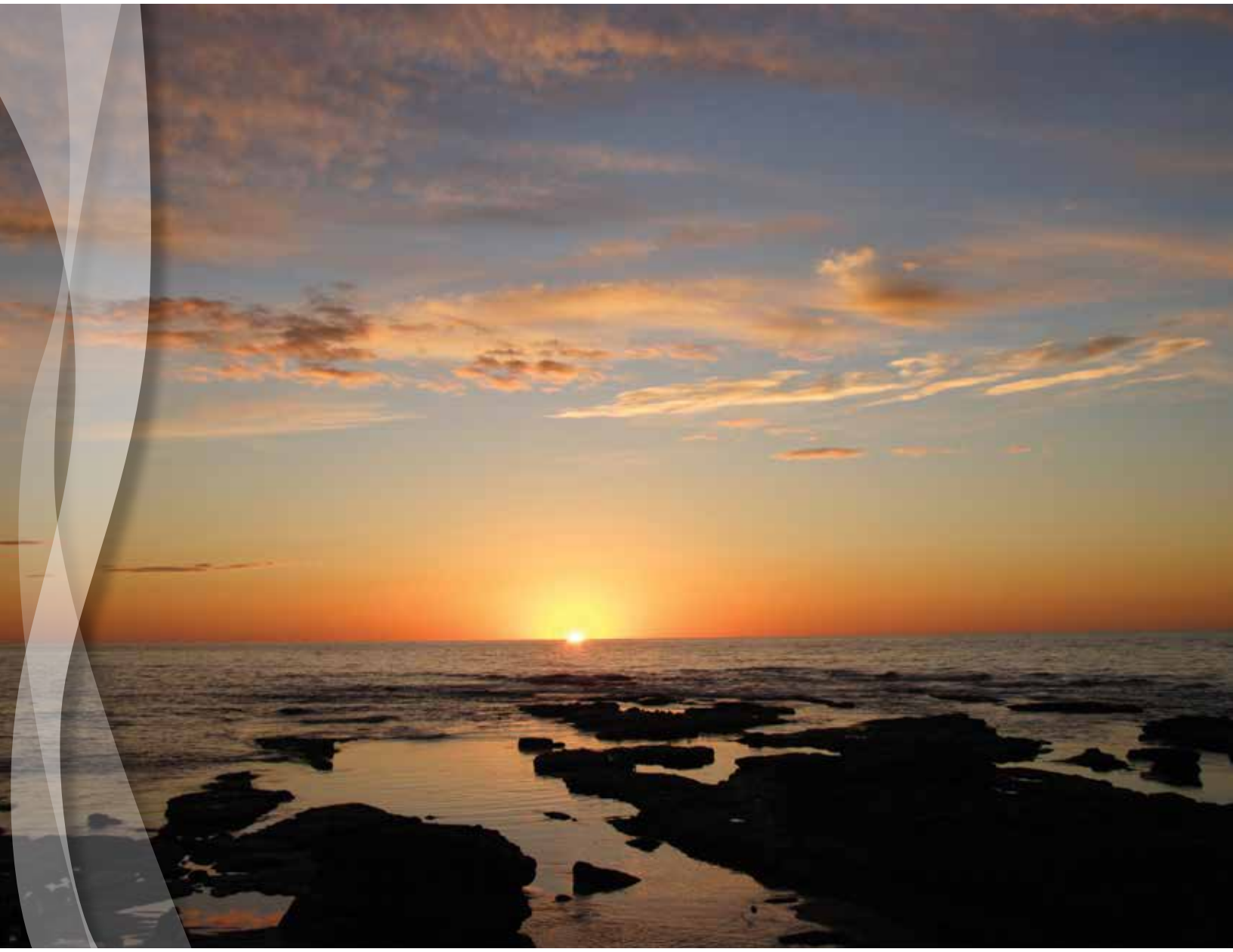
TriLink BioTechnologies

The Modified Nucleic Acid Experts

CleanAmp™ PCR Products



trilinkbiotech.com/cleanamp

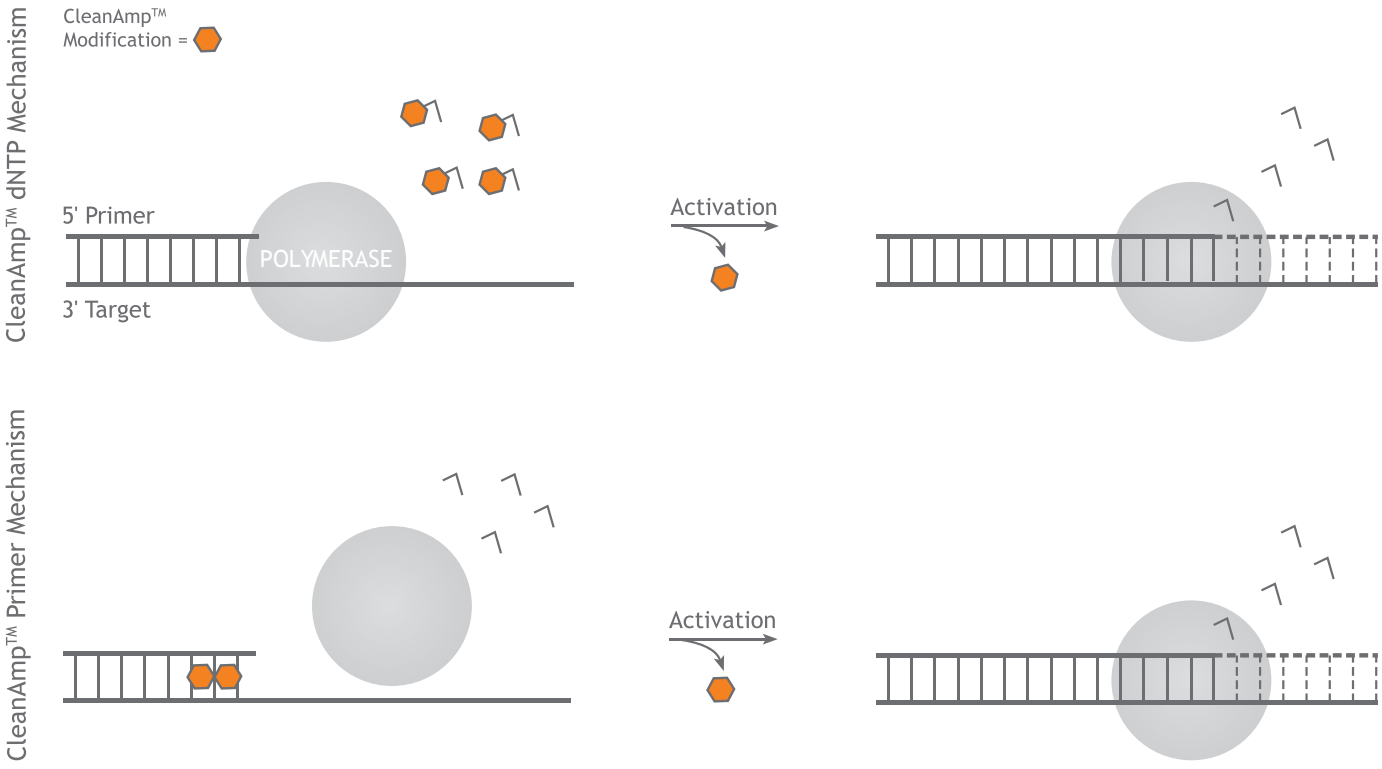
CleanAmp™ PCR Products

The Next Generation in Hot Start PCR

CleanAmp™ is a patented technology developed under SBIR grants from the NIH. CleanAmp™ Hot Start PCR products provide a specific, sensitive and flexible alternative to Hot Start DNA polymerases. TriLink has applied their expertise in modified nucleic acid chemistry to develop chemically modified dNTPs and primers that enable Hot Start PCR using standard *Taq* DNA polymerase. Simply substitute the standard dNTPs or primers in your PCR assay for the corresponding CleanAmp™ reagent to create a Hot Start PCR reaction. CleanAmp™ products are ideal for applications such as RT-PCR, multiplex PCR, digital PCR, fast PCR, end-point PCR and real-time PCR (including real-time RT-PCR and fast real-time PCR). CleanAmp™ Hot Start PCR products offer:

- Compatibility with a variety of DNA polymerases and PCR applications
- Unparalleled specificity and sensitivity due to significantly reduced non-specific amplification
- Easy assay development with minimal optimization
- Increased product yield
- High amplification efficiency with short and long amplicons (up to 23kb)
- Significant savings over other Hot Start technologies, including affordable licensing

Activation of CleanAmp™ products occurs during the initial heat cycle of Hot Start PCR and each subsequent denaturation step, releasing just enough reagent to allow efficient amplification. (In addition to heat, CleanAmp™ can also be activated by a change in pH or addition of a chemical reagent.) By limiting the amount of active reagent during the early cycles when the target is in low concentration, CleanAmp™ significantly reduces background amplification to achieve a reduction or even an elimination of primer dimer and mis-priming.



