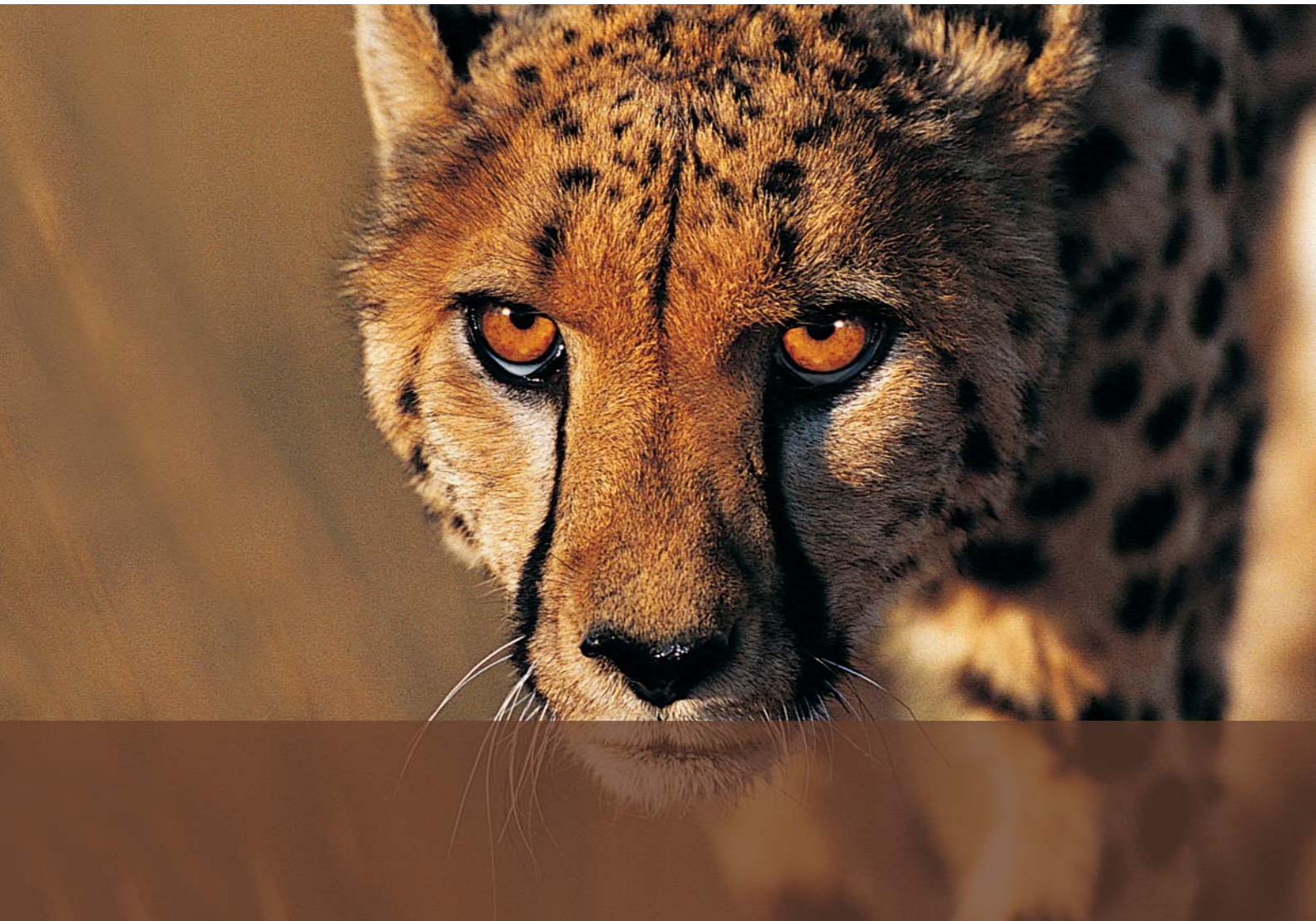
Diagnostics

FastStart Products for Hot Start PCR

Set your sights on the new standard for everyday PCR



Hot Start PCR

At room temperature during standard PCR setup, PCR primers often bind to partially complementary sequences within the DNA template. This creates the potential for standard Taq DNA Polymerase to elongate undesired, or "nonspecific," fragments.

*In **hot start PCR**, the polymerase is modified to ensure that it remains inactive at lower temperatures and only becomes active at the high temperatures at which primers specifically bind. This prevents the amplification of nonspecific products and increases the yield, or sensitivity, of the desired amplicon.*

FastStart Technology

Hot start enzymes — increase sensitivity and specificity in PCR

Specifically designed for hot start PCR, both FastStart Taq DNA Polymerase and FastStart High Fidelity PCR System employ chemically modified proteins to prevent nonspecific amplification at low temperatures. Brief incubation at 95°C prior to the first PCR cycle removes the heat-labile blocking groups from the FastStart products, activating them for hot start PCR.

- **Insist on higher specificity, sensitivity, and yield.**
  Hot start PCR dramatically improves overall PCR performance compared to basic Taq DNA Polymerase.
- **Employ robotic pipetting systems.**
  PCR setup can be performed at room temperature due to the hot start enzyme's inactivity at temperatures below 75°C.
- **Make PCR setup easier.**
  Manual hot start, wax barriers, beads, or the need to set up PCR on ice can be eliminated when using hot start enzymes.
- **Prevent carryover contamination.**
  These enzymes allow the incorporation of modified nucleotides and dUTP, enabling the use of Uracil-DNA Glycosylase to prevent cross-contamination in PCR.
- **Reduce the number of different enzymes you need to stock in your laboratory.**
  FastStart products are designed to perform equally well in various applications, including multiplex PCR and amplification of difficult templates.
- **Choose single reagents or convenient master mixes.**
  Single reagents allow manual optimization by Mg^{2+} titration or the addition of additives. Our ready-to-use master mixes only require the addition of primers and template.

