Product Catalog 2011/12

The PCR Company

- Real-Time PCR Mixes
- PCR Enzymes & Mixes
- RNA Analysis
- Cloning and Protein Expression
- Nucleic Acid Isolation
- Nucleotides
- Molecular Weight Markers
- Essential Reagents

BIOLINE

A Meridian Life Science® Company

Welcome to Your New 2011/12 Bioline Catalog

Bioline Ltd, The PCR Company, now forms part of Meridian Biosciences Inc., a world-leading manufacturer and supplier of antibodies, viral antigens and critical assay reagents. We are confident that the development of this partnership will allow us to better support our customers, both existing and new. We continue to increase investment in innovative technologies in order to maintain our delivery of outstanding reagents; while we strengthen our product portfolio, with particular emphasis upon PCR and real-time PCR; and further develop our worldwide support and distribution channels.

Our aim is to provide customers with an exhaustive range of top-quality products which can be easily employed by researchers. With this in mind, our team of scientists continually develops new products utilising the information gained from customer feedback to allow scientists in laboratories around the world to concentrate fully upon their research objectives when using Bioline products.

Bioline is ISO 9001:2008 certified, and we remain one of the world's few manufacturers of extremely pure dNTPs. We develop and manufacture a portfolio of more than 200 reagents and kits for PCR assays, molecular biology, DNA quantitation, cloning, cell analysis, and nucleic acid isolation.

Our continued investment into product development has allowed us to announce two new product ranges in this catalog: The SensiFAST™ range is a comprehensive set of highly-optimized products designed to deliver outstanding results for real-time experiments with DNA and RNA templates on all standard and fast real-time PCR instruments. The MyTaq™ range, based on the latest technology in PCR enzyme preparation, is a new generation of very high-performance PCR products engineered to increase affinity for DNA, resulting in significant improvements to yield, sensitivity, and speed. Please consult our New Products section on page IV for more details.

Bioline products and services are globally available through our subsidiaries and business partners in more than 40 nations in Europe, the Middle East, Africa, Latin America, the Pacific Rim, and the USA. We welcome new business partners willing to grow with us and distribute Bioline products in territories in which we are not yet represented.

At Bioline, we have been serving the life science community for 19 years. We look forward to being of service in your laboratory.

Marco J Calzavara
President

Product Search

Useful Information

Contents at a Glance

BIOLINE
A Meridian Life Science® Company

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New Product Highlights

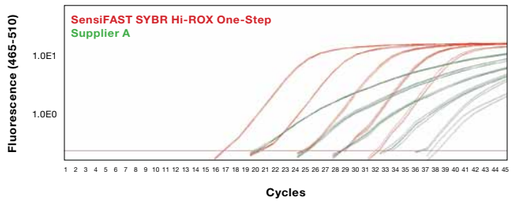
Real-Time PCR: **SensiFAST**™ Kits

Exceed the limit

Our new range of SensiFAST real-time PCR products are a complete range of highly optimized ready-to-use kits for the rapid and reliable detection of DNA, cDNA and RNA targets.

- **Results in under 30 minutes**
- **Robust performance for all SYBR Green and probe assays**
- **Highest reproducibility and sensitivity with all standard and fast-cycling instruments**

See Page 3 for complete product range information



Comparison of SensiFAST SYBR Lo-ROX One-Step (red) and supplier A (green) SYBR One-Step kit
A fragment of Ubiquitin gene was amplified using SensiFAST SYBR Hi-ROX One-Step (red) and the results were compared with amplifications using One-Step Kits from supplier A. The process used a 10-fold serial dilution of human total RNA over 5 orders of magnitude.

New Product Highlights

New Product Highlights

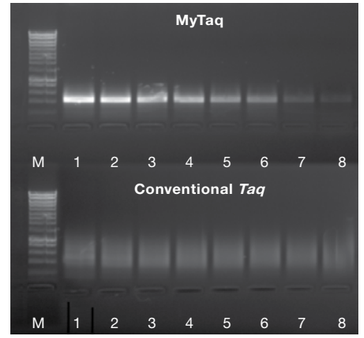
MyTaq™ DNA Polymerase Family

A Quantum Leap for PCR

Bioline introduces MyTaq™ DNA polymerase family, a new generation of hot-start and standard PCR products, developed to give outstanding results even with complex genomic DNA.

- **New generation of both hot-start and standard polymerases**
- **Highest specificity and superior performance**
- **Novel buffer system, with ultra-pure dNTPs and $MgCl_2$**

See Page 19 for complete product range information



Fast amplification of human genomic DNA (performed in 27.5 minutes)
Amplification of a 450bp fragment of the human *myc* gene (61% GC), from human genomic DNA (200ng, 66ng, 10ng, 3ng, 1ng, 300pg, 100pg and 30pg; lanes 1-8 respectively). Using MyTaq and a conventional *Taq* DNA polymerase). Marker is HyperLadder I (M). In contrast to conventional Taq, MyTaq readily copes with faster reactions times, resulting in higher yield without the need for further optimization.

MyTaq™ One-Step RT-PCR Kit

All-in-one for RNA Analysis

MyTaq™ One-Step RT-PCR Kit has been designed for extremely sensitive and highly reproducible first-stand cDNA synthesis and subsequent PCR in a single tube.

- **Extremely sensitive blend of reverse transcriptase and novel hot-start MyTaq DNA Polymerase**
- **Highly optimized for detection of low-copy genes**
- **High-quality, full-length cDNA from as little as 3pg of total RNA**

See Page 36 for complete product range information

How to place an order

Order Online **www.bioline.com**
Order online with or without an account, by Purchase Order Number or by Credit Card.

Order by email **orders@bioline.com**

UK Orders
Fax: +44 (0)20 8452 2822
Tel: +44 (0)20 8830 5300

German Orders
Fax: +49 (0)3371 681 244
Tel: +49 (0)3371 681 229

International Orders
A complete list of distributors from can be found on the back page of this catalog.
If your country is not listed, please contact us at **info.int@bioline.com**

General Enquiries
For general enquiries or to request further information, please email our customer services at:
UK: **info.uk@bioline.com**
DE: **info.de@bioline.com**

To place an order
When placing your order, please provide the following information:

1. Your name, department and telephone number
2. Your order number
3. Your shipping address
4. Your billing address and telephone number
5. Catalog number, product description and quantity
6. Any applicable discount codes
7. Tax exemption status - a copy of your certificate

All telephone orders require a hard copy confirmation, which can be faxed or posted. To avoid duplication, the hard copy should be clearly marked “Confirmation - Do Not Duplicate”.

Free Sample Qualification and Policy

Most of the products in our range are readily available in sample sizes at no cost, enabling a potential user to measure product performance before making a decision to purchase.

Applications to obtain for samples can be made online at **www.bioline.com**, email at **samples@bioline.com** by telephone or by contacting your local representative.

Shipping & Delivery
Shipments are sent via courier. Depending on the nature of the product and temperature sensitivity, shipments will include either blue ice-bricks or dry ice. Orders received by 3pm will generally be shipped the same day for next day delivery. Shipments are made Monday to Thursday. All orders are subject to a £13.50 handling fee in the UK and a 15 Handling fee for orders below 250 in Germany.

Conditions of Sale and Payment Terms
For complete information please refer to the Terms and Conditions of Sale at the back of this catalog. Terms are net 30 days. Prices are subject to change without notice.

