pack Size	Cat. No.
Taq-&GO Mastermix	1 mL	100 reactions of 50 µL	11EPTAG100
	10 x 1 mL	1000 reactions of 50 µL	11EPTAG110

References

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Taq DNA Polymerase Mastermix - *Taq*-&LOAD

Ready-to-use mastermix for direct loading of PCR products on an agarose gel

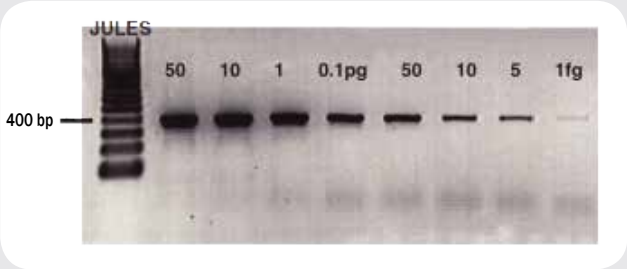
Taq-&LOAD is a mastermix containing high quality *Taq* DNA polymerase, ultra-pure dNTPs, incubation buffer with magnesium chloride, and a densifying agent and red/purple dye that allows direct monitoring on agarose gels.

Analysis of PCR results has never been so fast and convenient!

Direct loading of PCR reactions without additional step	Reduced cross-contamination	High yields and high sensitivity
Reproducible	Stable at 4°C	Fast, convenient and particularly useful in high throughput experiments

High sensitivity, high yields

Taq-&LOAD offers a very high PCR sensitivity, leading to greater yields of specific PCR products. Detection of as little as 1 fg of DNA has been achieved.



Amplification of a 400 bp fragment from a pBR plasmid with *Taq*-&LOAD. Reaction conditions: 5 µL of *Taq*-&LOAD Mastermix in a final 25 µL reaction. 10 µL of the reaction has been loaded on a 1.2% TBE gel.

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Description	Volume	Pack Size	Cat. No.
Taq-&LOAD Mastermix	1 mL	100 reactions of 50 µL	11EPTAL100
	10 x 1 mL	1000 reactions of 50 µL	11EPTAL110

References

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SurePRIME DNA Polymerase

For Hot Start PCR

SurePRIME DNA Polymerase is an improved "Hot Start" DNA Polymerase used to increase specificity and product yield. SurePRIME DNA Polymerase is heat-activated after a pre-incubation step at 95°C and is then functionally equivalent to classical *Taq* DNA Polymerase.

Chemically modified recombinant *Taq* DNA polymerase

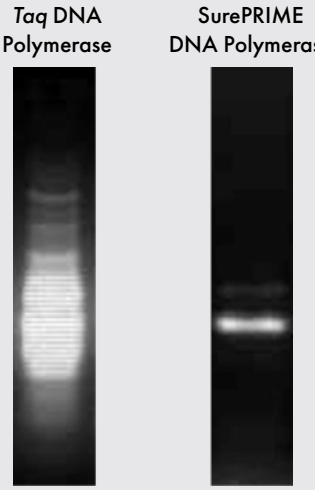
The enzyme is a highly purified form of recombinant *Taq* DNA Polymerase that has been chemically modified by the addition of heat-labile blocking groups to specific amino acid residues. Prior to PCR, in its inactive state, SurePRIME DNA Polymerase is incapable of extending primer-dimers or mis-annealed primer-template species that form below the specific annealing temperature. The 95°C incubation step therefore serves to activate the enzyme and to ensure a completely "clean" initial PCR cycle.

Easy to use

Once activated, SurePRIME DNA Polymerase is functionally equivalent to *Taq* DNA Polymerase. The only additional PCR program modification required is an initial 15 min. pre-incubation step at 95°C. Efficiency can be improved by a progressive activation (initial activation for 5 min. at 95°C followed by 1 min. activation at 95°C for each cycle).

Save time and effort

Switching to SurePRIME DNA Polymerase avoids complicated and time-consuming manual "Hot Start" procedures or less efficient antibody-binding solutions.



Comparison of *Taq* and SurePRIME DNA Polymerases
In this experiment, amplification conditions favoring the formation of non-specific product were intentionally employed. PCR conditions utilized non-optimized primers and a 30 minute pre-incubation step at room temperature.

Description	Volume	Pack Size	Cat. No.
SurePRIME polymerase	50 µL	250 U	11EPHSP025
	250 µL	5x 250 U	11EPHSP525

SurePRIME CORE Kits

SurePRIME DNA polymerase and dNTPs in one kit

SurePRIME CORE Kits contain all the reagents (separate items) required for amplification:

- **SurePRIME DNA polymerase supplied in a formulation containing 50% glycerol**
- **High purity dNTP Mix at either 10 mM or 25 mM of each dNTP**
- **Optimized incubation buffer without magnesium**
- **Separate $MgCl_2$ solution**
- **Dilution buffer containing 50% glycerol**