FastStart Product Overview

Select the best FastStart product for your hot start PCR application

Increase sensitivity and specificity through hot start PCR			Single reagents that allow manual optimization by Mg^{2+} titration or the addition of additives			
	Template type	**Product size**	**Carryover prevention**	**Accuracy****	**Products**	**See page**
Everyday PCR	Standard	up to 3 kb	Yes*	1x	FastStart Taq DNA Polymerase	5
		up to 5 kb	Yes*	4x	FastStart High Fidelity PCR System	9
High Fidelity and Multiplex PCR	All	up to 5 kb	Yes*	4x	FastStart High Fidelity PCR System	9
Difficult Template PCR	GC-rich, high secondary structure	up to 3 kb	Yes*	1x	FastStart Taq DNA Polymerase	5
		up to 5 kb	Yes*	4x	FastStart High Fidelity PCR System	9

Maximize convenience through a ready-to-use master mix			Ready-to-use, 2x-concentrated master mix that needs only addition of primers and template			
	Template type	**Product size**	**Carryover prevention**	**Accuracy****	**Products**	**See page**
Everyday PCR	Standard	up to 2 kb	No	1x	FastStart PCR Master	7

Ensure best performance and sensitivity with ultrapure PCR-grade dNTPs			Single reagents combined with PCR Nucleotide Mix (including dATP, dCTP, dGTP, and dTTP)			
	Template type	**Product size**	**Carryover prevention**	**Accuracy****	**Products**	**See page**
See first table above	See first table above	up to 3 kb	No***	1x	FastStart Taq DNA Polymerase, dNTPack	12
		up to 5 kb	No***	4x	FastStart High Fidelity PCR System, dNTPack	12

* In combination with PCR Nucleotide Mix^{PLUS} ** compared to Taq DNA Polymerase *** Provided nucleotide mix contains dTTP

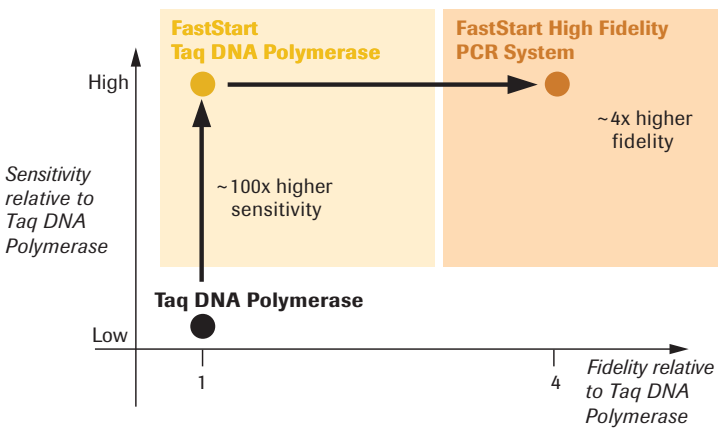


Figure 1: Sensitivity versus fidelity — relative to Taq DNA Polymerase. Improve sensitivity with either FastStart product, and increase fidelity by choosing the FastStart High Fidelity PCR System.

Single Reagents for Everyday PCR

Set your sights on the new standard for everyday PCR — hot start enzymes

FastStart Taq DNA Polymerase

Use FastStart Taq DNA Polymerase for all everyday PCR applications and overcome the poor performance of non-hot-start polymerases. FastStart Taq DNA Polymerase is a thermostable, chemically modified form of recombinant Taq DNA Polymerase. It delivers superior results for fragments up to 3 kb, thanks to its unique enzyme design and optimized buffer system. The enzyme is inactive at temperatures below 75°C, but is activated by a 2- to 4-minute incubation step at 95°C.

- **Obtain all the benefits of hot start PCR.** Hot start PCR increases specificity, sensitivity, and yield.
- **Amplify DNA fragments up to 3 kb.** Various DNA and cDNA templates can be amplified with FastStart Taq DNA Polymerase.
- **Overcome the challenges of even the most problematic DNA.** The revolutionary GC-RICH Resolution Solution, a PCR additive that reduces template secondary structure, is conveniently supplied with this product.
- **Employ robotic pipetting systems for PCR setup.** PCR setup can be performed at room temperature due to the enzyme's stability during extended reaction setup times.
- **Prevent carryover contamination.** FastStart Taq DNA Polymerase allows the incorporation of modified nucleotides and dUTP, enabling the use of Uracil-DNA Glycosylase to prevent cross-contamination in PCR.

Produce better sensitivity and higher yields. False negatives can be avoided by detecting smaller amounts of template DNA than basic Taq DNA Polymerase or other structurally or antibody-modified hot start products can amplify.

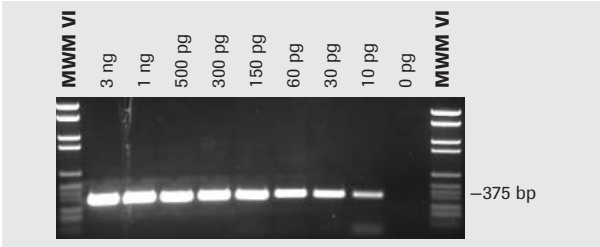


Figure 2: Amplification of a single-copy gene using FastStart Taq DNA Polymerase. Varying concentrations of human genomic DNA were used to amplify a single 375-bp fragment from the tissue plasminogen activator (tPA) gene.

Result: FastStart Taq DNA Polymerase amplifies a specific single-copy gene out of 10 pg human genomic DNA (corresponding to less than 5 copies/3 pg human genomic DNA, equivalent to one haploid genome).

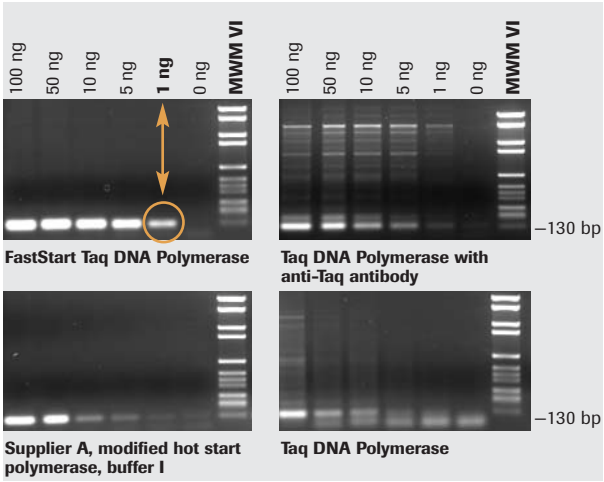


Figure 3: Amplification of a 130-bp fragment from the plasminogen activator (tPA) gene. Varying amounts of human genomic DNA were used for the amplification of a 130-bp fragment from the tissue plasminogen activator (tPA) gene.