For bulk and custom services please contact **custom@bioline.com**

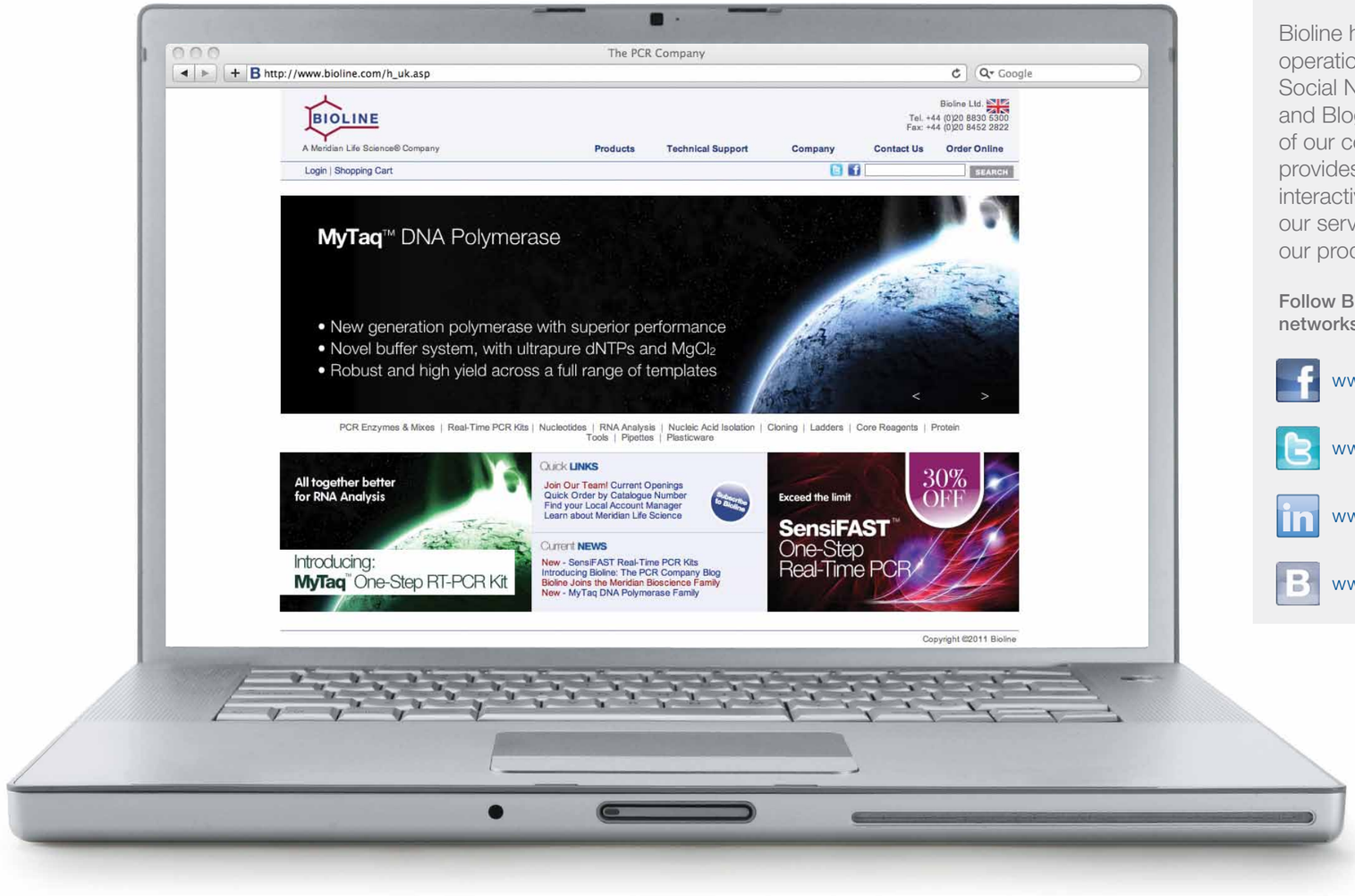
Customer Services

Bioline Website

The website offers a wide selection of products and services, together with highly informative product information and services to suit the specific needs of your laboratory. Additionally, our website also features our up-to-date competitive pricing information.

It is not essential to set up an account in order to purchase Bioline products from our secure online ordering service. However account holders do benefit from additional online facilities including the ability to keep track of product discounts, account history, previous orders and reordering options for speedy order placements.

Our customers can view the Bioline online catalog and take advantage of seasonal sale promotions, as well as keeping track of product updates. The Bioline website also hosts a live events page at **www.bioline.com/events**, where customers can browse through a list of upcoming local and international events at which Bioline or our Distributors will feature our products.



Social Networks

Bioline has expanded its online operations to include participation in Social Networks: Facebook, Twitter and Blog. This is a logical extension of our company online presence and provides our customers with new interactive ways to engage and utilize our services and gain information about our products.

Follow Bioline on the following social media networks:

www.facebook.com/ThePCRCompany

www.twitter.com/thepcrcompany

www.linkedin.com/company/bioline

www.thepcrcompany.wordpress.com

Online Product Support Catalog
www.bioline.com/catalog
View our latest Catalog on line, download or order your printed copy at:
UK: info.uk@bioline.com
DE: info.de@bioline.com

Product Sheets, Guides and Selection Tables
www.bioline.com/guides
Product sheets and guides are available online either to download or to order at:
UK: info.uk@bioline.com
DE: info.de@bioline.com

Various selection tables are also available to help in your product selection process for optimal experimental performance.

Product Insert and MSDS
Links to useful product insert and product MSDS for downloading or printing can also be found on each individual product page

FAQs
Our most popular products now all have the added feature of an FAQ page, easily accessible online from each individual product page. The page offers advice both on general and on more product- specific questions often presented to our technical support team.

Associated Products
All of our products have a comprehensive list of associated Bioline products on each individual product page. These links have been designed to recommend products complementing your choice.

Biomath Tools
www.bioline.com/tools
Bioline online features an interactive range of Biomath Tools, to guide you through your experimental steps and troubleshooting. These include: nucleic and amino acids sequence tools, PCR optimization calculators, unit converters, centrifuge force converters, genetic code reference and amino acid structure.

Bulk, Custom and OEM Services and Support

Creative Solutions to suit your needs

When your requirements are beyond the scope of our standard product range we invite you to take advantage of our bulk, custom and OEM service. We provide custom made solutions to industrial and bulk partners, and welcome new partners, big and small, with specific product needs.

Being a primary manufacturer since 1992, Bioline is able to accommodate requests from micro-liter to multi-liter quantities. We can manufacture special batches with unique formulations, blends and mixes to your requirements. Private labeling and packaging arrangements are also possible. We welcome on-site audits by our bulk, custom and OEM partners.

Visit our dedicated micro site www.bioline.com/custom for more information.

Scale

- Micro-liter to multi-liter
- Special Batches

Format

- Any Concentration
- Any Combination
- Any Volume
- Custom Mixes

Production Planning

- Batch Reservation
- Lot Retention Samples
- Scheduled Delivery
- Global Delivery

Packaging & Labeling

- Any Size
- Choice of Tubes, Vials & Bottles
- Custom Labeling
- Label Design & Printing
- OEM Product Finishing

Service and Support

Bioline is committed to providing our customers with the best service possible and maintains all bulk, custom and OEM nucleotide agreements in the strictest confidence. We understand the importance of trust and confidentiality to our customers and are dedicated to establishing successful and long-term partnerships. Bioline offers each of our customers a customized Confidentiality Agreement, which can be tailored to suit the customer's individual requirements.

- Validation Support File
- Customer On-Site Audits
- Validation Samples
- Special Testing
- Batch Re-testing
- Customer-tailored C of A
- Product Traceability
- Fast Track Technical Support

For bulk and custom services please contact **custom@bioline.com**

BIOLINE
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Bulk, Custom and OEM Services and Support

Technical Support

At Bioline we are dedicated to putting our expertize and technology at your service. Our teams of friendly molecular biology scientists and technical support services are available to assist you with any scientific or technical issues, product related questions not answered in our online FAQs, or general troubleshooting.

Contact the Bioline Support Services at any of the following:
email: tech@bioline.com
Online: www.bioline.com/support
Tel: +44 (0)20 8830 5300

Freezer Program

Bioline´s high quality products are available to you in convenient freezers located in many Institutions, stocked and regularly maintained to satisfy your daily needs of essential products. The easy access to our on-site freezers ensures 24 hours operation seven days a week. For locations in your country and further Information please visit www.bioline.com/freezers or send an e-mail to freezers@bioline.com.

The Bioline freezer program is available in all countries with Bioline subsidiaries: UK, Germany, US and Australia. For other International customers please contact your nearest Bioline Distributor for details about this service in your country.

ISO 9001:2008

The Bioline manufacturing facilities in the UK, Germany and Australia, operate quality management systems that comply with ISO 9001:2008 standards. This is the International standard against which the quality management and quality assurance system of a business is measured. This certification confirms that the production, manufacture and distribution of Bioline products, as well as its customer support, adhere to the quality policy described in detail in the Quality Management Manual. With ISO certification implemented, Bioline demonstrates its commitment to being a reliable and technically competent partner for our customers, suppliers and future collaborators.

Quality Orientation
The chief goal of our business is to satisfy customer demands for innovative solutions in the area of PCR and molecular biology. Our ability to achieve these goals depends particularly on the quality of our products and our customer orientation. In this sense, quality is an obligation for our company and therefore a constant task of all employees.

Competence and Customer Satisfaction
The expertise of Bioline lies in the area of PCR and molecular biology. The quality of our products and the support offered to customers, are set to high class standards that compare favorably with those of our competitors. Our employees are committed to make their contribution towards this goal. Customer requests are evaluated critically as to their feasibility, and if accepted, are put into effect as soon as possible.

Summary of our Quality Policy Goals
- Satisfying customers by providing a high-quality service promptly, at favorable prices
- Professional competence and reliability for all inquiries and orders
- Motivated employees, trained in line with demand and comprehensively informed
- Comprehensive organization of co-operation with partners and suppliers
- Economic efficiency and avoidance of nonconformities
- Clear and transparent instructions and operational sequences for the realization of customers demands
- Positive external effect and creation of total confidence in the company on the part of the customer

Commitment to Environmental Sustainability
At Bioline, we acknowledge the importance of sustainable development and the environmental responsibility we have to help conserve our planet. Through responsible utilization of resources and waste management, we continuously strive to improve our work policies and practices to reduce our environmental impact.

We encourage all our employees to use energy and resources sparingly and to recycle materials wherever possible.

Simple, Sensitive Real-Time PCR Solutions

Real-time PCR is one of the most powerful and sensitive gene analysis techniques available and has become the standard in most laboratories. Its effectiveness, particularly at amplification and quantification of low levels of nucleic acids, has driven the emergence of numerous applications, including cellular mRNA and miRNA quantification, biomarker discovery and validation, microarraying, microbial quantification, cancer risk assessment, gene dosage determination and detection of extremely low copy targets for forensic investigations.

The increase in the use of real-time PCR has increased the demand for a higher throughput and faster assays, to reduce the overall protocol time. This has been achieved by improvements in instruments, using faster enzymes (without sacrificing accuracy), and shortening or even combining PCR steps. The new SensiFAST Kits have been designed to take up this challenge, with an antibody mediated hot-start and very rapid enzyme-extension rates, enabling fast cycling conditions. The SensiFAST formulations provide fastest cycling times whilst still maintaining the performance, reliability and high reproducibility of conventional real-time PCR reagents. They can be used on all real-time instruments including the new generation of fast-cyclers.