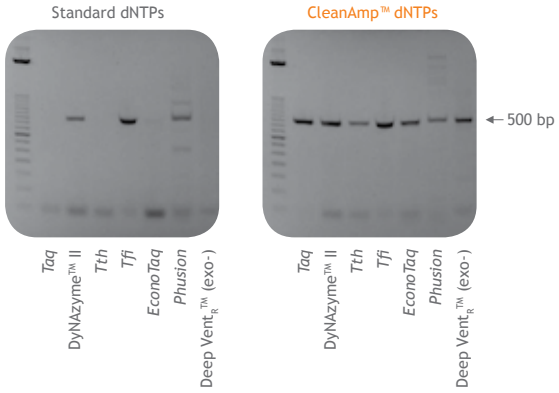
CleanAmp™ dNTPs

Make Your Assay a Hot Start

CleanAmp™ dNTPs are the most versatile solution in TriLink's line of PCR enhancing products, offering a universal approach to improved Hot Start PCR. Replacement of the standard dNTPs in your assay with CleanAmp™ dNTPs, offers the same advantages as more costly Hot Start enzymes.

CleanAmp™ dNTPs offer precise control at the start of PCR thermal cycling by blocking nucleotide incorporation until heat activation of the dNTPs. A pH change or addition of a chemical reagent can also be used to activate CleanAmp™ dNTPs. This control of DNA polymerase extension vastly reduces mis-priming, primer dimer formation and other common deleterious effects.

Improve Performance of DNA Polymerases

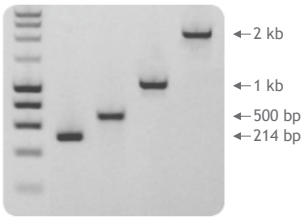


A Flexible Solution

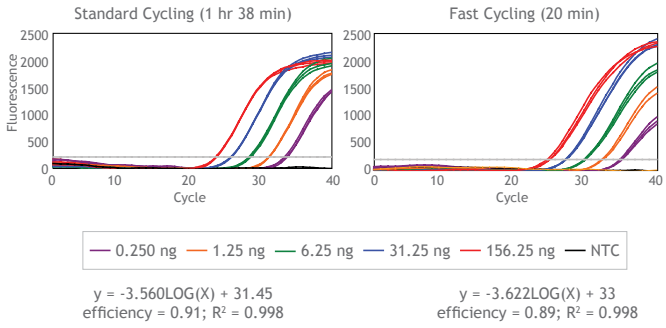
CleanAmp™ dNTPs are a flexible solution, applicable in a number of different reaction formats. The intrinsic Hot Start properties of CleanAmp™ dNTPs provide a simple means to improve the specificity of your assay. CleanAmp™ dNTPs can be substituted for routine length or long amplicons. To date, targets greater than 20 kb have been successfully amplified.

A fast activation rate allows for substitution of CleanAmp™ dNTPs in traditional and in fast thermal cycling protocols. CleanAmp™ dNTPs provide reliable performance in real-time PCR, resulting in the same PCR efficiencies in both standard and fast cycling protocols. Furthermore, the sensitivity and low limit of detection achieved with CleanAmp™ dNTPs is evident in the successful amplification of low abundance targets.

Robust Amplification Over a Range of Target Sizes



Effective in Standard and Fast Thermal Cycling



y = -3.560LOG(X) + 31.45
efficiency = 0.91; R^2 = 0.998

y = -3.622LOG(X) + 33
efficiency = 0.89; R^2 = 0.998

"Combining CleanAmp™ dNTPs with our novel lyophilization methods creates the ultimate in high quality easy-to-use PCR assays. Inclusion of CleanAmp™ dNTPs allows us to create accurate, reproducible and simple diagnostic kits, that greatly improve the quality of clinical testing and patient care."
- Mike Bunce, Ph.D., CEO and CSO at Biofortuna