Result: FastStart Taq DNA Polymerase produced the best specificity and sensitivity, even from the smallest amount of template.

Single Reagents for Everyday PCR

Set your sights on the new standard for everyday PCR — hot start enzymes

Overcome even the most difficult DNA templates.

Even the most problematic templates (*e.g.*, GC-rich sequences, repeats, high secondary structure) can be amplified with the supplied optimized buffer system and revolutionary GC-RICH Resolution Solution.

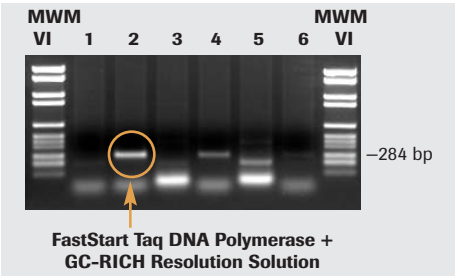


Figure 4: Amplification of a GC-rich template with a variety of enzymes and buffers. A 200 ng sample of human genomic DNA was used for the amplification of a 284-bp Apo E fragment (74% GC content).

1: FastStart Taq DNA Polymerase with standard buffer
2: FastStart Taq DNA Polymerase with GC-RICH Resolution Solution
3: Supplier C with standard buffer
4: Supplier C with special buffer solution
5: Supplier A, modified hot start polymerase
6: Taq DNA Polymerase with standard buffer

Result: FastStart Taq DNA Polymerase produced the best specificity and yield when compared to other commercially available polymerase systems designed for hot start applications.

FastStart Taq DNA Polymerase

Length	1 kb 3 kb 5 kb 10 kb
Accuracy*	3x 6x 9x 12x 15x 18x
Specificity/Sensitivity	▪▪▪▪/▪▪▪▪
Robustness/Carryover prevention	▪▪▪/YES

* compared to Taq DNA Polymerase

Obtain high yields in sensitive, specific RT-PCR assays.

In combination with Transcriptor Reverse Transcriptase, FastStart Taq DNA Polymerase saves you precious template RNA.

Figure 5: High yield in RT-PCR through specificity. Human skeletal muscle total RNA was reverse transcribed with Transcriptor Reverse Transcriptase by specific priming in a 20-µl reaction. A 2.5 µl sample of the RT reaction was used in a PCR of a 1849-bp fragment of the human dystrophin gene, using different hot start polymerases in the respective reaction buffers:

1: FastStart Taq DNA Polymerase
2: Supplier A - special buffer
3: Supplier C
4: Supplier B - enzyme X
5: Supplier B - enzyme Y

Result: Transcriptor Reverse Transcriptase and FastStart Taq DNA Polymerase produced the best yield.

Product	Cat. No.	Pack Size
FastStart Taq DNA Polymerase¤	12 032 902 001	100 U
	12 032 929 001	500 U (2 x 250 U)
	12 032 937 001	1,000 U (4 x 250 U)
	12 032 945 001	2,500 U (10 x 250 U)
	12 032 953 001	5,000 U (20 x 250 U)

Supplied with:

- 10x PCR Buffer with $MgCl_2$
- 10x PCR Buffer without $MgCl_2$
- GC-RICH Resolution Solution
- $MgCl_2$ Solution

Ensure optimal performance by choosing **FastStart Taq DNA Polymerase, dNTPacks** containing FastStart Taq DNA Polymerase in combination with a ready-to-use solution of PCR-Grade Nucleotides (see page 12).

Master Mixes for Everyday PCR

Maximize convenience in high-performance hot start PCR

FastStart PCR Master

Make hot start PCR virtually effortless with the new FastStart PCR Master — a ready-to-use, 2x-concentrated hot start master mix. It contains FastStart Taq DNA Polymerase, our unmatched PCR-Grade Nucleotides, and all other reagents (except PCR primers and template) required for running everyday PCR and two-step RT-PCR on thermal block cycler instruments.

- **Maximize convenience.**
  All you need to provide is primers, template, and water — the 2x-concentrated master mix contains everything else you need.
- **Simplify a variety of PCR applications.**
  The convenient master mix can be used to amplify fragments in routine, high-throughput PCR, or direct colony PCR.
- **Improve reliability, and reduce risk of contamination.**
  Fewer pipetting steps are necessary, thus limiting sources of error and contamination.
- **Set up reactions with robotic pipetting stations.**
  The heat-activated polymerase-based mix is stable for 24 hours at room temperature.
- **Reduce setup time.**
  FastStart PCR Master can be stored at +2 to +8°C — ready for immediate use — for up to one month.

Amplify genomic and cDNA fragments up to 2 kb.

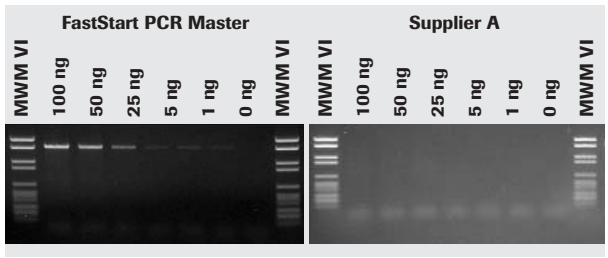


Figure 6: Amplification of a 1.8-kb fragment of the erythropoietin gene from different amounts of human genomic DNA (100 ng, 50 ng, 25 ng, 10 ng, 5 ng, 1 ng, 0 ng) using Roche's FastStart PCR Master or a master mix from Supplier A.

Result: FastStart PCR Master amplified the fragment with high specificity, whereas Supplier A's master mix showed no amplification product.

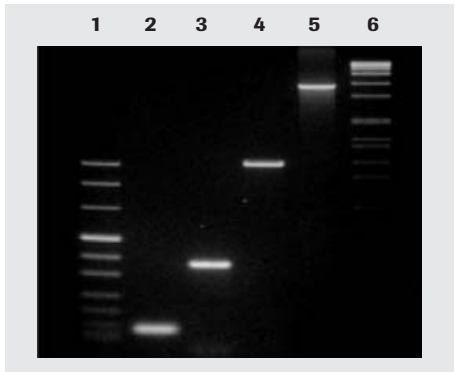


Figure 7: Amplification of different DNA targets (genomic DNA, plasmid DNA) using FastStart PCR Master without adjustment of individual reagent compositions.