Real-Time PCR Mixes

The PCR Company • BIOLINE since 1992 • The PCR Company

Real-Time PCR Mix Selection Table

SensiFAST™ is a comprehensive range of highly optimized products designed to deliver outstanding results for real-time experiments with both DNA and RNA templates, providing reliable and highly reproducible data on all commonly used real-time PCR instruments including the new generation of fast-cyclers.

The SensiFAST Selection Table will enable you to choose the most appropriate SensiFAST reagent for your application and real-time instrument.

For information on our classic SensiMix™ kits, please visit www.bioline/sensimix

			Applied Biosystems™												**Cepheid®**	**Illumina®**		**Takara**		**Qiagen (Corbett)**			**Bio-Rad®**								**Roche**		**Eppendorf**			**Techne**		**Agilent (Stratagene)**			
			7000	7300	7500	7500 FAST	7700	7900	7900HT	7900HT FAST	StepOne™	StepOne™ plus	ViiA7™		SmartCycler®		Eco™		Thermal Cycler Dice® (TP800)			Rotor-Gene™ 3000	Rotor-Gene™ 6000		iCycler®	MyiQ™	iQ™5	Opticon™	Opticon™2	Chromo4™	MiniOpticon™	CFX96™	CFX384™		Lightcycler® 480		Mastercycler® ep realplex	Mastercycler® ep realplex 2S		Quantica®		MX4000P®	MX3000P®	MX3005P®
DNA Templates	**SYBR Green Assays**	**SensiFAST™ SYBR No-ROX Kit**													✓		✓		✓			✓	✓					✓	✓	✓	✓	✓	✓		✓		✓	✓		✓			
		SensiFAST™ SYBR Hi-ROX Kit	✓	✓			✓	✓	✓	✓	✓	✓																													
		SensiFAST™ SYBR Lo-ROX Kit			✓	✓							✓																												
		SensiFAST™ SYBR & Fluorescein Kit																							✓	✓	✓														
	Probe Assays	**SensiFAST™ Probe No-ROX Kit***													✓		✓		✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		✓			
		SensiFAST™ Probe Hi-ROX Kit	✓	✓			✓	✓	✓	✓	✓	✓																													
		SensiFAST™ Probe Lo-ROX Kit			✓	✓							✓																												
RNA Templates	**SYBR Green Assays**	**SensiFAST™ SYBR No-ROX One-Step Kit**													✓		✓		✓			✓	✓					✓	✓	✓	✓	✓	✓		✓		✓	✓		✓			
		SensiFAST™ SYBR Hi-ROX One-Step Kit	✓	✓			✓	✓	✓	✓	✓	✓																													
		SensiFAST™ SYBR Lo-ROX One-Step Kit			✓	✓							✓																												
		SensiFAST™ SYBR & Fluorescein One-Step Kit																							✓	✓	✓														
	Probe Assays	**SensiFAST™ Probe No-ROX One-Step Kit***													✓		✓		✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓		✓			
		SensiFAST™ Probe Hi-ROX One-Step Kit	✓	✓			✓	✓	✓	✓	✓	✓																													
		SensiFAST™ Probe Lo-ROX One-Step Kit			✓	✓							✓																												

* Used for all instruments when multiplexing ✓ Recommended

For more information please visit **www.bioline.com/sensifast**

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SensiFAST™ SYBR Kits

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	REACTION SIZE	CAT NO.
SensiFAST SYBR No-ROX Kit			
200 Reactions	2x	20µl	BIO-98002
500 Reactions	2x	20µl	BIO-98005
2000 Reactions	2x	20µl	BIO-98020
SensiFAST SYBR Hi-ROX Kit			
200 Reactions	2x	20µl	BIO-92002
500 Reactions	2x	20µl	BIO-92005
2000 Reactions	2x	20µl	BIO-92020
SensiFAST SYBR Lo-ROX Kit			
200 Reactions	2x	20µl	BIO-94002
500 Reactions	2x	20µl	BIO-94005
2000 Reactions	2x	20µl	BIO-94020

Components	200 Reactions	500 Reactions	1000 Reactions
2x SensiFAST SYBR Mastermix	2 x 1ml	5 x 1ml	20 x 1ml

Features and Benefits:

- **Accurate quantification - hot-start capability saves time and reduces primer-dimer formation**
- **Sensitive - from low copy targets**
- **Rapid – unique buffer chemistry for highest specificity and sensitivity**
- **Flexible - compatible with all standard and fast cycling instruments**

Instrument Compatibility: See product selection table, page 3. Each of these instruments having the capacity to analyze the real-time PCR data with the passive reference signal either on or off, as well as instruments that do not require the use of ROX.

Description: The SensiFAST SYBR Kits have been developed for fast, highly reproducible real-time PCR and have been validated on commonly used real-time instruments. A combination of the latest advances in buffer chemistry and enhancers, together with an antibody-mediated hot-start DNA polymerase system, ensures that the SensiFAST SYBR Kits produces fast, highly-specific, reproducible (fig. 1) and ultra-sensitive real-time PCR (fig. 2). The kits are suitable for DNA templates and also for RNA templates following reverse transcription with the Bioline Tetro cDNA Synthesis Kit (BIO-65042).

The SensiFAST SYBR Hi-ROX and Lo-ROX Kit contain premixed ROX for optional use.

Kit Size: The pack size is based on a 20µl final reaction volume.
Storage Conditions: 6 months at -20°C. Avoid exposure of the SYBR® Green I to light.

Associated Products	Cat. No.	Page
Tetro cDNA Synthesis Kit	BIO-65042	37
ISOLATE Genomic DNA Mini Kit	BIO-52031	64
ISOLATE Plant DNA Mini Kit	BIO-52035	65
Mouse Genomic DNA	BIO-35027	104

Compatibility Table	
SensiFAST SYBR No-ROX Kit	Roche LightCycler® 480, Bio-Rad Opticon®, Opticon™2, Chromo4™, MiniOpticon™, CFX96™, CFX384™, Cepheid SmartCycler®, Qiagen Rotor-Gene™ 3000, 6000, Eppendorf Mastercycler® ep realplex and Techne Quantica®, Illumina® Eco™, Takara Thermal Cycler Dice® (TP800)
SensiFAST SYBR Hi-ROX Kit	ABI 7000, 7300, 7700, 7900, 7900HT, 7900HT FAST, StepOne™, StepOne™ Plus
SensiFAST SYBR Lo-ROX Kit	ABI 7500, 7500 FAST, ViiA7™, Stratagene (Agilent) Mx4000™, Mx3000P™, Mx3005P™

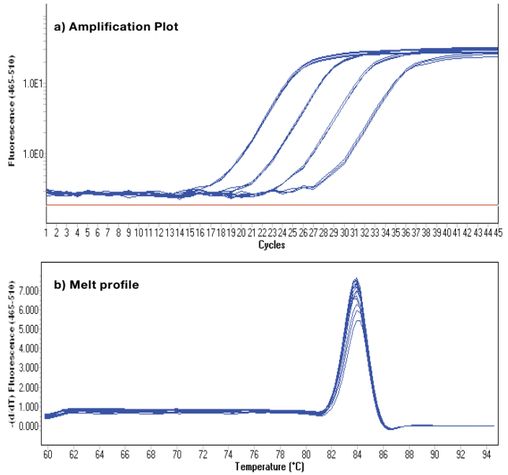


Fig. 1 SensiFAST SYBR No-ROX using fast cycling conditions.
A fragment of rps18 gene was amplified using SensiFAST SYBR No-ROX from a 10 fold serial dilution of human cDNA (in triplicate) over 4 orders of magnitude. The conditions were 95°C for 2min and 45 cycles of 95°C 10s, 60°C 15s.
a) The results illustrate that SensiFAST SYBR No-ROX is fast, highly reproducible and sensitive.
b) There was no detectable primer-dimer formation.

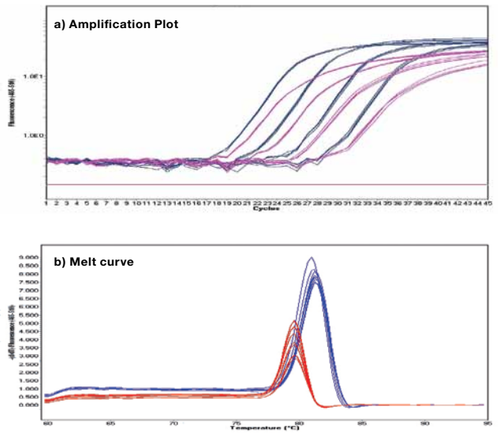


Fig. 2 Comparison of SensiFAST SYBR Hi-ROX (blue line) against another leading supplier (red line) using fast cycling conditions.
A fragment of ubiquitin gene was amplified using SensiFAST SYBR Hi-ROX (blue) and the results were compared with amplifications using a Kit from supplier Q (red). The process used a 10 fold serial dilution of human cDNA (in quadruplicate) over 4 orders of magnitude. The conditions were 95°C for 2min and 45 cycles of 95°C 10s, 60°C 15s.
The results illustrate SensiFAST SYBR Hi-ROX was faster (earlier Ct). At low temperature concentration supplier Q has a lower yield of product.