CORE Kit Components	Pack Size	Cat. No. With dNTPs 10 mM each	Cat. No. With dNTPs 25 mM each
SurePRIME DNA Polymerase 5 U/µL; 10x Standard buffer without Mg; 25 mM $MgCl_2$; dNTP mix; Dilution buffer containing 50% glycerol	5 x 250 U	11EPHSK105	11EPHSK255

Performance of SurePRIME DNA Polymerase with non-optimized primers

A set of non-optimized primers amplifying a 400 bp region of the human ß-globin gene was prepared. The primer set (see below) was designed with mismatched bases at the 5' end to represent PCR conditions frequently encountered in cloning (e.g. introduction of a restriction site). Two parallel sets of experiments were set up using SurePRIME and classical *Taq* DNA Polymerase. PCR mixes were assembled using the recommended buffer for each enzyme and 100 ng of template DNA. To further influence the conditions for non specific priming, the PCR reactions, once set up, were incubated for 30 min at 25°C. (Under these conditions classical *Taq* DNA Polymerase is able to elongate mismatched primers). After this incubation step, SurePRIME DNA Polymerase was activated by heating for 15 min at 95°C, followed by identical cycling conditions for both sets of reactions.

Taq DNA Polymerase

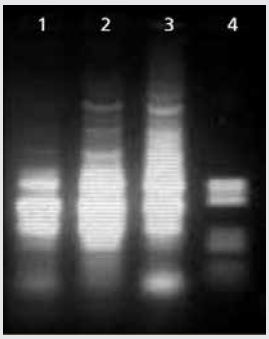


Figure 1
Lane 1: 1 U
Lane 2: 2 U
Lane 3: 5 U of *Taq* DNA Polymerase, respectively with 100 ng template DNA
Lane 4: pBR322/HaeIII

SurePRIME DNA Polymerase

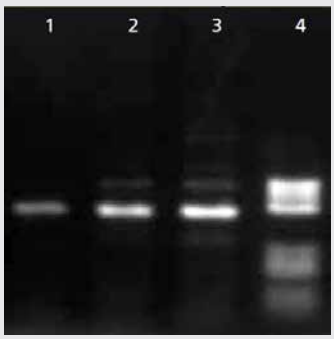


Figure 2
Lane 1: 1 U
Lane 2: 2 U
Lane 3: 5 U of SurePRIME™ DNA Polymerase, respectively with 100 ng template DNA
Lane 4: pBR322/HaeIII.

PCR Primers

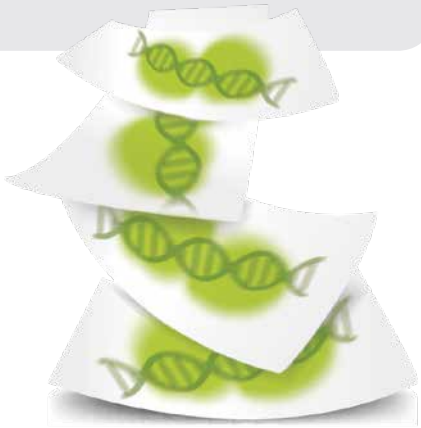
Oligo1 (Sal I)
5′ CTG TCG ACT CAC CTT AGG GT 3′
Tm = 36°C for specific bases (underlined), 60°C for whole oligo - 20 nts

Oligo2 (EcoR I)
5′ TCG GAA TTC TGG GCA TAA AAG 3′
Tm = 34°C for specific bases (underlined), 60°C for whole oligo - 21 nts

PCR Programs

Taq DNA Polymerase
[30′ at 25°C] [(5′ at 93°C) x 1] – [(1′ at 53°C – 2′ at 70°C – 1′ at 93°C) x 3] – [(1′ at 62°C – 2′ at 70°C – 1′ at 93°C) x 30] – [(1′ at 62°C – 10′ at 70°C) x 1], Hold at 30°C

SurePRIME DNA Polymerase
[30′ at 25°C] [(15′ at 95°C) x 1] – [(1′ at 53°C – 2′ at 70°C – 1′ at 93°C) x 3] – [(1′ at 62°C – 2′ at 70°C – 1′ at 93°C) x 30] – [(1′ at 62°C – 10′ at 70°C) x 1], Hold at 30°C



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Izis DNA Polymerase

For high fidelity PCR

High fidelity is a key requirement for many PCR applications, particularly for cloning lengthy and difficult DNA strands. Izis High Fidelity DNA polymerase amplifies long DNA fragments with one of the lowest error rates in the market. Moreover, this polymerase exhibits very high thermal stability. Therefore, the denaturation temperature can be increased for reading through difficult secondary structure.

40x more accurate than *Taq* DNA polymerase

Originally isolated from *Pyrococcus abyssi,* Izis DNA Polymerase is a high-performing proofreading DNA polymerase. This enzyme displays an extremely low error rate and is 40 times more accurate than *Taq* DNA Polymerase, according to the method of Flaman (Flaman, J.M. et al. **1995** Proc. Natl. Acad. Sci. USA 92, 3963-3967). This translates to a probability of misincorporation of around one error per 1,600,000 base pairs per PCR cycle.