Learn More

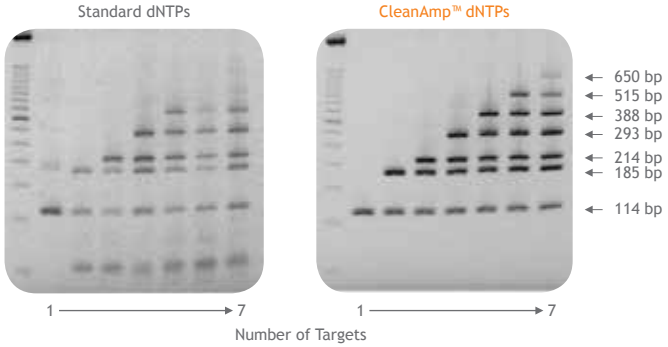
trilinkbiotech.com/cleanamp/dntps

CleanAmp™ dNTPs

Simplify Multiplex Assay Development

Multiplex PCR is a powerful technique that allows for the simultaneous amplification and detection of two or more targets in a single reaction. The use of CleanAmp™ dNTPs minimizes the iterative design process required to develop a robust multiplex assay. Successful amplification of more than 50 targets in a single reaction has been demonstrated. Improve your multiplex assay by substituting CleanAmp™ dNTPs for standard dNTPs, or try our convenient multiplex master mix.

Increase Yield and Specificity in Multiplex PCR



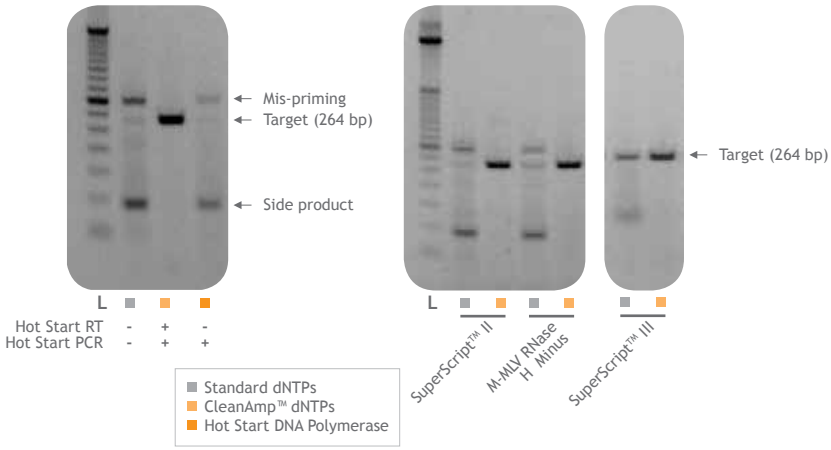
"CleanAmp™ dNTPs used with native *Taq* polymerase perform to specification in our demanding multiplex ScorpionsTM assays at a substantial cost savings."
- Richard DeScenzo, Ph.D., Microbiology Group Leader at ETS Laboratories

Improve RNA Detection

CleanAmp™ dNTPs improve the specificity of one-step reverse transcription PCR (RT-PCR) by providing Hot Start activation for both the RT and the PCR steps. The Hot Start control of the PCR step alone cannot effectively suppress off-target amplifications in one-step RT-PCR.

CleanAmp™ dNTPs provide specific amplification when used with a number of commonly used RT enzymes. The use of CleanAmp™ dNTPs provides a elegant solution by avoiding the complexity and cost of integrating a Hot Start solution for both the RT and the PCR step.

Improve One-Step RT-PCR Specificity by Hot Start Activation of both the RT and PCR Steps



"Using CleanAmp™ dNTPs in your PCR is an interesting way to improve specificity. This novel Hot Start method is easy to incorporate into any PCR master mix."
- Carl Wittwer, M.D., Ph.D., Professor of Pathology at the University of Utah and co-founder of Idaho Technology

"CleanAmp™ dNTPs is a clever alternative to conventional antibody based Hot Start approaches that circumvents some of their limitations. We are very excited including it in our tools portfolio and expect to use it when developing delicate assays."
- Mikael Kubista, Ph.D., CEO and founder of TATAA Biocenter

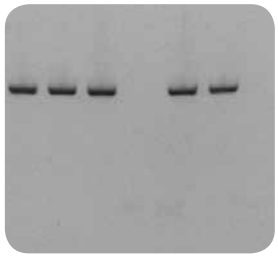
CleanAmp™ dUTP

For PCR Carry-over Contamination Prevention

CleanAmp™ dUTP can be substituted for dTTP in PCR to produce uracil-containing amplicons. One of the most commonly described applications of dUTP is in PCR-based carryover decontamination schemes employing the enzyme uracil-N-glycosylase (UNG). CleanAmp™ dUTP can be used in routine endpoint PCR and in real-time PCR.