SensiFAST™ SYBR & Fluorescein Kit

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	REACTION SIZE	CAT NO.
200 Reactions	2x	20µl	BIO-96002
500 Reactions	2x	20µl	BIO-96005
2000 Reactions	2x	20µl	BIO-96020

Components	200 Reactions	500 Reactions	1000 Reactions
2x SensiFAST SYBR & Fluorescein Mastermix	2 x 1ml	5 x 1ml	20 x 1ml

Features and Benefits:

- **Accurate quantification - hot-start capability saves time and reduces primer-dimer formation**
- **Sensitive - from low copy targets**
- **Rapid – unique buffer chemistry for highest specificity and sensitivity**
- **Compatible with Bio-Rad Instruments - where fluorescein is required to calculate dynamic well factors**

Instrument Compatibility: Bio-Rad iCycler®, iQ™5, MyiQ™ (See product selection table, page 3) each of these instruments having the capacity to analyze the real-time PCR data with the passive reference signal either on or off, as well as several instruments that do not require the use of fluorescein

Description: The SensiFAST SYBR & Fluorescein Kit uses a combination of the latest advances in buffer chemistry and enhancers, together with an antibody-mediated hot-start DNA polymerase system, to ensure fast, highly-specific and ultra-sensitive real-time PCR (fig. 1 and 2). SensiFAST SYBR & Fluorescein Kit has been optimized for use in SYBR Green-based real-time PCR on the real-time instruments listed in the following compatibility table, each of these instruments having the capacity to analyze the real-time PCR data with the passive reference signal either on or off. The kit is also compatible with several instruments that do not require the use of ROX, such as the Qiagen (Corbett) Rotor-Gene™ 6000, the Bio-Rad CFX96 or the Roche LightCycler® 480.

The SensiFAST SYBR & Fluorescein Kit contains premixed Fluorescein for optional use.

Kit Size: The pack size is based on a 20µl final reaction volume.
Storage Conditions: 6 months at -20°C. Avoid exposure of the SYBR® Green I to light.

Associated Products	Cat. No.	Page
Tetro cDNA Synthesis Kit	BIO-65042	37
ISOLATE Genomic DNA Mini Kit	BIO-52031	64
ISOLATE Plant DNA Mini Kit	BIO-52035	65
Rat Genomic DNA	BIO-35026	104

Compatibility Table	
SensiFAST SYBR & Fluorescein Kit	Bio-Rad iCycler®, iQ™5, MyiQ™

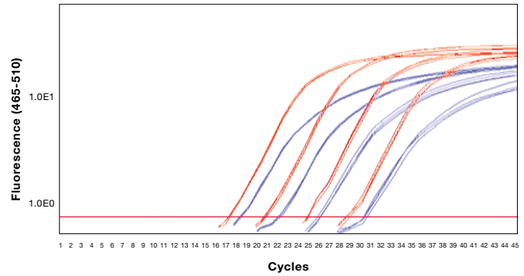


Fig. 1 Comparison of SensiFAST SYBR & Fluorescein (red line) against a leading competitor (blue line) using fast cycling conditions.
A fragment of γ-actin gene was amplified using SensiFAST SYBR & Fluorescein (red) and the results were compared with amplifications using a Kit from supplier I (blue). The process used a 10 fold serial dilution of human DNA (in triplicate) over 4 orders of magnitude. The conditions were 95°C for 2min and 45 cycles of 95°C 10s, 60°C 15s. The results illustrate that SensiFAST SYBR & Fluorescein is faster (earlier Ct) and more efficient than supplier I.

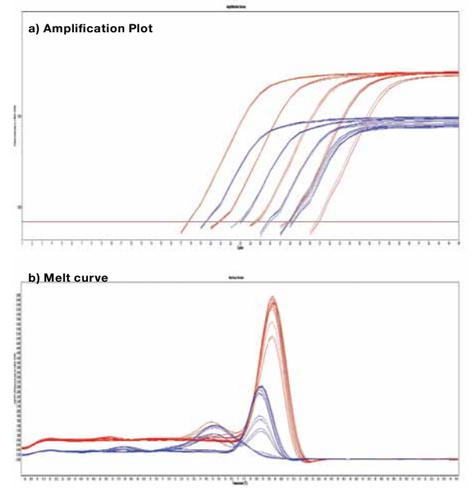


Fig. 2 Comparison of SensiFAST SYBR & Fluorescein (red line) against another leading supplier Q (blue line) using fast cycling conditions.
A fragment of ubiquitin gene was amplified using SensiFAST SYBR & Fluorescein (red) and the results were compared with amplifications using a Kit from supplier Q (red). The process used a 10 fold serial dilution of human RNA (in triplicate) over 5 orders of magnitude. The conditions were 95°C for 2min and 45 cycles of 95°C 10s, 60°C 15s. The results illustrate that SensiFAST SYBR & Fluorescein was faster (earlier Ct) and more sensitive than supplier Q
a) The results exhibit that SensiFAST SYBR & Fluorescein was faster (earlier Ct) and more sensitive than supplier Q.
b) There was far less primer-dimer formation with SensiFAST SYBR & Fluorescein.

SensiFAST™ Probe Kits

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	REACTION SIZE	CAT NO.
SensiFAST Probe No-ROX Kit			
200 Reactions	2x	20µl	BIO-86002
500 Reactions	2x	20µl	BIO-86005
2000 Reactions	2x	20µl	BIO-86020
SensiFAST Probe Hi-ROX Kit			
200 Reactions	2x	20µl	BIO-82002
500 Reactions	2x	20µl	BIO-82005
2000 Reactions	2x	20µl	BIO-82020
SensiFAST Probe Lo-ROX Kit			
200 Reactions	2x	20µl	BIO-84002
500 Reactions	2x	20µl	BIO-84005
2000 Reactions	2x	20µl	BIO-84020

Components	200 Reactions	500 Reactions	2000 Reactions
2x SensiFAST Probe Mastermix	2 x 1ml	5 x 1ml	20 x 1ml

Features and Benefits:

- **Specificity – minimal non-specific activity**
- **Sensitivity – perfect for low copy number samples**
- **Speed – earlier Ct with fast protocols**
- **Efficient multiplexing – no loss in efficiency using multiple probes**

Instrument Compatibility: See product selection table, page 3. Each of these instruments having the capacity to analyze the real-time PCR data with the passive reference signal either on or off, as well as instruments that do not require the use of ROX.

Description: The SensiFAST™ Probe has been developed for fast, highly reproducible real-time PCR and has been validated on all commonly used real-time instruments. The kit has been formulated for use with probe-detection technology, including TaqMan®, Scorpions® and molecular beacon probes. A combination of the latest advances in buffer chemistry and PCR enhancers, together with a hot-start DNA polymerase, ensures that the SensiFAST Probe Kit delivers fast, highly-specific and ultra-sensitive real-time PCR (fig. 1). Making SensiFAST Probe ideal for multiplexing (fig. 2). The kits are suitable for DNA templates or RNA templates following reverse transcription with the Bioline Tetro cDNA Synthesis Kit (BIO-65042).

The SensiFAST Probe Hi-ROX and Lo-ROX Kit contain premixed ROX for optional use.

Kit Size: The pack size is based on a 20µl final reaction volume.
Storage Conditions: 6 months at -20°C. Avoid exposure of the ROX dye to light.

Associated Products	Cat. No.	Page
Tetro cDNA Synthesis Kit	BIO-65042	37
Human Genomic DNA	BIO-35025	104
ISOLATE Genomic DNA Mini Kit	BIO-52031	64
ISOLATE Plant DNA Mini Kit	BIO-52035	65

Compatibility Table	
SensiFAST Probe No-ROX Kit	Roche LightCycler® 480, Bio-Rad Opticon®, Opticon™2, Chromo4™, MiniOpticon™, CFX96™, CFX384™, Cepheid SmartCycler®, Qiagen Rotor-Gene™ 3000, 6000, Eppendorf Mastercycler® ep realplex and Techne Quantica®, Illumina® Eco™, Takara Thermal Cycler Dice® (TP800)
SensiFAST Probe Hi-ROX Kit	ABI 7000, 7300, 7700, 7900, 7900HT, 7900HT FAST, StepOne™, StepOne™ Plus
SensiFAST Probe Lo-ROX Kit	ABI 7500, 7500 FAST, ViiA7™, Stratagene (Agilent) Mx4000™, Mx3000P™, Mx3005P™

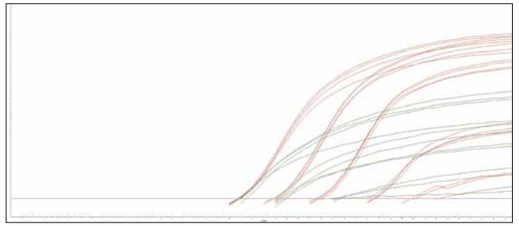


Fig. 1 Comparison of SensiFAST Probe and Supplier I in a quadruplex reaction.
A fragment of GAPDH gene was amplified using SensiFAST Probe (Red) and the results were compared with amplifications using a Kit from supplier I (Green). The process used a 10 fold serial dilution of human DNA (in quadruplicate) over several orders of magnitude. The conditions were 95°C for 2min and 45 cycles of 95°C 10s, 60°C 15s. The results illustrate that SensiFAST Probe is far more sensitive than supplier I.