Lane 1: Molecular Weight Marker VIII
Lane 2: 130-bp fragment from 200 ng human genomic DNA
Lane 3: 365-bp fragment from 1 ng human genomic DNA
Lane 4: 1.1-kb fragment from 200 ng human genomic DNA
Lane 5: 3.6-kb fragment from 100 ng pUCIQ 17 plasmid
Lane 6: Molecular Weight Marker VII

Result: DNA fragments ranging from 130 bp up to 1.1 kb were obtained from complex genomic DNA with high yield and specificity. Amplification of even longer fragments (3.6 kb) is possible (*e.g.*, from plasmid DNA).

Master Mixes for Everyday PCR

Maximize convenience in high-performance hot start PCR

Insist on extended stability at room temperature.

In addition to delivering consistent amplification at each time point, the heat-activated FastStart Taq DNA Polymerase in the FastStart PCR Master prevents the amplification of nonspecific fragments at room temperature.

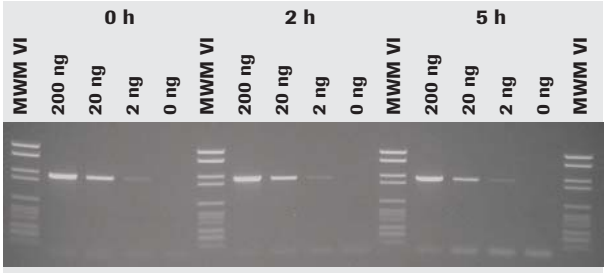


Figure 8: Room-temperature stability of a complete reaction mix containing FastStart PCR Master, template, and primers. FastStart PCR Master was used to amplify a 1.1-kb fragment of the collagen gene from various amounts of human genomic DNA (200 ng, 20 ng, 2 ng, 0 ng) after room-temperature incubation for the indicated times.

Result: The complete reaction mix shows the same sensitivity after 5 hours of incubation at room temperature.

Simply amplify directly from colonies.

FastStart PCR Master is a convenient and ideal tool for direct colony PCR. The hot start master mix enables the direct analysis of intact bacteria without prior template purification, making it the product of choice for rapid screening of cloning experiments.

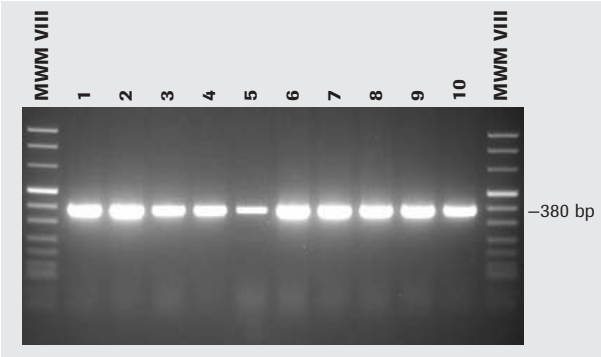


Figure 9: Colony screening of pCAPs-transformed DH5α cells. Amplification of the cloned 380-bp fragment of the IL-2 gene was performed by direct colony PCR using FastStart PCR Master. Ten clones were randomly picked with sterile toothpicks and heated in 50 µl of water for 5 minutes at 95°C. Following centrifugation at 13,000 rpm for 1 minute, direct colony PCR of the supernatant was performed using the FastStart PCR Master mix and gene-specific primers to identify positive clones.

Result: FastStart PCR Master is very well suited for PCR performed directly on *E. coli* cells. All randomly selected colonies carried the ligation product.

FastStart PCR Master

Length	1 kb 2 kb 5 kb 10 kb
Accuracy*	3x 6x 9x 12x 15x 18x
Specificity/Sensitivity	▪▪▪▪/▪▪▪▪
Robustness/Carryover prevention	▪▪▪/NO

* compared to Taq DNA Polymerase

Product	Cat. No.	Pack Size
FastStart PCR Master¤	04 710 436 001	2.5 ml (2 x 1.25 ml)
	04 710 444 001	10 ml (8 x 1.25 ml)
	04 710 452 001	50 ml (10 x 5 ml)

Reagents for High Fidelity and Multiplex PCR

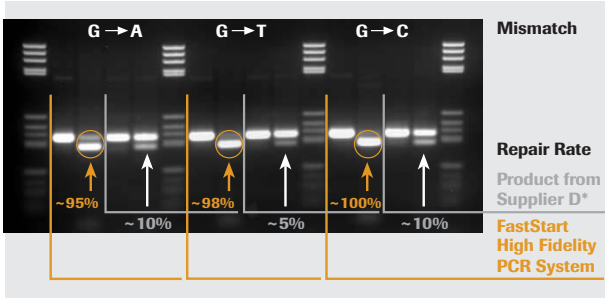
Challenge the performance of your hot start PCR

FastStart High Fidelity PCR System

Combine all the features of FastStart Taq DNA Polymerase with four times the accuracy, and the ability to amplify fragments up to 5 kb, by choosing the FastStart High Fidelity PCR System. It comprises a unique blend of FastStart Taq DNA Polymerase and a novel thermostable proofreading protein that carries no polymerase activity. Both proteins are chemically modified and inactive below 75°C, but are activated by heating to 95°C for 2 minutes.

- **Obtain all the benefits of hot start PCR.** Hot start PCR increases specificity, sensitivity, and yield.
- **Amplify longer templates.** FastStart High Fidelity PCR System allows the amplification of a variety of DNA and cDNA fragments up to 5 kb.
- **Increase fidelity.** The enzyme blend shows an approximate four-fold higher fidelity compared to Taq DNA Polymerase and FastStart Taq DNA Polymerase.
- **Achieve excellent performance in multiplex PCR.** The system amplifies multiple PCR fragments simultaneously. For difficult multiplex reactions, optimal performance is obtained in combination with our PCR Optimization Kit.
- **Amplify even the most problematic DNA.** DMSO, a PCR additive that facilitates working with difficult templates, is conveniently supplied with this product.

Achieve four-fold higher fidelity.
Produce more accurate replications of amplicons (for cloning, sequencing, and other high-fidelity applications) than with Taq DNA Polymerase or FastStart Taq DNA Polymerase.