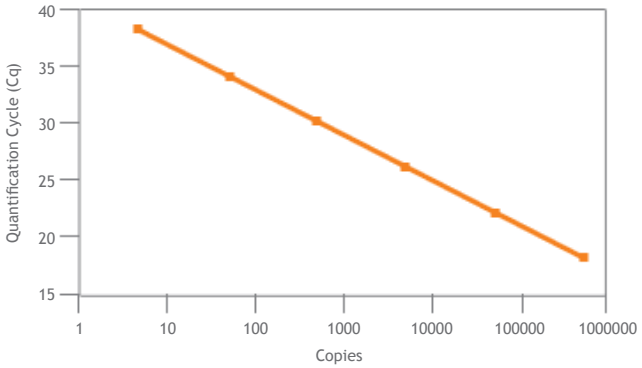
Optimal PCR results are achieved when CleanAmp™ dUTP is in a three-fold excess over dATP, dCTP and dGTP. Use CleanAmp™ dUTP with standard dNTPs for well-behaved targets and with CleanAmp™ dNTPs for problematic targets.

Successful Carryover Decontamination



+	+	-	-	+	+	-	Lambda gDNA Template
-	+	-	+	-	+	-	Uracil N Glycosylase
-	-	+	+	+	+	-	dU Contaminant

Sensitive Limit of Detection



Standard curve from the amplification of 715 bp target from Lambda genomic DNA with 5 to 500,000 copies of input target, with detection by intercalating dye. Y = -3.884*LOG(X) + 40.11, Eff. = 80.9%

Learn More

trilinkbiotech.com/cleanamp/dutp

"We designed a quadruplex PCR assay to simultaneously amplify four herpesviruses, including herpes simplex virus (HSV), cytomegalovirus (CMV), Epstein-Barr virus (EBV) and varicella zoster virus (VZV). We found that the use of CleanAmp™ Turbo Primers enhanced amplification efficacies in the quadruplex herpesvirus PCR assay where normal multiplex techniques previously failed."
- Yi-Wei Tang, University of Vanderbilt

Product	Catalog #	Pack Size	Price
CleanAmp™ dNTP Mix dATP, dCTP, dGTP and dTTP each at 10 mM	N-9506-2 N-9506-10	2 µmoles each (4 x 2 µmoles)[1] 10 µmoles each (4 x 10 µmoles)	$90 $350
CleanAmp™ dNTP Set 1 Vial of dATP, dCTP, dGTP and dTTP each at 50 mM	N-9507-2 N-9507-10	2 µmoles each (4 x 2 µmoles)[1] 10 µmoles each (4 x 10 µmoles)	$80 $295
CleanAmp™ PCR 2X Master Mix CleanAmp™ dNTP Mix, *Taq* DNA Polymerase in reaction buffer	L-5101-100	100 reactions[2]	$75
CleanAmp™ Multiplex PCR 2X Master Mix CleanAmp™ dNTP Mix, *Taq* DNA Polymerase in reaction buffer	L-5103-100	100 reactions[2]	$195
CleanAmp™ dUTP 50 mM	N-9524-2 N-9524-10	2 µmoles 10 µmoles	$50 $180
CleanAmp™ dUTP Set 1 Vial of dATP, dCTP, dGTP and dUTP each at 50 mM	N-9508-2 N-9508-10	2 µmoles each (4 x 2 µmoles) 10 µmoles each (4 x 10 µmoles)	$100 $360

[1]A 2 µmole pack size is sufficient for approximately 200, 25 µl reactions at a 0.4 mM concentration or 400, 25 µl reactions at a 0.2 mM concentration.
[2]25 µl reactions using standard thermal cycling protocol.

CleanAmp™ 7-deaza-dGTP

Robust Amplification of GC-Rich Targets

Struggling with amplification of DNA targets high in GC content? PCR product formation can often be compromised by inadequate strand separation and the propensity for complex secondary structure formation. The use of standard 7-deaza-dGTP is a notable method for overcoming this problem.1 TriLink developed CleanAmpTM 7-deaza-dGTP, an elegant fusion of the secondary structure reducing nucleotide analog, 7-deaza-dGTP, and TriLink's CleanAmp™ dNTP Hot Start technology. The use of the CleanAmp™ 7-deaza-dGTP Mix consistently provides a clean, high-yield product. CleanAmp™ 7-deaza-dGTP is available individually, as a nucleotide mix (CleanAmp™ 7-deaza-dGTP Mix) and is now available in the ready-to-use CleanAmp™ GC-Rich PCR 2X Master Mix for amplification of GC-rich targets.