Highly thermostable

The Izis DNA Polymerase is the most thermostable proofreading polymerase available and will therefore retain more activity during PCR, thereby providing higher product yields. 90% of polymerase activity remains after a 5 hour incubation at 90°C, and 50% activity remains after 5 hours at 100°C. Higher thermostability permits greater flexibility in setting denaturation times and temperature, e.g. for difficult, GC rich templates.

Easy to use

Izis DNA Polymerase shows very robust activity over a range of different amplification conditions and does not require primer 3'-end protection, unlike many other proofreading enzymes. This means less time is needed for reaction set-up and optimization.

Amplification of human ß-globin DNA 400 bp (lane 2), 900 bp (lane 3) and mitochrondrial human DNA (4.0 kb, lane 4) with Izis DNA polymerase. Reactions: 10 ng of each DNA template, 50 pmoles of each primer, 100 µM of each dNTP and 1.5 mM $MgSO_4$. 0.5 U of Izis DNA polymerase was used for amplifying 400 bp and 1 U for 900 bp and 4.0 kb. Lane 1: Leon™ molecular weight marker.

Amplifications programs:

400 bp 5' at 93°C (1' at 91°C, 1' at 62°C, 1'15" at 72°C) x 30. 900 bp 5' at 93°C (1' at 91°C, 1' at 62°C, 1'30" at 72°C) x 30. 4.0 kb 5' at 93°C (30" at 94°C, 2' at 62°C, 5' at 72°C) x 20.

Description	Volume	Pack Size	Cat. No.
Izis Polymerase	100 µL	100 U	11EPSIS100
	300 µL	3 x 100 U	11EPSIS103

Izis CORE Kit

Izis DNA polymerase and dNTPs in one kit

Izis CORE Kits contain all the reagents (separate items) required for amplification:

100 U Izis DNA Polymerase at 1 U/µL	Izis buffer 10 x C (1 mL) with $MgSO_4$	Separate $MgCl_2$ solution	dNTP 10 mM

CORE Kit Components	Pack Size	Cat. No. With dNTPs 10 mM each
Izis Polymerase 1U/µL; 10x Standard Buffer with Mg 30 mM $MgCl_2$, dNTP mix	100 U	11EPSISK100

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Q-Bio *Taq* DNA Polymerase

For multiplex PCR

Q-Bio *Taq* DNA Polymerase is encoded by a modified form of the *Thermus aquaticus* DNA Polymerase gene with a N-terminal deletion.

Lacks 5′-3′ exonuclease activity	Q-Bio *Taq* DNA Polymerase lacks 5′exonuclease activity, which makes this enzyme particularly suitable for Multiplex PCR using several primer pairs.
Highly thermostable	Q-Bio *Taq* DNA Polymerase is more thermostable than full-length *Taq* DNA Polymerase, as repeated exposure to 98°C does not diminish enzyme activity.
Cannot degrade the 5′ end of primers	Q-Bio *Taq* DNA Polymerase lacks the ability to degrade the 5′ end of primers and is therefore ideal for Multiplex PCR and RAPD applications.

Description	Volume	Pack Size	Cat. No.
Q-Bio *Taq* polymerase	50 µL	250 U	11EPQBT025
	100 µL	500 U	11EPQBT050

Q-Bio *Taq* CORE Kit

Q-Bio *Taq* DNA polymerase and dNTPs in one kit

The Q-Bio *Taq* CORE Kit contains all the reagents (separate items) required for amplification:

- **250 U Q-Bio *Taq* DNA Polymerase at 5 U/µL**
- **Q-Bio *Taq* PCR buffer 10xC with and without $MgCl_2$**
- **dNTP mix at 10 mM each**
- **Separate $MgCl_2$ solution**

CORE Kit Components	Pack Size	Cat. No. With dNTPs 10 mM each
Q-Bio *Taq* Polymerase 5 U/µL; 10x Standard buffer with Mg; 10x Standard buffer without Mg; 25 mM $MgCl_2$; dNTP mix	250 U	11EPQBK1025

REFERENCES - Q-BIO *TAQ* POLYMERASE

De Mazancourt, V.; Klotz, W.; Marquet, G.; Keith P. Integrative taxonomy helps separate four species of freshwater shrimps commonly overlooked as Caridina longirostris (Crustacea : Decapoda : Atyidae) on Indo-West Pacific islands. *Invertebrate Systematics*. **2018**, *32*, 1422.

Samadi, S.; Puillandre, N.; Pante, E.; Boisselier, M. C.; Corbari, L.; Chen, W. J.; Maestrati, P.; Mana, R.; Thubaut, J.; Zuccon, D.; Hourdez, S. Patchiness of deep-sea communities in Papua New Guinea and potential susceptibility to anthropogenic disturbances illustrated by seep organisms. *Marine Ecology*. **2015**, *36*, 109.