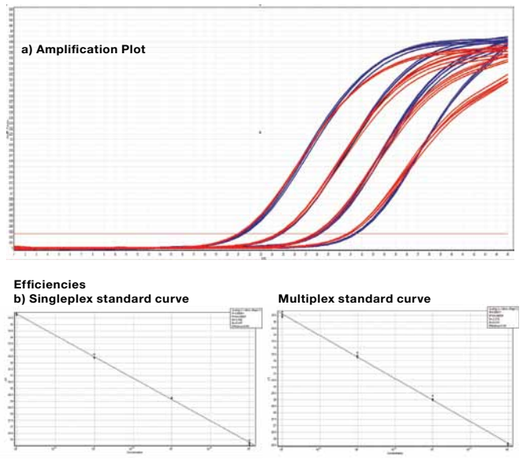


Fig. 2 Comparison of SensiFAST Probe No-ROX in a singleplex and quadruplex reaction
A 10 fold serial dilution of human cDNA was amplified with four different probes, both in singleplex reactions (blue line) and a quadruplex reaction (red line) (the results displayed are for the γ-actin and JOE dye). Five replicates were run using a conventional TaqMan primer/probe set under fast cycling conditions (3 min 95°C followed by 45 cycles 95°C 10s, 60°C 10s), on a Qiagen Rotor-Gene 6000. SensiFAST Probe No-ROX illustrates exactly the same high sensitivity, excellent reproducibility and Ct values for both the singleplex and multiplex reactions (A) and no reduction of efficiency (B) that is commonly associated with multiplexing.

SensiMix™ HRM Kit

PACK SIZE	CONC.	REACTION SIZE	CAT NO.
250 Reactions	2x	25µl	QT805-02
500 Reactions	2x	25µl	QT805-05
2000 Reactions	2x	25µl	QT805-20

Components	250 Reactions	500 Reactions	2000 Reactions
2x SensiMix HRM Mastermix	5 x 625µl	10 x 625µl	40 x 625µl
50x EvaGreen™ Dye	1 x 250µl	1 x 500µl	4 x 500µl
50mM $MgCl_2$ Solution	1 x 1ml	1 x 1ml	4 x 1ml

Features and Benefits:

- **Cost effective: Ideal for large scale genotyping projects**
- **Simple and reproducible: Does not require design of probes**
- **Sensitive: Detects all classes of SNP missmatching including class 4 (A/T) SNP mutations**
- **Optimized protocols: Reliable assays can quickly and reliably be established, even with genomic loci that are difficult to amplify**

Description: High Resolution Melt-curve (HRM) analysis characterizes nucleic acid samples based on their dissociation profile. It combines the principle of intercalating dyes, melt curve analyses and the application of specific statistical analyses.

HRM uses the fundamental property of the separation of the two strands of DNA with heat (melting), and the monitoring of this melting with a fluorescent dye. The SensiMix HRM Kit employs a 3rd generation saturating dye that does not inhibit PCR at high concentrations and has been validated for use on the Roche LightCycler® 480 as well as the Qiagen Rotor-Gene 6000.

Melting temperature of a dsDNA target depends on GC content, structure, length, and sequence. Due to the high sensitivity of HRM dyes, even a single base change will induce differences in the melting profile. Main applications of HRM include Single Nucleotide Polymorphisms (SNPs) genotyping (fig. 1), epigenetics (DNA methylation analysis), zygosity testing (DNA mapping and DNA fingerprinting) and gene scanning (search for the presence of unknown variation. For information on our classic SensiMix™ kits, please visit www.bioline/sensimix.

Kit Size: The pack size is based on a 25µl final reaction volume.
Storage Conditions: 6 months at -20°C. Avoid exposure of the EvaGreen to light.

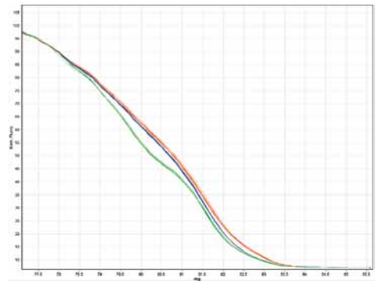
Product Citations:

1. Tuohy, M. J., *et al. Antimicrob Agents Chemother.* **54(5)**, 2248–2251 (2010).
2. Du Preez, M. *et al. Water SA* **36(5)**, 615-620 (2010).
3. Andriantsoanirina, V. *et al. Microbiol. Methods* **78(2)**, 165-170 (2009).
4. Chana, W-F., *et al. J. Microbiol. Methods* **77(3)**, 326-329 (2009).
5. FitzGerald, L.M., *et al. The Prostate* **68(13)**, 1373-1379 (2008).
6. Helen, E. *et al. Clin. Chem.* **53(11)**, 1960-1975 (2007).

Associated Products	Cat. No.	Page
Tetro cDNA Synthesis Kit	BIO-65042	37
ISOLATE Genomic DNA Mini Kit	BIO-52031	64
ISOLATE Plant DNA Mini Kit	BIO-52035	65

Compatibility Table	
SensiMix HRM Kit	ABI 7300, 7500 FAST, Qiagen Rotor-Gene™, 6000, Eppendorf Mastercycler® ep realplex, Illumina® Eco™, Roche LightCycler® 480, Bio-Rad Opticon®, CFX96™, CFX384™, Idaho LightSacnner® 32 (LS32™)

a) Normalized melt curves



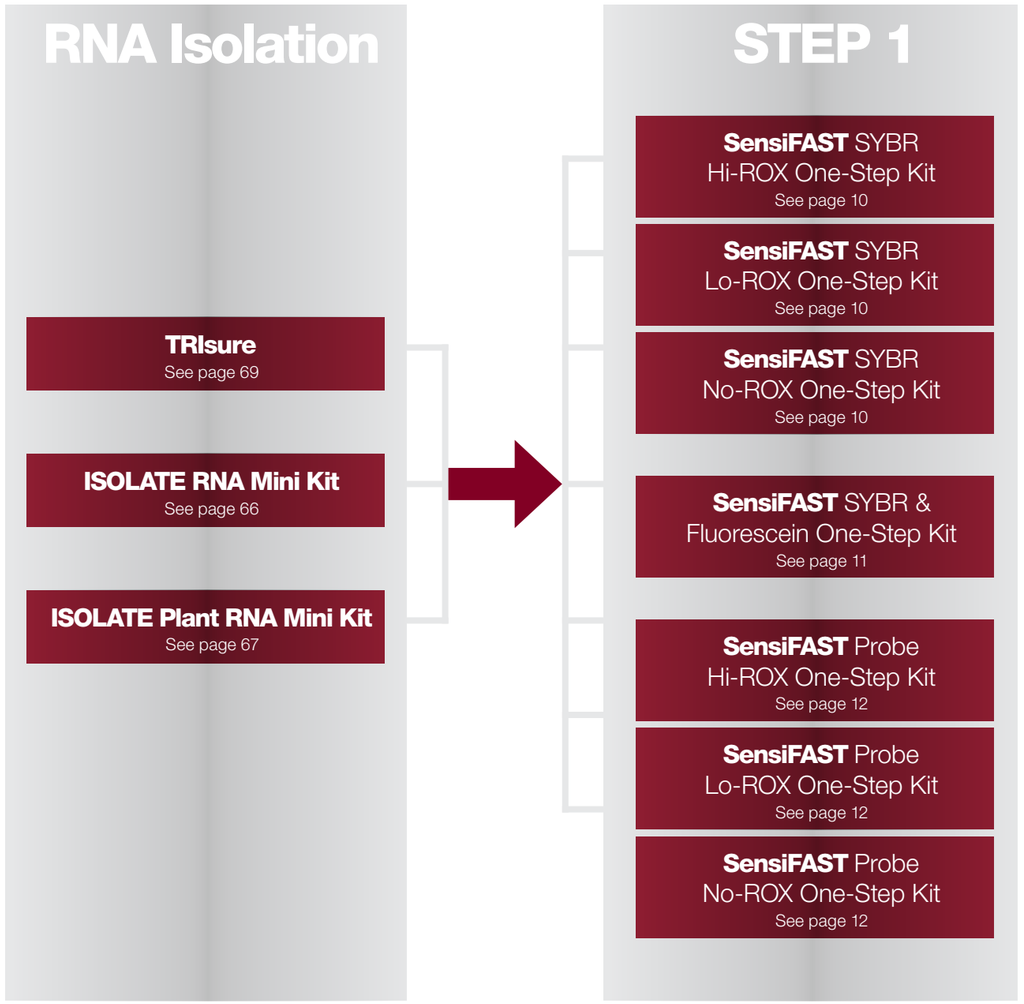
b) Genotyping results

No.	C	Name	Genotype	Confidence %
36		HOMODUPLEX A	A	97.91
37		HOMODUPLEX A	A	99.76
38		HOMODUPLEX A	A	99.70
39		HOMODUPLEX A	A	99.75
40		HOMODUPLEX A	A	99.73
41		HOMODUPLEX A	A	99.22
42		HOMODUPLEX A	A	98.80
50		HOMODUPLEX T	T	99.77
51		HOMODUPLEX T	T	99.70
52		HOMODUPLEX T	T	99.88
53		HOMODUPLEX T	T	99.90
54		HOMODUPLEX T	T	99.86
55		HOMODUPLEX T	T	99.68
56		HOMODUPLEX T	T	99.93
57		HETERODUPLEX AT	AT	99.66
58		HETERODUPLEX AT	AT	99.65
59		HETERODUPLEX AT	AT	99.71
60		HETERODUPLEX AT	AT	99.94
61		HETERODUPLEX AT	AT	99.75
62		HETERODUPLEX AT	AT	98.75
63		HETERODUPLEX AT	AT	99.20

Fig. 1 High-resolution melt analysis using the SensiMix HRM Kit on A>T SNP.
a) and b) Each sample was genotyped with over 97% confidence. The experiment was performed on a Qiagen Rotor-Gene 6000 instrument.

One-Step Real-Time PCR

One-Step real-time PCR is an extremely sensitive and highly reproducible method to generate first-strand cDNA synthesis and subsequent real-time PCR in a single tube from either total RNA or poly(A) using gene-specific, see diagram below.