[1] McConlogue, L., Brow, M.A. and Innis, M.A. (1988) Structure independent DNA amplification by PCR using 7-deaza-2'-deoxyguanosine. Nucleic Acids Res, 16, 9869.

Improve Yield and Specificity of High GC Targets

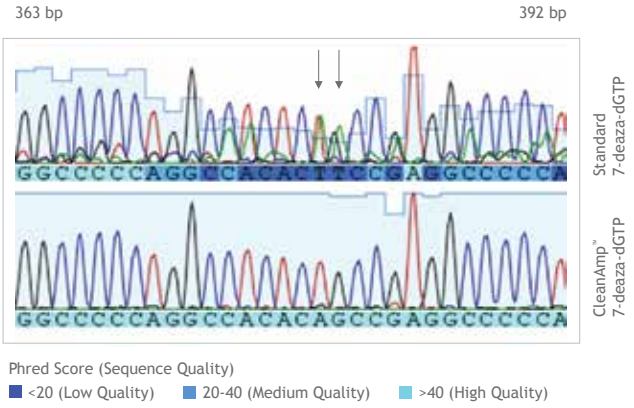
"I was having a terrible time trying to PCR amplify a region of DNA that is 62% G+C rich. Your new product, CleanAmp™ 7-deaza-dGTP Mix, made it a breeze and solved my problem. I have since recommended this to our collaborators and it is now an essential component in our protocol."
- Jane Michalski, University of Maryland, School of Medicine

Improving Downstream Sequencing

GC-rich DNA targets can be difficult to sequence due to the high degree of intrastrand secondary structure formation. Sequencing GC-rich regions can also be complicated by loss of signal, band compressions and weak signal base calls.

PCR amplification of these problematic targets using CleanAmpTM 7-deaza-dGTP prior to sequencing can significantly improve the read quality. Use of CleanAmp™ 7-deaza-dGTP Mix or CleanAmp™ GC-Rich PCR 2X Master Mix in the PCR step affords the best sequencing results by providing long read lengths, high quality Phred scores, and reliable sequencing data.

Increase Sequencing Accuracy



Product	Catalog #	Pack Size	Price
CleanAmp™ 7-deaza-dGTP Mix dATP, dCTP, (dGTP: 7-deaza-dGTP) and dTTP each at 10 mM	N-9504-2 N-9504-10	2 µmoles each of d(A,C,G[1],T)TP[2] 10 µmoles each of d(A,C,G[1],T)TP	$120 $465
CleanAmp™ 7-deaza-dGTP 50 mM	N-9515-2 N-9515-10	2 µmoles[2] 10 µmoles	$120 $465
CleanAmp™ GC-Rich PCR 2X Master Mix CleanAmp™ 7-deaza-dGTP Mix, *Taq* DNA Polymerase in reaction buffer	L-5102-100	100 reactions[3]	$85

[1]The CleanAmp™ 7-deaza-dGTP Mix contains a 1:3 ratio of dGTP:7-deaza-dGTP.
[2]A 2 µmole pack size is sufficient for approximately 200, 25 µl reactions at a 0.4 mM concentration or 400, 25 µl reactions at a 0.2 mM concentration.
[3]25 µl reactions using standard thermal cycling protocol.

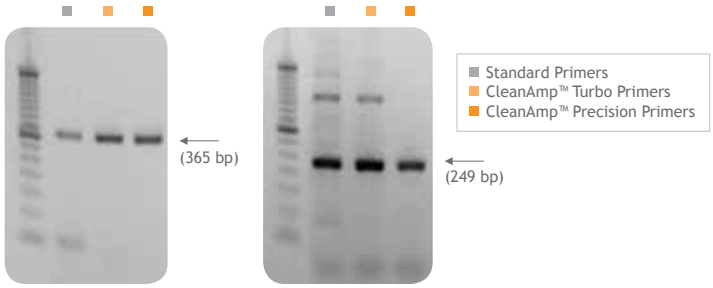
CleanAmp™ Primers

A Hot Start Assay for Less

Like CleanAmp™ dNTPs, CleanAmp™ Primers contain chemical modifications that enable Hot Start activation in PCR. The initial heat cycle removes the modification generating the corresponding unmodified primer thereby initiating amplification of the desired target. CleanAmp™ Primers eliminate primer dimer and mis-priming events.