Wang, X. D.; Zhang, D. F.; Liu, X. B.; Qi, W. G.; Luo, Y.; Hu, B.; Yao, Y. A. Modified clopidogrel loading dose according to platelet reactivity monitoring in patients carrying ABCB1 variant alleles in patients with clopidogrel resistance. *European Journal of Internal Medicine*. **2012**, *23*, 48.

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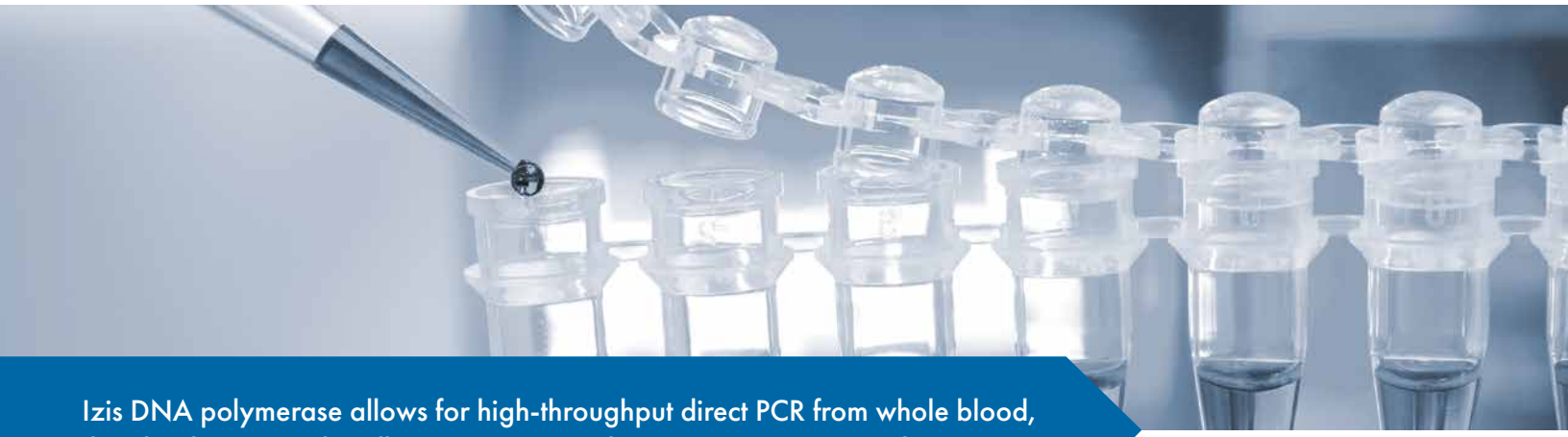
APPLICATION NOTE

Direct Amplification of DNA from Whole Blood Samples



Izis DNA polymerase allows for high-throughput direct PCR from whole blood, thereby decreasing handling time, costs and cross-contamination risks.

Traditional testing methods in clinical and research laboratories are increasingly being replaced by Molecular Diagnostic techniques, the most popular of which is PCR. PCR offers several advantages over traditional methods, including increased sensitivity, specificity and testing times.

Despite its widespread use as a molecular diagnostic technique, PCR methods still impose several challenges in various applications. Initial sample preparation prior to PCR setup is often labor-intensive, requiring a high degree of standardization and increasing costs. DNA isolation procedures can increase the risk of cross-contamination between samples. For particular sample types such as blood, endogenous and exogenous DNA polymerase inhibitors make it necessary to start with a highly purified template for amplification.

To overcome the challenges of performing PCR with whole blood samples, MP Bio offers a solution with Izis DNA polymerase. Compared to standard *Taq* DNA polymerase, the Izis proofreading DNA polymerase is shown to have higher resistance to common PCR inhibitors at equivalent units and an accuracy 40x greater. This high-fidelity property is of particular interest for SNP testing.

Figure 1 compares Izis and *Taq* DNA Polymerase performances to detect the beta-globin gene from 10 ng exogenous gDNA in the presence of different volumes of blood, with EDTA as the anticoagulant. Assays using up to 5% (vol/vol) blood are efficiently performed with 0.5 U of Izis, while amplifications with 1.25 U *Taq* DNA are inhibited beyond 0.2% blood. This demonstrates a 25-fold increase in performance for Izis DNA Pol compared to *Taq* DNA Pol.

Identical PCR assays were performed without addition of external DNA. Izis DNA Pol is able to amplify the target in the presence of 0.2% to 5% blood, whereas *Taq* DNA Pol is ineffective (Fig. 2). These results were also confirmed with sodium citrate as the anticoagulant.

Conclusion

Izis DNA polymerase is a useful tool for PCR amplification direct from whole blood. Decreased time, costs, cross-contamination risks and greater resistance to common inhibitors provide an ideal solution for high-throughput screening of blood samples.