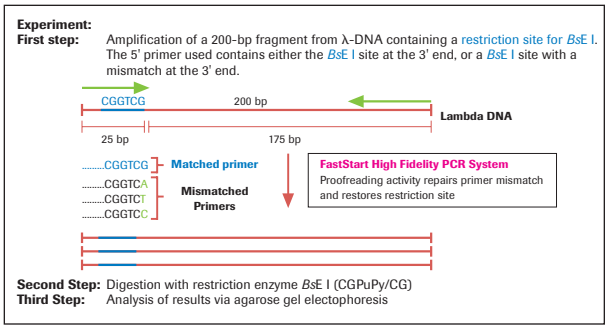


Figure 10: A 3'-mismatched primer correction assay, using the FastStart High Fidelity PCR System or a product from Supplier D*.

* Product from Supplier D promoted as a "High Fidelity Enzyme Blend": a mix of Taq DNA Polymerase, a proofreading polymerase, and an anti-Taq DNA Polymerase antibody.

Result: The FastStart High Fidelity PCR System corrects the primer mismatches very well; the product from Supplier D does not efficiently correct the primer mismatches.

Reagents for High Fidelity and Multiplex PCR

Challenge the performance of your hot start PCR

Amplify genomic and cDNA fragments up to 5 kb.

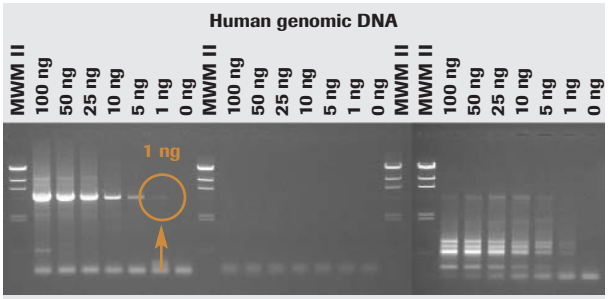


Figure 11: Varying amounts of human genomic DNA were used for the amplification of a 4.8-kb fragment from the tPA gene.

Result: The FastStart High Fidelity PCR System showed superior sensitivity and specificity compared to enzymes from two other suppliers.

Overcome even the most difficult DNA templates.
Amplify problematic templates (*e.g.*, GC-rich sequences, repeats, high secondary structure) with the optimized buffer system and supplied DMSO up to a concentration of 10%.

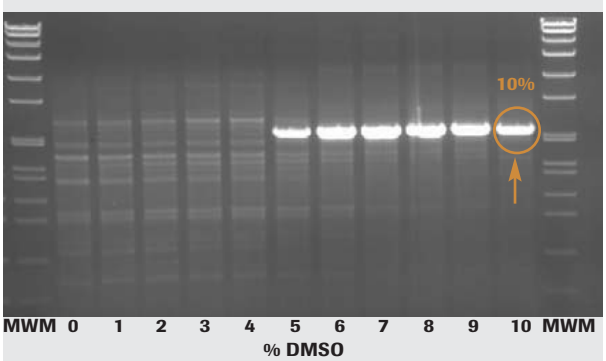


Figure 12: Effects of DMSO as an additive in PCR.
A 2.0-kb fragment of the Apo E gene (GC content is 74%) was amplified from 200 ng human genomic DNA using the FastStart High Fidelity PCR System with the addition of varying amounts of DMSO.

Result: PCR specificity can be significantly improved by adding DMSO. The enzyme mix remains active up to a final DMSO concentration of 10%.

Simplify PCR setup at room temperature.
The same high specificity, sensitivity, and yield (Figure 13) are maintained — even after room-temperature setup. Take advantage of an enzyme blend that is inactive below 75°C, allowing you to prepare reaction plates with robotic pipetting stations and avoid the need to pipet PCR components on ice.

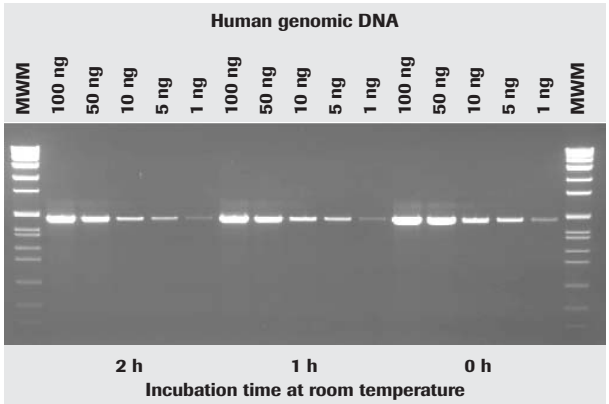
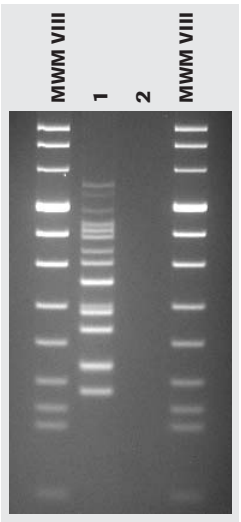


Figure 13: Amplification of a 1.8-kb Epo fragment with varying amounts of human genomic DNA using the FastStart High Fidelity PCR System. The complete reaction mix was pipetted and incubated at room temperature for different time periods before it was run in a thermal cycler.

Result: The total reaction mix – containing all reaction components – is stable for at least 2 hours at room temperature. As such, robotic pipetting stations can be used to pipet all reaction components together with the FastStart High Fidelity PCR System.

Amplify multiple DNA regions.
In most cases, the system easily amplifies multiple templates in the same reaction. For very challenging multiplex reactions, optimal reaction conditions can be established in combination with our PCR Optimization Kit. A dedicated application note (Cat. No. 04 788 958 001) is available for multiplex PCR with the FastStart High Fidelity PCR System.



1: 100 ng human genomic DNA

2: No-template control

Figure 14: Amplification of selected portions of the CFTR (Cystic Fibrosis Transmembrane Conductance Regulator) gene. Multiplex PCR was performed as a 14-plex PCR using 28 primers. The amplicon length varied from 198 bp to 598 bp.

Result: The FastStart High Fidelity PCR System is well suited for multiplex PCR applications, such as the amplification of multiple DNA regions for SNP analysis, genetic screening, and microsatellite analysis.

Achieve excellent results in RT-PCR.
Because of the high sensitivity of the enzyme blend, only a small amount of precious template RNA is needed. Combine the FastStart High Fidelity PCR System with our Transcriptor First Strand cDNA Synthesis Kit to achieve superior results in two-step RT-PCR.