SensiFAST™ SYBR One-Step Kits NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	REACTION SIZE	CAT NO.
SensiFAST SYBR No-ROX One –Step Kit			
100 Reactions	2x	20µl	BIO-72001
500 Reactions	2x	20µl	BIO-72005
SensiFAST SYBR Hi-ROX One –Step Kit			
100 Reactions	2x	20µl	BIO-73001
500 Reactions	2x	20µl	BIO-73005
SensiFAST SYBR Lo-ROX One –Step Kit			
100 Reactions	2x	20µl	BIO-74001
500 Reactions	2x	20µl	BIO-74005

Components	100 Reactions	500 Reactions
2x SensiFAST SYBR One-Step Mastermix	1 x 1 ml	5 x 1 ml
RNase Inhibitor (10u/µl)	1 x 40µl	1 x 200µl
Reverse Transcriptase	1 x 20µl	1 x 100µl
DEPC-treated Water	1 x 1.8ml	2 x 1.8ml

Features and Benefits:

- **Accurate quantification - hot-start capability saves time and reduces primer-dimer formation**
- **Sensitive - from low copy targets**
- **Rapid – unique buffer chemistry for highest specificity and sensitivity**
- **Flexible - compatible with all standard and fast cycling instruments**

Instrument Compatibility: See product selection table, page 3. Each of these instruments having the capacity to analyze the real-time PCR data with the passive reference signal either on or off, as well as several instruments that do not require the use of ROX.

Description: The SensiFAST SYBR One-Step Kits have been developed for fast RT-qPCR and has been validated on all commonly used real-time instruments. The SensiFAST SYBR One-Step Kits have been formulated for highly reproducible first-strand cDNA synthesis and subsequent real-time PCR in a single tube (fig. 1). The SensiFAST SYBR One-Step Kits uses a combination of the latest advances in buffer chemistry and enhancers, together with an antibody-mediated hot-start DNA polymerase system, to ensure fast, highly-specific and ultra-sensitive one-step RT-qPCR (fig. 2).

The SensiFAST One-Step Kits consist of a 2x SensiFAST SYBR One-Step mix, plus separate reverse transcriptase and RiboSafe RNase Inhibitor. SensiFAST SYBR Hi-ROX and Lo-ROX One-Step Kits also contain premixed ROX for optional use.

Kit Size: The pack size is based on a 20µl final reaction volume.
Storage Conditions: 6 months at -20°C. Avoid exposure of the SYBR® Green I to light.

Associated Products	Cat. No.	Page
DEPC-treated Water	BIO-38030	103
ISOLATE RNA Mini Kit	BIO-52042	66
RiboSafe RNase Inhibitor	BIO-65027	39
TRIsure	BIO-38032	69

Compatibility Table	
SensiFAST SYBR No-ROX One-Step Kit	Roche LightCycler® 480, Bio-Rad Opticon®, Opticon™2, Chromo4™, MiniOpticon™, CFX96™, CFX384™, Cepheid SmartCycler®, Qiagen Rotor-Gene™ 3000, 6000, Eppendorf Mastercycler® ep realplex and Techne Quantica®, Illumina® Eco™, Takara Thermal Cycler Dice® (TP800)
SensiFAST SYBR Hi-ROX One-Step Kit	ABI 7000, 7300, 7700, 7900, 7900HT, 7900HT FAST, StepOne™, StepOne™ Plus
SensiFAST SYBR Lo-ROX One-Step Kit	ABI 7500, 7500 FAST, ViiA7™, Stratagene (Agilent) Mx4000™, Mx3000P™, Mx3005P™

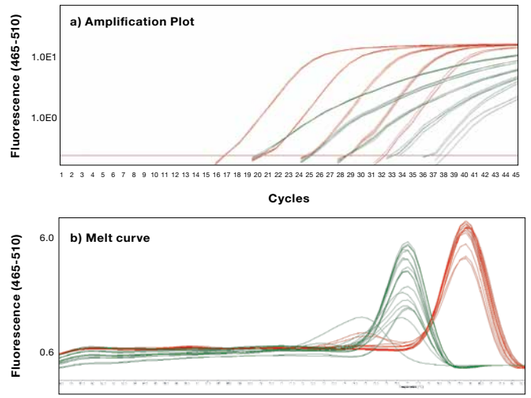


Fig. 1 Comparison of SensiFAST SYBR Lo-ROX One-Step (red line) against a leading competitor (green line) using fast cycling conditions.
A fragment of the human -actin gene was amplified using SensiFAST SYBR Lo-ROX One-Step (red) and the results were compared with amplifications using One-Step Kits from supplier A (green). The process used a 10 fold serial dilution of human RNA (in triplicate) over 5 orders of magnitude. The conditions were 45°C 10min followed by 95°C for 5min (15min for supplier A) and 45 cycles of 95°C 10s, 60°C 10s and 72°C 5s.
a) The results illustrate that the SensiFAST SYBR Lo-ROX One-Step Kit was faster (earlier Ct) and much more sensitive than competitor A.
b) With less primer dimers, hence more sensitive.

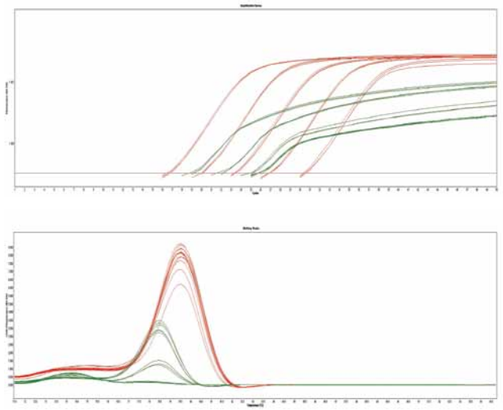


Fig. 2 Comparison of SensiFAST SYBR Hi-ROX One-Step (red line) against another leading supplier (green line) using fast cycling conditions.
A fragment of ubiquitin gene was amplified using SensiFAST SYBR Hi-ROX One-Step (red) and the results were compared with amplifications using a Kit from supplier I (green). The process used a 10 fold serial dilution of human RNA (in triplicate) over 5 orders of magnitude. The conditions were 45°C 10min followed by 95°C for 5min and 35 cycles of 95°C 10s, 60°C 10s and 72°C 5s. The results illustrates that SensiFAST SYBR Hi-ROX One-Step was faster (earlier Ct) and more sensitive than supplier I
a) The results illustrates that SensiFAST SYBR Hi-ROX One-Step was faster (earlier Ct) and more sensitive than supplier I.
b) Primer-dimer is seen in the supplier I data, but not in SensiFAST data.

SensiFAST™ SYBR & Fluorescein One-Step Kit

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	REACTION SIZE	CAT NO.
100 Reactions	2x	20µl	BIO-75001
500 Reactions	2x	20µl	BIO-75005

Components	100 Reactions	500 Reactions
2x SensiFAST SYBR & Fluorescein One-Step Mastermix	1 x 1 ml	5 x 1 ml
RNase Inhibitor (10u/µl)	1 x 40µl	1 x 200µl
Reverse Transcriptase	1 x 20µl	1 x 100µl
DEPC-treated Water	1 x 1.8ml	2 x 1.8ml

Features and Benefits:

- **Sensitive - Accurate quantification of gene expression over a broad dynamic range**
- **Rapid – unique buffer chemistry for earlier Ct detection**
- **Flexible - suitable for block-based instruments where fluorescein is required to calculate dynamic well factors**
- **Convenient - fast and easy one-tube setup**

Instrument Compatibility: Bio-Rad iCycler®, iQ™5, MyiQ™ (See product selection table, page 3) each of these instruments having the capacity to analyze the real-time PCR data with the passive reference signal either on or off, as well as several instruments that do not require the use of fluorescein

Description: The SensiFAST SYBR & Fluorescein One-Step Kit has been developed for fast RT-qPCR and has been validated on several BioRad real-time PCR instruments. The SensiFAST SYBR & Fluorescein One-Step Kit has been formulated for highly reproducible first-strand cDNA synthesis and subsequent real-time PCR in a single tube (fig. 1). The SensiFAST SYBR & Fluorescein One-Step Kit uses a combination of the latest advances in buffer chemistry and enhancers, together with an antibody-mediated hot-start DNA polymerase system, to ensure fast, highly-specific and ultra-sensitive one-step RT-qPCR (fig. 2).

The SensiFAST SYBR & Fluorescein One-Step Kit consists of a 2x SensiFAST SYBR One-Step mix, which contains fluorescein for optional use, separate reverse transcriptase and RiboSafe RNase Inhibitor.

Kit Size: The pack size is based on a 20µl final reaction volume.
Storage Conditions: 6 months at -20°C. Avoid exposure of the SYBR® Green I to light.