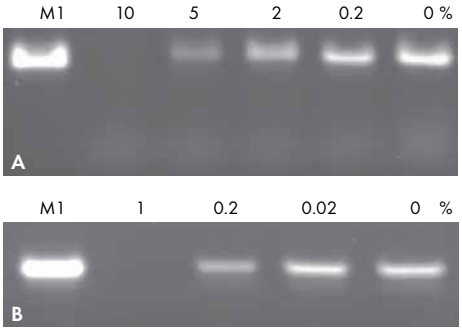


Figure 1:
PCR amplification of exogenous genomic human DNA (10 ng) in presence of fresh human blood collected with EDTA (% v/v). A: 0.5 U Izis DNA Pol per 50 µL assay. Blood quantities in % v/v: 10%; 5%; 2%; 0.2% and without blood. B: 1.25 U *Taq* DNA Pol per 50 µL assay. Blood quantities in % v/v: 1%; 0.2 %; 1.12% and without blood. M1 - 420 bp frament marker.

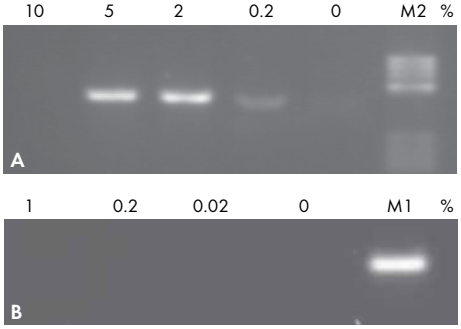


Figure 2:
Blood direct amplification of 420 bp beta-globin fragment. Fresh human blood collected with EDTA as anti-coagulant and stored at +4°C. No external DNA is added. A: 0.5 U of Izis DNA Pol per 50 µL assay. Blood quantities in % v/v: 10%; 5%; 2%; 0.2% and without blood. Molecular weight marker (M2) is pBR322 Hae III digest. B: 1.25 U of *Taq* DNA Pol per 50 µL assay. Various concentations of blood were tested: 1%, 0.2%; 0.02 % and without blood. The marker (M1) is at 420 bp.

Choose a DNA polymerase that fits your application needs.

	Routine PCR	PCR with increased specificity (hot start)	Extermely high fidelity	Simultaneous PCR of multiple targets (multiplex PCR)
	Taq	SurePRIME™	Izis	Q-Bio *Taq*
5′ to 3′ exonuclease	Yes	Yes	No	No
3′ to 5′ exonuclease	No	No	Yes	No
Error rate (10^{-6})	24	24	0.6	24
Thermostability (half life at 95°C)	40 min	40 min	18 hours	80 min
Activity at 25°C	Yes	No	Yes	Yes
Max Target Length	>7kb	>7kb	>18 kb	>7kb
3' - End	dA	dA	blunt	dA

Applications for PCR continue to increase in complexity and variety. This growth has driven researchers to choose novel polymerases with specific high performance features. MP Bio is actively developing innovative enzymes that offer higher:

Sensitivity	Processivity	Fidelity	Thermostability

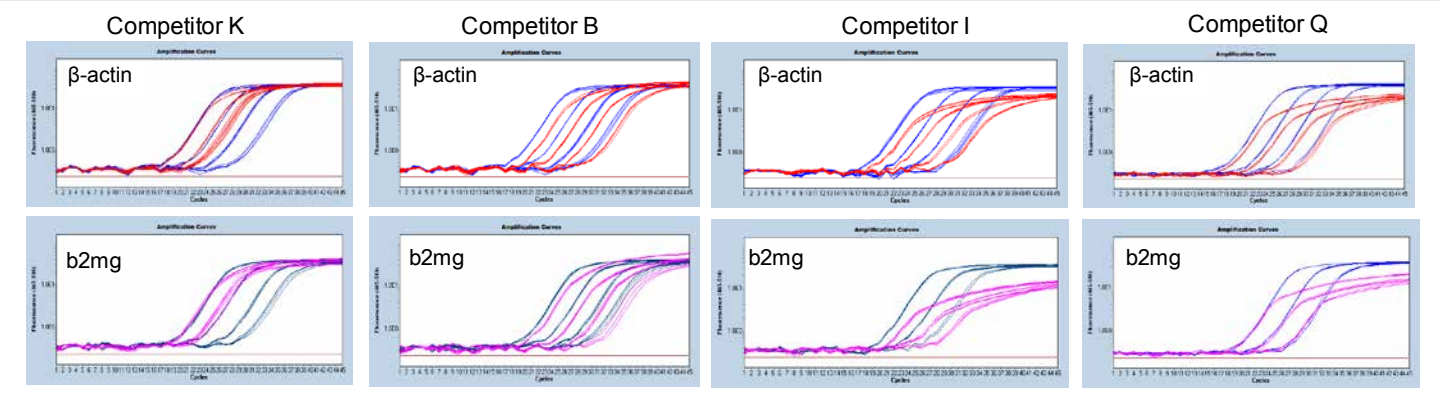
qPCR & Go SYBR® Kits

SYBR-Green-based quantitative PCR

The qPCR & Go SYBR Kit has been developed for fast, highly sensitive and reproducible real-time PCR and has been validated on commonly used real-time instruments. The use of antibodies for the hot-start DNA polymerase system reduces the chances of primer-dimer formation and non-specific priming, leading to greater sensitivity. The addition of the latest advances in buffer chemistry and enhancers also ensures that the qPCR & Go SYBR Kit produces faster (under 30 minutes), highly reproducible real-time PCR results.