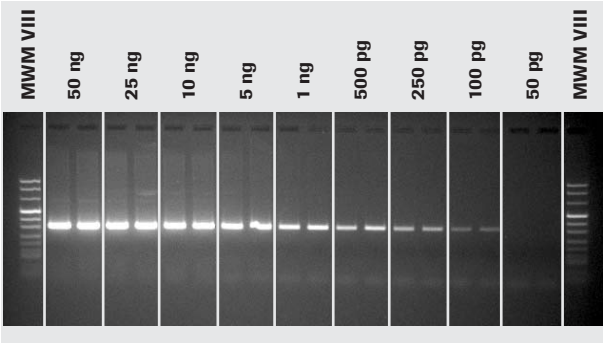
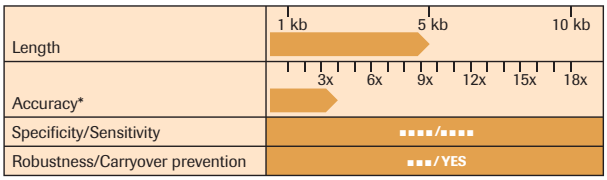


Figure 15: RT-PCR: Mouse Actin (324 bp). Mouse liver total RNA was reverse transcribed in duplicate with Transcriptor Reverse Transcriptase by oligo(dT)$_{15}$ priming in a 20-µl reaction.

Result: The FastStart High Fidelity PCR System – in combination with Transcriptor Reverse Transcriptase – amplifies with high sensitivity in RT-PCR. Amplification products are visible starting from 100 pg total RNA.

FastStart High Fidelity PCR System



* compared to Taq DNA Polymerase

Product	Cat. No.	Pack Size
FastStart High Fidelity PCR System¤	03 553 426 001 03 553 400 001 03 553 361 001	125 U 500 U (2 x 250 U) 2,500 U (10 x 250 U)
PCR Optimization Kit+	11 636 138 001	1 kit

Supplied with:
- 10x PCR Buffer with $MgCl_2$
- 10x PCR Buffer without $MgCl_2$
- DMSO
- $MgCl_2$ Solution

Ensure optimal performance by choosing **FastStart High Fidelity PCR System, dNTPacks** containing the FastStart High Fidelity PCR System in combination with a ready-to-use solution of PCR-Grade Nucleotides (see page 12).

FastStart dNTPacks

Ensure optimal performance by using FastStart reagents combined with PCR-grade nucleotides

FastStart Taq DNA Polymerase, dNTPack

FastStart High Fidelity PCR System, dNTPack

Choose Roche's dNTPacks, convenient products that combine PCR-Grade Nucleotides, thermostable hot start enzymes, and all associated components such as buffers and PCR-enhancing additives. Our PCR-Grade Nucleotides are assayed for function in RT-PCR, ensuring optimal performance of all components. Each dNTPack contains the additive-free sodium salt nucleotides as a ready-to-use mix (10 mM of each dNTP).

- **Profit from best performance.**
  Superior enzymes (see pages 5 and 9), combined with a mix of ultrapure PCR-Grade Nucleotides, ensure highest sensitivity and performance of amplification reactions.
- **Safeguard your precious reaction components.**
  The extensive investment in generating template material should not be risked by using nucleotides from another supplier.
- **Simplify ordering.**
  dNTPacks provide everything you need for PCR in one convenient package.
- **Benefit from an attractive price.**
  Thermostable DNA polymerases and premixed solutions of PCR-Grade Nucleotides are provided in one economical package.

Rely on dNTPs that are free of PCR inhibitors.

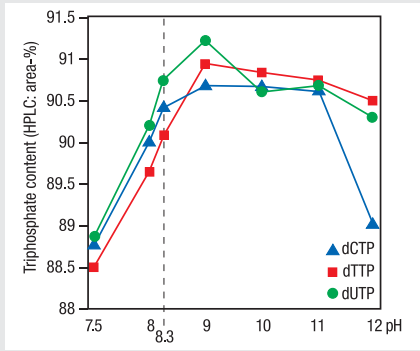
The enzymatic synthesis process avoids the generation of contaminants like tetraphosphate, which can disintegrate and form pyrophosphate — a known inhibitor of amplification reactions.

Insist on patented technology.

PCR-Grade Nucleotides are manufactured by an enzymatic synthesis process that does not generate nucleotides with modified bases, tetraphosphates, or pyrophosphate contaminants common in chemically synthesized nucleotide preparations. The patented buffer conditions of Roche's PCR-Grade Nucleotides result in nucleotide solutions with unmatched stability values and longer shelf life (Figure 16).

Optimum pH for dNTPs 100 mmol/l Na^+ solutions were stressed. Purity was checked using HPLC.

dCTP, dTTP, and dUTP: 28 days at 35°C



dATP and dGTP: 28 days at 35°C

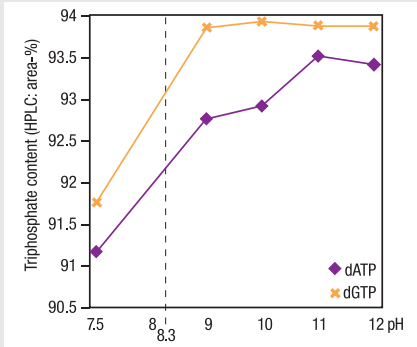


Figure 16: PCR-Grade Nucleotide stability experiment. Nucleotides were stored at 35°C for indicated time periods at indicated pH values. Stability of purines and pyrimidines is improved when nucleotides are stored at pH 8.3 instead of lower pH storage conditions. Stability tests also indicate enhanced tolerance of increasing pH through normal experimental pH values.

Improve the performance and consistency of every PCR.

Improve experimental consistency by choosing nucleotides that always exhibit a consistent purity of >99% dNTP and <0.9% dNDP as determined by HPLC (Figure 18).