Associated Products	Cat. No.	Page
ISOLATE RNA Mini Kit	BIO-52042	66
TRIsure	BIO-38032	69
Bacterial Enhancement Reagent	BIO-38037	70
DEPC-treated Water	BIO-38030	103

Compatibility Table	
SensiFAST SYBR & Fluorescein One-Step Kit	Bio-Rad iCycler®, iQ™5, MyiQ™

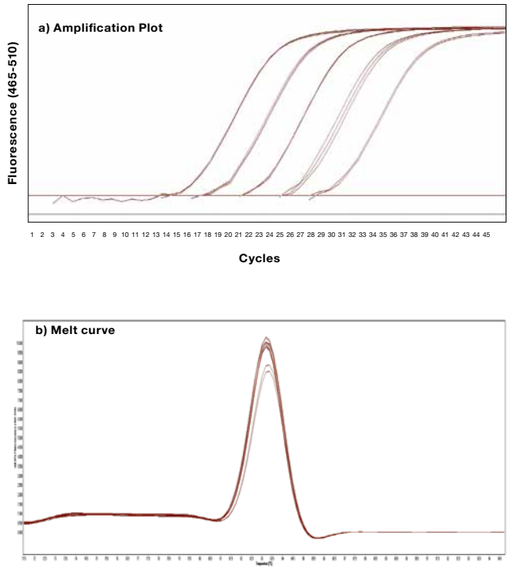


Fig. 1 SensiFAST SYBR & Fluorescein One-Step using fast cycling conditions.
A fragment of Ssdah gene was amplified using SensiFAST SYBR & Fluorescein One-Step from a 10 fold serial dilution of human RNA (in triplicate) over 5 orders of magnitude. The conditions were 45°C 10min followed by 45 cycles of 95°C 10s, 60°C 15s. The results illustrate that SensiFAST SYBR & Fluorsecein One-Step was fast, highly reproducible and sensitive.

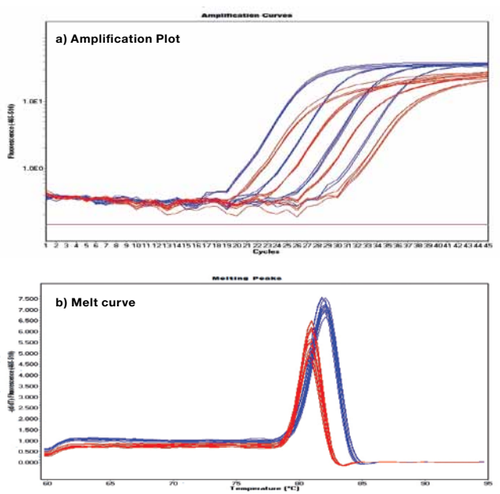


Fig. 2 Comparison of SensiFAST SYBR & Fluorescein One-Step (red line) against another leading supplier (blue line) using fast cycling conditions.
A fragment of human -actin gene was amplified using SensiFAST SYBR & Fluorescein One-Step (red) and the results were compared with amplifications using One-Step Kits from supplier I (blue). The process used a 10 fold serial dilution of human RNA (in quadruplicate) over 5 orders of magnitude. The conditions were 45°C 10min followed by 95°C for 5min and 35 cycles of 95°C 10s, 60°C 10s and 72°C 5s.
a) The results illustrate that SensiFAST SYBR & Fluorescein One-Step was faster (earlier Ct) and almost 10 fold more sensitive than competitor I.
b) There was no detectable primer-dimer formation with either kit.

SensiFAST™ Probe One-Step Kits

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	REACTION SIZE	CAT NO.
SensiFAST Probe No-ROX One-Step Kit			
100 Reactions	2x	20µl	BIO-76001
500 Reactions	2x	20µl	BIO-76005
SensiFAST Probe Hi-ROX One-Step Kit			
100 Reactions	2x	20µl	BIO-77001
500 Reactions	2x	20µl	BIO-77005
SensiFAST Probe Lo-ROX One-Step Kit			
100 Reactions	2x	20µl	BIO-78001
500 Reactions	2x	20µl	BIO-78005

Components	100 Reactions	500 Reactions
2x SensiFAST Probe One-Step Mastermix	1 x 1 ml	5 x 1 ml
RNase Inhibitor (10u/µl)	1 x 40µl	1 x 200µl
Reverse Transcriptase	1 x 20µl	1 x 100µl
DEPC-treated Water	1 x 1 ml	5 x 1 ml

Features and Benefits:

- **Rapid - optimized for fast reverse transcription real-time PCR**
- **Accurate quantification - for RNA from low copy targets**
- **Sensitive – unique buffer chemistry for earlier Ct detection**
- **Flexible - compatible with all fast cycling instruments**

Instrument Compatibility: See product selection table, page 3. Each of these instruments having the capacity to analyze the real-time PCR data with the passive reference signal either on or off, as well as instruments that do not require the use of ROX

Description: The SensiFAST Probe One-Step Kits have been developed for fast RT-qPCR and has been validated on all commonly used real-time instruments. The kit is designed for superior sensitivity and specificity with probe-detection technology, including TaqMan®, Scorpions® and molecular beacon probes (fig. 1).

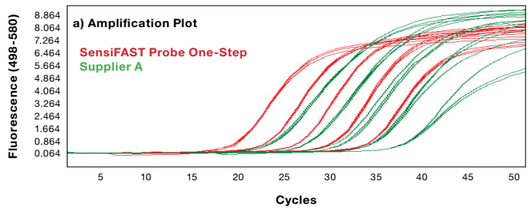
The SensiFAST Probe One-Step Kits have been formulated for highly reproducible first-strand cDNA synthesis and subsequent real-time PCR in a single tube and uses a combination of the latest advances in buffer chemistry and enhancers, together with an antibody-mediated hot-start DNA polymerase system, to ensure fast, highly-specific and ultra-sensitive one-step RT-qPCR (fig. 2). This also gives SensiFAST Probe One-Step unbeatable efficiency in multiplexing.

The SensiFAST Probe One-Step Kits consists of a 2x SensiFAST Probe One-Step mix, separate reverse transcriptase and RiboSafe RNase Inhibitor. SensiFAST Probe Hi-ROX and Lo-ROX One-Step Kits also contain premixed ROX for optional use.

Kit Size: The pack size is based on a 20µl final reaction volume.
Storage Conditions: 6 months at -20°C. Avoid exposure of the ROX dye to light.

Associated Products	Cat. No.	Page
RiboSafe RNase Inhibitor	BIO-65027	39
ISOLATE RNA Mini Kit	BIO-52042	66
TRIsure	BIO-38032	69
DEPC-treated Water	BIO-38030	103

Compatibility Table	
SensiFAST Probe No-ROX One-Step Kit	Roche LightCycler® 480, Bio-Rad Opticon®, Opticon™2, Chromo4™, MiniOpticon™, CFX96™, CFX384™, Cepheid SmartCycler®, Qiagen Rotor-Gene™ 3000, 6000, Eppendorf Mastercycler® ep realplex and Techne Quantica®, Illumina® Eco™, Takara Thermal Cycler Dice® (TP800)
SensiFAST Probe Hi-ROX One-Step Kit	ABI 7000, 7300, 7700, 7900, 7900HT, 7900HT FAST, StepOne™, StepOne™ Plus
SensiFAST Pr0be Lo-ROX One-Step Kit	ABI 7500, 7500 FAST, ViiA7™, Stratagene (Agilent) Mx4000™, Mx3000P™, Mx3005P™



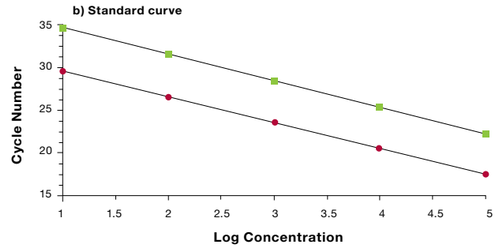


Fig. 1. Comparison of SensiFAST Probe One-Step (red line) against a leading supplier using fast cycling conditions.
A fragment of Mouse ß-actin amplified in triplicate using gene specific primers and TaqMan probe according to each manufacturer's protocol, from 10-fold serial dilution of RNA with either SensiFAST Probe One-Step (red) and competitor mix A (green).
a) The results illustrate that SensiFAST Probe One-Step Kit is faster by four Cts and more sensitive than supplier A. (more than 10 fold)
b) The standard curve shows an efficiency of 98% together with excellent specificity.