- **Rapid**
  Unique buffer chemistry saves time and increases specificity and sensitivity
- **Accurate**
  Hot-start capability reduces primer-dimer formation, resulting in specific amplification
- **Sensitive**
  Amplification from low copy targets
- **Flexible**
  Compatible with all standard and fast cycling instruments

SPEED, REPRODUCIBILITY AND SENSITIVITY



Comparison of qPCR & Go SYBR® (blue) mixes against 4 other suppliers (red or pink) using fast cycling conditions. The process used a 10-fold serial dilution of murine cDNA (in quadruplicate) over 4 orders of magnitude. The conditions were 95°C for 2 min and 45 cycles of 95°C 10 sec, 60°C 15 sec. The results illustrate that the qPCR & Go SYBR® was faster (earlier Ct) and shows consistent reproducibility and sensitivity (highlighted by the uniform sigmoid curves, even after diluting down over several orders of magnitude).

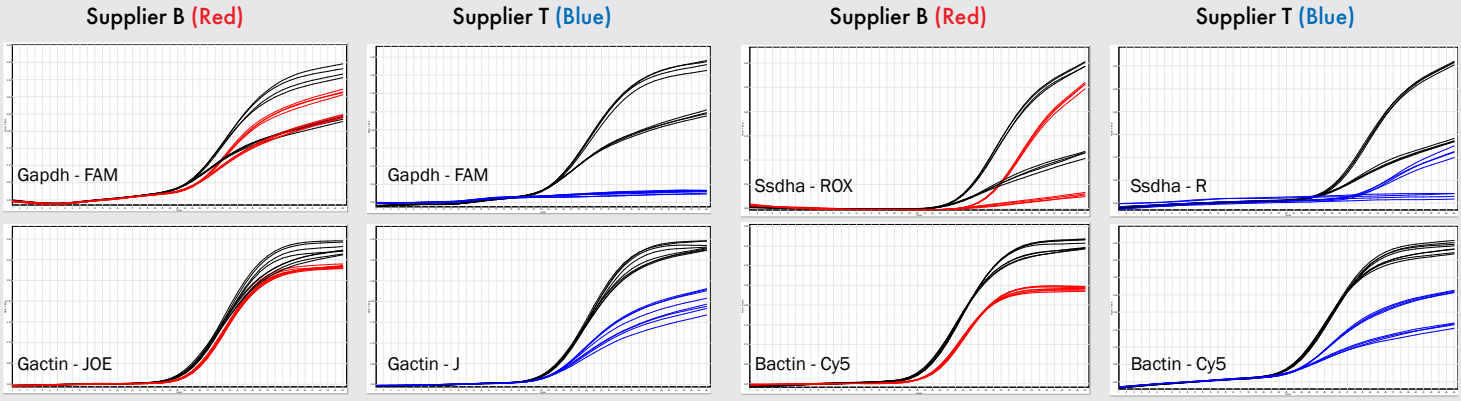
Description	Pack Size	Cat. No.
qPCR & Go SYBR® High-ROX Kit	500 rxns (5 x 1 mL)	11EBI01050
	2000 rxns (4 x 5 mL)	11EBI01200
qPCR & Go SYBR® Low-ROX Kit	500 rxns (5 x 1 mL)	11EBI02050
	2000 rxns (4 x 5 mL)	11EBI02200
qPCR & Go SYBR® No-ROX Kit	500 rxns (5 x 1 mL)	11EBI03050
	2000 rxns (4 x 5 mL)	11EBI03200

qPCR & Go Probe Kits

Probe-based quantitative PCR

The qPCR & Go Probe Kit is designed for superior sensitivity and specificity with probe-detection technology, including *TaqMan*®, Scorpions® and molecular beacon probes. The qPCR & Go Probe Kit has been optimized for fast mode on fast real-time PCR instruments, and fast cycling conditions on standard real-time PCR instruments. A combination of the latest advances in buffer chemistry and PCR enhancers, with antibodies for the hot-start DNA polymerase system, ensures that the qPCR & Go Probe Kit delivers shorter run times, is highly reproducible, highly-specific and ultra-sensitive. The advanced buffer chemistry and enhancers also makes the qPCR & Go Probe Kit perfect for multiplexing, allowing more samples to be run in a day with the highest confidence, ideal for high-throughput assays.

- **Highly specific**
  Minimal non-specific activity leading to better efficiency
- **Ultra-sensitive**
  Perfect for low copy number samples
- **Fast**
  Unique buffer chemistry allowing fast protocols and higher productivity
- **Efficient multiplexing**
  No loss in efficiency using multiple probes



Comparison of qPCR & Go Probe (black) against 2 other suppliers (red for supplier B and blue for supplier T). The process used murine cDNA to analyze 4 different DNA targets. The conditions were 95°C for 5 min and 40 cycles of 95°C 10 sec, 60°C 20 sec. The results illustrate that qPCR & Go Probe displays more consistent and reproducible results (Ct values) when comparing singleplex and multiplex assays compared to mastermixes from Suppliers B and T.