CleanAmp™ Primers are a key choice for diagnostic kits and other established assays. In these assays CleanAmp™ Primers can be as little as $0.03 per reaction when manufactured at our standard scale and less at larger scales.

Reduce Primer Dimer Formation and Mis-priming

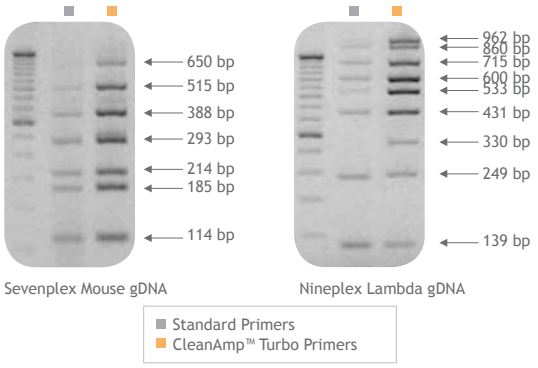


Maximize Your Multiplex

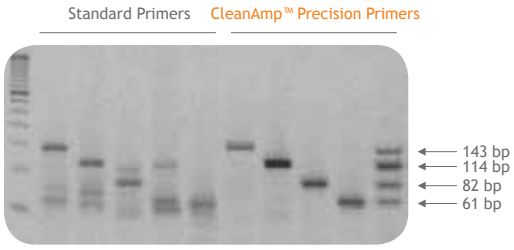
If you are seeking a Hot Start solution for a problematic multiplex system, CleanAmp™ Primers may be your answer. CleanAmp™ Primers offer high specificity with the greatest number of targets. CleanAmp™ Turbo Primers greatly improve formation of the desired products in multiplex PCR. The development of a robust multiplex PCR assay typically requires an iterative design process to discover primer pairs that are both specific for the targets of interest and exhibit a low level of off-target amplicon formation. With CleanAmp™ Primers, minimal design optimization is required.

The reduction or elimination of nonspecific amplifications achieved with the use of CleanAmp™ Primers makes them a powerful solution for improved one-step reverse transcription PCR (RT-PCR) performance. By introducing CleanAmp™ Precision Primers only the RT primer can extend during the reverse transcription step of the protocol, resulting in specific amplification in a one tube, single step protocol.

Improve Specificity in Multiplex PCR



Increase Amplicon Yield in Multiplex One-Step RT-PCR



ABCA 7	+	-	-	-	+	+	-	-	-	+
ABCA 6	-	+	-	-	+	-	+	-	-	+
ABCA 5	-	-	+	-	+	-	-	+	-	+
ABCA 10	-	-	-	+	+	-	-	-	+	+

Product Details

CleanAmp™ Primers are available in two forms (Turbo and Precision) that differ in the rate of thermal activation. CleanAmp™ Primers 15-40 bases in length are $250/pair. We guarantee at least a 10 OD final yield from every synthesis, enough material for approximately 6,250 reactions.

CleanAmp™ Turbo	
	Fast cycling
	Multiplex PCR
	Improves amplicon yield
	Reduces mis-priming/primer dimer formation

CleanAmp™ Precision	
	Standard cycling
	One-step RT-PCR
	Improves specificity and limit of detection
	Greatest reduction in mis-priming/primer dimer formation

TriLink BioTechnologies

The Modified Nucleic Acid Experts

Since 1996 TriLink has offered cutting edge services to researchers in the fields of gene therapy, nucleoside chemotherapy, oligonucleotide therapy and diagnostics. Our scientists and technicians have decades of collective experience in synthesizing modified nucleosides, nucleotides, oligonucleotides and transcripts for research, diagnostics and therapeutic applications.

TriLink operates a GMP laboratory with a QSR environment and provides:

- Milligram to multi-gram synthesis
- Highly-modified oligonucleotides and nucleosides
- Custom chemistry
- Custom mRNA and long RNA synthesis
- Contract research services
- Industry-leading technical support

30%

Printed on 30% Post Consumer Recycled Paper
Printed with Soy-Based Inks

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