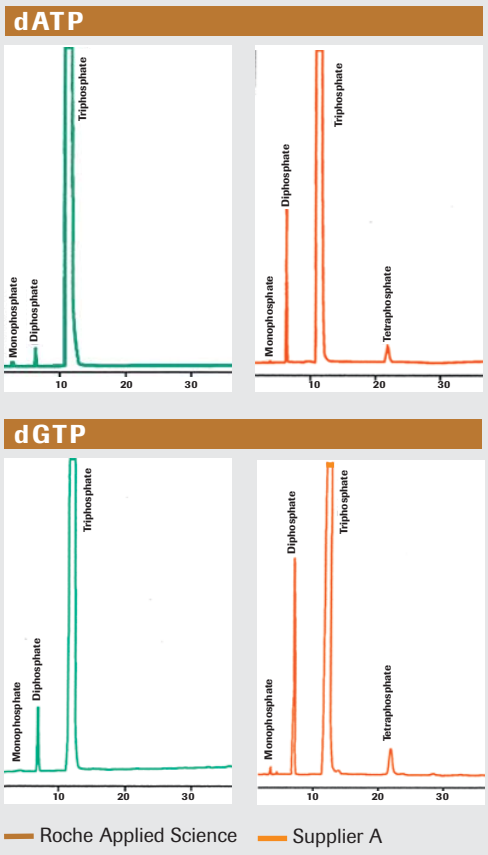


Figure 18: HPLC (RP 18) purity analysis of Roche's PCR-Grade Nucleotides in comparison with Supplier A's nucleotides.

Result: Roche's PCR-Grade Nucleotides are free of tetraphosphates and show much higher purity overall in comparison to Supplier A's nucleotides.

Insist on nucleotides that are extensively function tested.

Rest assured that our PCR-Grade Nucleotides will work well in your lab, because they are function tested in RT-PCR to confirm suitability for PCR and reverse transcription at the same time. Each lot is also tested for the absence of RNases, DNases, and nicking activity to protect your precious template.

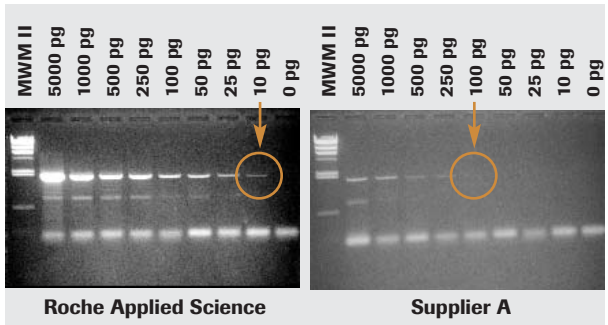


Figure 17: RT-PCR of a 1849-bp fragment of the human dystrophin gene. Varying amounts of human skeletal muscle total RNA were used in the RT-PCR.

Result: Roche's dNTPs produced the RT-PCR product from only 10 picograms of RNA, compared with 100 picograms when using Supplier A's dNTPs (10-fold higher sensitivity with Roche's dNTPs).

Product	Cat. No.	Pack Size
FastStart Taq DNA Polymerase, dNTPack¤	04 738 314 001 04 738 357 001 04 738 381 001 04 738 403 001 04 738 420 001	100 U 500 U (2 x 250 U) 1,000 U (4 x 250 U) 2,500 U (10 x 250 U) 5,000 U (20 x 250 U)
FastStart High Fidelity PCR System, dNTPack¤	04 738 284 001 04 738 292 001 04 738 306 001	125 U 500 U (2 x 250 U) 2,500 U (10 x 250 U)

For more information about these reagents, please refer to the product descriptions on pages 5 and 9.

Reagents for Real-Time PCR

Revolutionize your qPCR experiments

FastStart TaqMan® Probe Master

FastStart SYBR Green Master

Insist on all the features and benefits of our FastStart hot start technology for all your real-time PCR applications. Optimize the way you design and perform real-time qPCR assays with the powerful combination of innovative Universal ProbeLibrary Probes† and FastStart TaqMan® Probe Master, our new master mix for real-time PCR systems other than the LightCycler® Instruments.

Product	Cat. No.	Pack Size
FastStart TaqMan® Probe Master (Rox)‡	04 673 450 001 04 673 468 001 04 673 476 001	2.5 ml (2 x 1.25 ml) 12.5 ml (10 x 1.25 ml) 50 ml (10 x 5 ml)
FastStart TaqMan® Probe Master‡	04 673 409 001 04 673 417 001 04 673 433 001	2.5 ml (2 x 1.25 ml) 12.5 ml (10 x 1.25 ml) 50 ml (10 x 5 ml)
FastStart SYBR Green Master (Rox)¥	04 673 514 001 04 673 522 001	5 ml (4 x 1.25 ml) 50 ml (10 x 5 ml)
FastStart SYBR Green Master¥	04 673 484 001 04 673 492 001	5 ml (4 x 1.25 ml) 50 ml (10 x 5 ml)
ROX Reference Dye+	04 673 549 001	50 µl

Choose the powerful combination of the ProbeFinder Software, the Universal ProbeLibrary, the Transcriptor First Strand cDNA Synthesis Kit, and the FastStart TaqMan® Probe Master to revolutionize the way you design and perform real-time qPCR assays.

For more information, please refer to ***www.universalprobelibrary.com***

Reagents for the LightCycler® Instruments

The FastStart technology is also an integral part of our kits for the LightCycler® Instruments. For more information, please refer to the LightCycler® Instruments Special Interest Site at ***www.lightcycler.com***

Related Products

Product	Cat. No.	Pack Size
Agarose MP	11 388 983 001 11 388 991 001	100 g 500 g
DNA Molecular Weight Marker VI	11 062 590 001	50 µg
DNA Molecular Weight Marker VIII	11 336 045 001	50 µg
PCR Optimization Kit+	11 636 138 001	1 kit
PCR Nucleotide Mix+	11 581 295 001 11 814 362 001	200 µl 10 x 200 µl
PCR Nucleotide Mix PLUS+	11 888 412 001	200 µl
Transcriptor First Strand cDNA Synthesis Kit+	04 379 012 001	50 reactions
Uracil-DNA Glycosylase+,§	11 444 646 001	100 units
Uracil-DNA Glycosylase, heat-labile+,§	11 775 367 001 11 775 375 001	100 units 500 units
Water, PCR Grade	03 315 932 001 03 315 959 001 03 315 843 001	25 ml (25 x 1 ml) 25 ml 100 ml (4 x 25 ml)

Additional Information

Resources

Use the following services and tools supplied by Roche Applied Science to support you in your daily research needs:

Access detailed information about all our products related to PCR and RT-PCR by visiting our PCR Special Interest Site at ***www.roche-applied-science.com/pcr***