SENSITIVITY AND EFFICIENCY IN MULTIPLEXING

Description	Pack Size	Cat. No.
qPCR & Go Probe High-ROX Kit	500 rxns (5 x 1 mL)	11EBI04050
	2000 rxns (4 x 5 mL)	11EBI04200
qPCR & Go Probe Low-ROX Kit	500 rxns (5 x 1 mL)	11EBI05050
	2000 rxns (4 x 5 mL)	11EBI05200
qPCR & Go Probe No-ROX Kit	500 rxns (5 x 1 mL)	11EBI06050
	2000 rxns (4 x 5 mL)	11EBI06200

AMV Reverse Transcriptase

Isolated from Avian Myeloblastosis Virus

AMV Reverse Transcriptase is an RNA-dependent DNA polymerase. It is widely used for first and second strand synthesis of complementary DNA (cDNA) from mRNA templates for cloning or for hybridization probes.

Withstands high reaction temperatures	AMV reverse transcriptase is suitable for synthesis of cDNA using specific primers, at temperatures of 55°C to 60°C. This high reaction temperature permits transcription of RNA containing secondary structure.
No 5′ to 3′ exonuclease activity	Polymerization proceeds in the 5′ to 3′ direction with no 5′ to 3′exonuclease activity.
Exhibits several enzymatic activities	AMV reverse transcriptase exhibits several enzymatic activities, an RNA-directed DNA polymerase, a DNA-dependent DNA polymerase, an RNase H and an unwinding activity.

Description	Volume	Pack Size	Cat. No.
AMV reverse transcriptase	10 µL	200 U	11EMAMV200
	30 µL	3 x 200 U	11EMAMV203

cDNA Synthesis & Go Kit

Mastermix for first strand cDNA synthesis

The cDNA Synthesis & Go Kit provides a rapid and sensitive method for first-strand cDNA synthesis. It displays excellent linearity across a wide range of starting material, revealing the same relative representation in cDNA templates, regardless of gene abundance, making it excellent for use in real-time PCR studies. A novel, highly-pure reverse transcriptase and new buffer system delivers highly-efficient synthesis of cDNA, enhanced reproducibility and data accuracy. These features make the cDNA Synthesis & Go Kit ideal for working with limited samples, such as laser-microdissected samples and tissue biopsies. The supplied buffer also employs a unique blend of random hexamer primers and anchored oligo dT to ensure unbiased 3′ to 5′ coverage and reverse transcription of all regions.

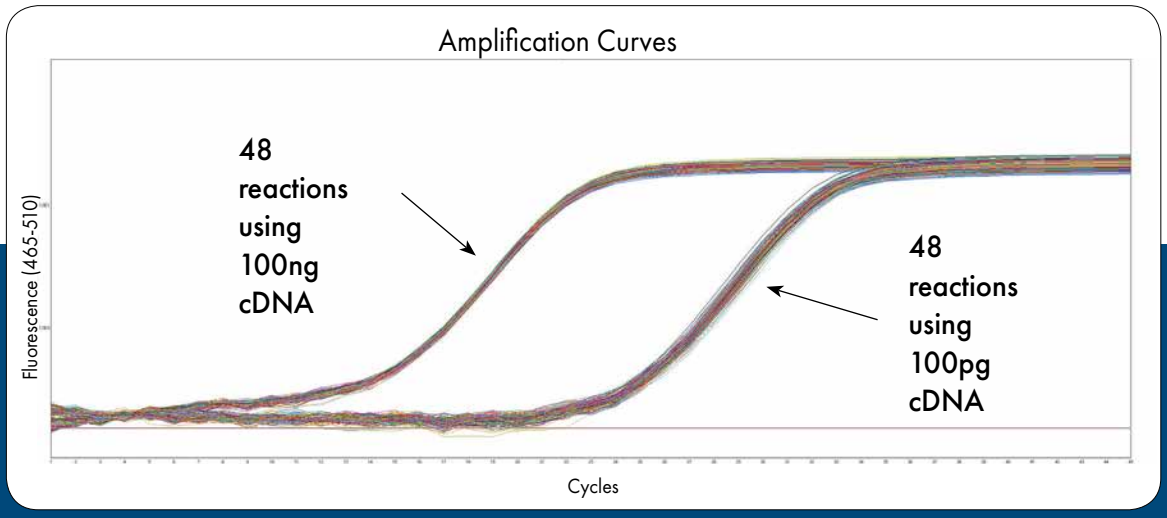
Additionally, the cDNA Synthesis & Go Kit can be used with qPCR & Go SYBR® and Probe Kits for fast real-time RT-PCR without compromising quality, with real-time results in less than one hour.

Reproducible
Unique reverse transcriptase and buffer generate consistent first-strand cDNA

Sensitive
Real-time RT-PCR analysis from as little as 1 pg of starting total RNA

Broad dynamic range
Ideal for dilute and low-copy samples

Unbiased cDNA synthesis
Complete 5′ to 3′ RNA sequence representation



Reproducibility

The cDNA Synthesis & Go Kit was employed in 48 independent first-strand reactions, containing 100 ng or 100 pg of total RNA. The first strand products from the high and low input RNA were used in a real-time PCR assay (reactions performed in triplicate). The results demonstrate the excellent reproducibility of the cDNA Synthesis & Go Kit (the same Ct values), across all 144 wells with 100 ng of input target RNA and all 144 wells with 100 pg of input target RNA.

Description	Pack Size	Cat. No.
cDNA Synthesis & Go Kit	50 rxns	11EBI00005

Deoxynucleotides

Achieve sensitive and consistent PCR results with ultra-purified deoxynucleotides. Free of polymerase inhibitors, each batch is specifically controlled for RNase, DNase and nicking contaminants activity.

This high-quality standard is assured by stringent functional testing in PCR using genomic template. PCR Grade Deoxynucleotides are suitable for use in PCR, RT-PCR, qPCR, cDNA synthesis, DNA sequencing and labeling.

dNTP Mixes

Ready-to-use solutions of dATP, dCTP, dGTP, dTTP

Avoid pipetting errors and cross-contamination using ready-to-use dNTP Mix. Optimized dNTP Mix includes dATP, dCTP, dGTP, dTTP in an aqueous solution neutralized to pH 7.0, guaranteeing stability for 24 months when stored at -20°C.

Description	Volume	Pack Size	Cat. No.
dNTP Mix 5 mM each	1 mL	5 µmoles	11NTPMX050
	5 x 1mL	5 x 5 µmoles	11NTPMX055
dNTP Mix 10 mM each	500 µL	5 µmoles	11NTPMX100
	5 x 500 µL	5 x 5 µmoles	11NTPMX105
dNTP Mix 25 mM each	200 µL	5 µmoles	11NTPMX250
	5 x 200 µL	5 x 5 µmoles	11NTPMX255

dNTP Sets

Sets of separate vials of the 4 dNTPs (dATP, dCTP, dGTP, dTTP)

Each set is composed of four separate vials of highly purified (>99%), PCR grade, sodium salts of dATP, dCTP, dGTP and dTTP. This format allows the use of different concentrations according to specific reaction requirements.

Description	Volume	Pack Size	Cat. No.
dNTP set - 100 mM each	4 x 250 µL	4 x 25 µmoles	11NTACG100
	4 x 1 mL	4 x 100 µmoles	11NTACG111

dNTP Separate Vials

Separate vials of dATP, dCTP, dGTP, dTTP

Description	Volume	Pack Size	Cat. No.
dATP (100 mM)	250 µL	25 µmoles	11NTATP100
	1 mL	100 µmoles	11NTATP111
dCTP (100 mM)	250 µL	25 µmoles	11NTCTP100
	1 mL	100 µmoles	11NTCTP111
dGTP (100 mM)	250 µL	25 µmoles	11NTGTP100
	1 mL	100 µmoles	11NTGTP111
dTTP (100 mM)	250 µL	25 µmoles	11NTTTP100
	1 mL	100 µmoles	11NTTTP111

T4 bacteriophage gene 32

Protein that enhances DNA Polymerase proofreading activity

Single-strand binding protein.

T4 bacteriophage gene 32 product, or T4 gp32, is a single strand binding protein isolated from the bacteriophage T4.
It is reported to act by binding to single stranded DNA in a cooperative manner, thereby destabilizing double-stranded DNA.

T4 gp32 is used to improve:

Yields of long PCR products catalyzed by *Taq* DNA Polymerase	PCR efficiency in the presence of inhibitors like humic acids	Amplification efficiency in low purity DNA
DNA Polymerase proofreading	Restriction enzyme digestion	Stabilizing of DNA single-stranded regions for site-directed mutagenesis

The supplied protein is a purified recombinant form free of endonucleases and nickases.

Description	Volume	Pack Size	Cat. No.
T4 gp32	200 µL	500 µg/mL	11TGP32100

Betaine Solution

Betaine has been shown to improve the amplification of DNA by reducing the formation of secondary structure in GC-rich regions.
It is an isostabilizing agent, equalizing the contribution of GC- and AT-base pairing to the stability of the DNA duplex.

Description	Pack Size	Cat. No.
Betaine, 5M, PCR grade	2 mL	11BETA0020

DMSO Solution

DMSO has been shown to facilitate DNA strand separation in GC-rich difficult secondary structures because it disrupts base pairing and has been shown to improve PCR efficiency.

Description	Pack Size	Cat. No.
Dimethyl Sulfoxide, Molecular Biology grade	50 mL	0219481950
	100 mL	0219481980
	250 mL	0219481983

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- Molecular Biology
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