Roche Applied Science introduced the first restriction enzymes in 1976. Since then, many researchers have chosen to apply our enzymes in their everyday work and have relied on the quality and consistency we provide. Learn more about our solutions for mapping and cloning by visiting our Restriction Enzymes Special Interest Site at ***www.restriction-enzymes.com***

Calculate the annealing temperature, molecular weight, and absorbance factor of a given oligonucleotide up to 60 bases in length with the easy-to-use online tool, Benchmate T_m Calculator, at ***www.roche-applied-science.com/benchmate***

Limited Label Licenses, Disclaimers, and Trademarks

¤ A license under the non-U.S. counterparts of U.S. Patents Nos. 4,683,202, 4,683,195 and 4,965,188 owned by F. Hoffmann-La Roche Ltd. (Roche), for use in research and development, has an up-front fee component and a running-royalty component. The purchase price of the product includes a limited, non-transferable license under the running-royalty component to use only this amount of product to practice the Polymerase Chain Reaction (PCR) and related processes described in said patents solely for the research and development activities of the purchaser when this product is used in conjunction with a thermal cycler whose use is covered by the up-front fee component. Rights to the up-front fee component must be obtained by the end user in order to have a complete license. These rights under the up-front fee component may be purchased from Applied Biosystems or obtained by purchasing an authorized thermal cycler. This product is also an authorized reagent and may also be used under service sublicenses from Applied Biosystems under the foregoing patents. No right to perform or offer commercial services of any kind using PCR, including without limitation reporting the results of purchaser's activities for a fee or other commercial consideration, is hereby granted expressly, by implication or estoppel. This product is for research use only. Diagnostic uses require a separate license from Roche. Further information on purchasing licenses to practice the PCR process may be obtained by contacting the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.

+ This product is optimized for use in the Polymerase Chain Reaction (PCR) process covered by patents owned by F. Hoffmann-La Roche Ltd. No license under these patents to use the PCR process is conveyed expressly or by implication to the purchaser by the purchase of this product.

‡ A license under the non-U.S. counterparts of U.S. Patents Nos. 4,683,202, 4,683,195 and 4,965,188 owned by F. Hoffmann-La Roche Ltd. (Roche), for use in research and development, has an up-front fee component and a running-royalty component. The purchase price of the product includes a limited, non-transferable license under the running-royalty component to use only this amount of product to practice the Polymerase Chain Reaction (PCR) and related processes described in said patents solely for the research and development activities of the purchaser when this product is used in conjunction with a thermal cycler whose use is covered by the up-front fee component. Rights to the up-front fee component must be obtained by the end user in order to have a complete license. These rights under the up-front fee component may be purchased from Applied Biosystems or obtained by purchasing an authorized thermal cycler. This product is also an authorized reagent and may also be used under service sublicenses from Applied Biosystems under the foregoing patents.

A license to perform the 5' nuclease process for research requires the use of a Licensed 5' Nuclease Kit (containing Licensed Probe), or the combination of an Authorized Core Kit plus Licensed Probe, or license rights that may be purchased from Applied Biosystems. This product is an Authorized Core Kit without Licensed Probe. Its purchase price includes a limited, non-transferable immunity from suit under U.S. Patents Nos. 5,210,015, 5,487,972, 5,476,774, and 5,219,727, and corresponding patent claims outside the United States, owned by Roche Molecular Systems, Inc. Or F. Hoffmann-La Roche Ltd ("Roche"), for using only this amount of the product in the practice of the 5' nuclease process solely for the purchaser's own internal research and development activities. This product is also an Authorized Core Kit for use with service sublicenses available from Applied Biosystems. This product conveys no rights under U.S. Patents Nos. 5,804,375, 6,214,979, 5,538,848, 5,723,591, 5,876,930, 6,030,787, or 6,258,569, or corresponding patent claims outside the United States, expressly, by implication, or by estoppel. No right under any other patent claims (such as apparatus or system claims in U.S. Patent No. 6,814,934) and no right to perform commercial services of any kind, including without limitation reporting the results of purchaser's activities for a fee or other commercial consideration, is hereby granted expressly, by implication, or by estoppel. This product is for research purposes only. Diagnostic uses require a separate license from Roche. Further information on purchasing licenses to practice real-time PCR processes may be obtained by contacting the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.

¥ Purchase of this product is accompanied by a limited license to use it in the PCR process, including homogeneous PCR methods described in U.S. Patents Nos. 5,994,056, 6,171,785, 6,569,627 and corresponding patents outside the United States, for life science research in conjunction with a thermal cycler whose use in the automated performance of the PCR process is covered by the up-front license fee, i.e., an authorized thermal cycler. No real-time apparatus or system patent rights or any other patent rights owned by Applera Corporation are conveyed expressly, by implication or by estoppel. No rights for any other application, including any in vitro diagnostic application, are conveyed expressly, by implication or by estoppel under U.S. Patents Nos. 6,174,670 and 6,245,514 and corresponding patent claims outside the United States, or any other patents owned by Roche Molecular Systems, Inc. and F. Hoffmann-La Roche Ltd, claiming real-time amplification and detection methods. The product is covered in-part by US 5,871,908, co-exclusively licensed from Evotec OAI AG.

§ Licensed by Life Technologies, under US Patent 5.035.996 and foreign equivalents for research use only. No right for use in other applications, including the diagnosis of disease in human, animals, or plants under any patents owned by Life Technologies are conveyed by the purchase of this product.

† This product is a Licensed Probe. Its use with an Authorized Core Kit and Authorized Thermal Cycler provides a license for the purchaser's own internal research and development under the 5' nuclease patents and basic PCR patents of Roche Molecular Systems, Inc. and F. Hoffmann-La Roche Ltd. No real-time apparatus or system patent rights or any other patent rights owned by Applera Corporation, and no rights for any other application, including any *in vitro* diagnostic application under patents owned by Roche Molecular Systems, Inc. and F. Hoffmann-La Roche Ltd claiming homogeneous or real-time amplification and detection methods, are conveyed expressly, by implication or by estoppel.

The technology used for the LightCycler® System is licensed from Idaho Technology, Inc., Salt Lake City, UT, USA.

FASTSTART, LIGHTCYCLER, AND TAQMAN are trademarks of Roche.

PROBELIBRARY is a registered trademark of Exiqon A/S, Vedbaek, Denmark.

Other brands or product names are trademarks of their respective holders.