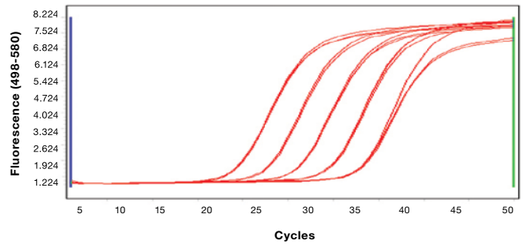


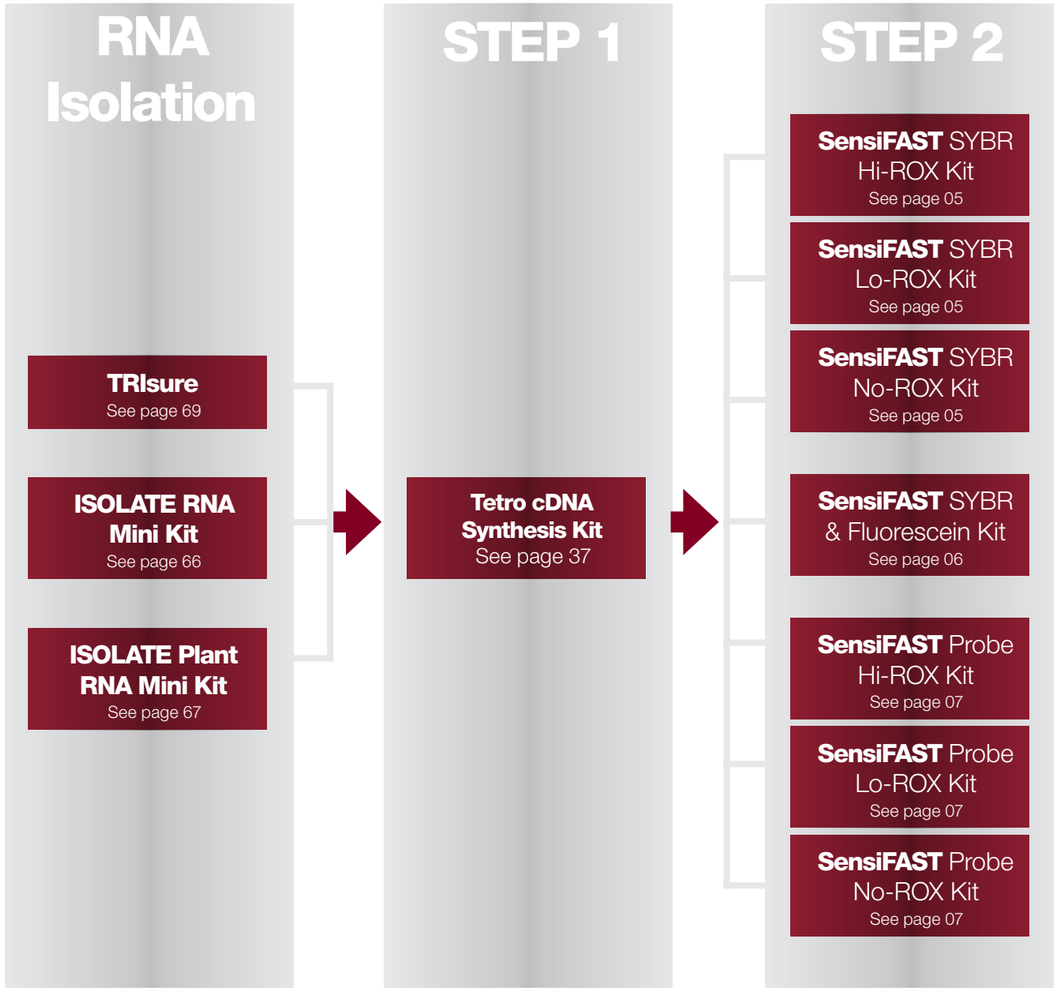
Fig. 2. Sensitivity and reproducibility of SensiFAST Probe One-Step.
A fragment of the mouse β-actin gene was amplified from a 10-fold serial dilution of total RNA from mouse 3T3 cells in triplicate using SensiFAST Probe One-Step Kit, primers and a TaqMan probe, using fast cycling conditions (40 cycles 95°C 10s, 60°C 30s). The results illustrate that that the SensiFAST Probe One-Step Kit works reproducibly and efficiently with fast protocols.

For more information please visit **www.bioline.com/sensifast**

BIOLINE
A Meridian Life Science® Company

Two-Step Real-Time PCR

Two-Step real-time PCR is achieved by generating cDNA from total RNA or poly(A) RNA with the Tetro cDNA Synthesis Kit and subsequently performing real-time PCR reactions with the appropriate SensiFAST kit, see diagram below.



Tetro cDNA Synthesis Kit

See page 37 for full product details

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
30 Reactions	BIO-65042
100 Reactions	BIO-65043

Components	30 Reactions	100 Reactions
5x RT Buffer	1 x 120µl	1 x 400µl
Reverse Transcriptase (200u/µl)	1 x 30µl	1 x 100µl
RiboSafe RNase Inhibitor (10u/µl)	1 x 30µl	1 x 100µl
dNTP Mix, 10mM Total	1 x 30µl	1 x 100µl
Oligo $(dT)_{18}$ Primer Mix	1 x 30µl	1 x 100µl
Random Hexamer Primer Mix	1 x 30µl	1 x 100µl
DEPC-treated Water	1 x 1.2ml	1 x 1.2ml

Features:

- **Generate high quality cDNA for any downstream application**
- **Highly suited to low abundance total RNA down to 100pg**
- **Convenient, reliable, cost-effective**

Description: The Tetro cDNA Synthesis Kit contains all the necessary components to generate cDNA from total or poly(A) RNA. The cDNA generated is used as a template for the appropriate SensiFAST product in accordance with the user requirements (see diagram).

The Tetro cDNA Synthesis Kit is optimized for RT reactions from a wide range of total RNA amounts (100pg- 2µg), such that long and low-abundance cDNAs are both represented after cDNA synthesis. The kit contains oligo $(dT)_{18}$ and random hexamer primers together with MMLV Reverse Transcriptase and control RNA template. The kit components are fully optimized to generate maximum yields of full-length cDNA (fig. 1).

Storage Conditions: The Tetro cDNA Synthesis Kit can be stored for 12 months at -20°C.

Associated Products	Cat. No.	Page
SensiFAST SYBR No-ROX Kit	BIO-98002	5
ISOLATE RNA Mini Kit	BIO-52042	66
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

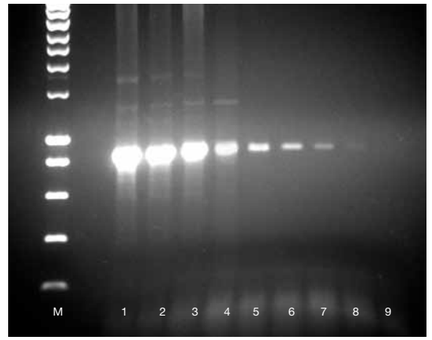


Fig. 1 High Sensitivity.
High sensitivity was observed with a serial dilution experiment: Total HeLa RNA was reverse-transcribed using Reverse Transcriptase and Oligo $(dT)_{18}$ primer in a 20µl reaction. Lanes: 50ng (1), 25ng (2), 10ng (3), 1ng (4), 500pg (5), 250pg (6), 100pg (7), 50pg (8) and 0pg (9). Subsequently, 5µl of each reaction was used in conjunction with β-actin specific PCR primers to amplify an 860bp band from human mRNA. HyperLadder I (M).

MyTaq™ HS & MyTaq™ HS Red DNA Polymerase

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
MyTaq HS DNA Polymerase		
250 Units	5u/µl	BIO-21111
1000 Units	5u/µl	BIO-21112
2500 Units	5u/µl	BIO-21113
MyTaq HS Red DNA Polymerase		
250 Units	5u/µl	BIO-21114
1000 Units	5u/µl	BIO-21115
2500 Units	5u/µl	BIO-21116

Components	250 Units	1000 Units	2500 Units
MyTaq HS DNA Polymerase	1 x 50µl	1 x 200µl	2 x 250µl
5x MyTaq Reaction Buffer	2 x 1ml	8 x 1ml	14 x 1.5ml

Features:

- **New generation of antibody-based hot-start polymerase**
- **Highest specificity and superior performance**
- **Novel buffer system, including dNTPs and $MgCl_2$**
- **Fast PCR reactions**
- **Red dye for direct gel loading**

Applications:

- **High-throughput PCR**
- **Assays with prolonged reaction setup on the bench or liquid handling**
- **Amplification of challenging targets susceptible to mispriming**
- **Colony PCR**
- **Multiplexing**
- **Specific amplification of difficult templates (GC rich)**
- **Genotyping**
- **TA cloning**

Description: MyTaq™ HS DNA Polymerase consists of a high performance PCR product that is powered by antibody-mediated hot-start, specifically designed for fast, highly-specific, hot-start PCR. MyTaq HS does not possess polymerase activity during the reaction set-up, thus reducing non-specific amplification including primer-dimer formation. The advanced formulation of MyTaq HS allows fast cycling conditions, considerably reducing the reaction time without compromising PCR specificity or yield (fig. 1).

This new enzyme from Bioline is supplied with 5x MyTaq buffer system, a proprietary formulation that saves time and delivers superior results, as it contains dNTPs, $MgCl_2$ and enhancers at optimal concentrations which removes the need for optimization.

The specially designed MyTaq HS Red formulation does not interfere with the PCR reaction and enables users to load samples directly onto a gel after the PCR without the need to add loading buffer.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: MyTaq HS DNA Polymerase: 5u/µl
Storage Conditions: MyTaq HS can be stored for 6 months at -20°C.

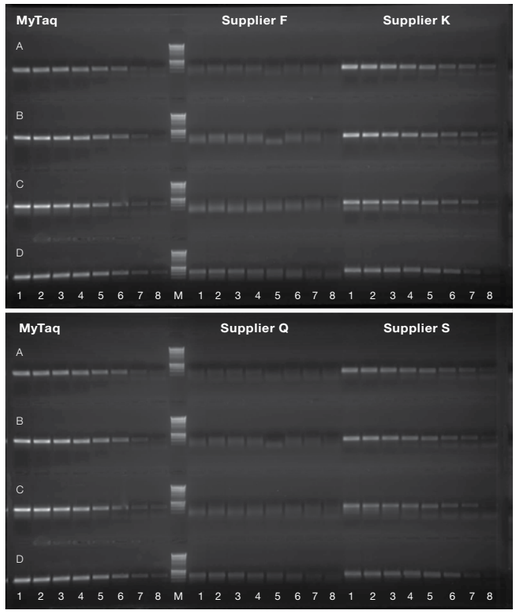


Fig. 1 Fast amplification (26.3 minutes) was carried out on a range of human genomic genes
A) A 340bp
B) A 450bp fragment of the myc gene.
C) A 525bp fragment of the EGFR gene.
D) A 530bp fragment of the AGRI1 gene.
The three genes amplified using MyTaq HS and the results were compared with amplifications using hot-start DNA polymerases from other suppliers. The process used a serial dilution of human genomic DNA (100ng, 33ng, 10ng, 4ng, 1ng, 33pg, 10pg and 3pg genomic DNA, lanes 1-8 respectively), incubated for 3 min at 95ºC followed by 35 cycles of 15s at 95ºC, 55ºC and 72ºC. Marker is HyperLadder I (M) (Cat No. BIO-33025). MyTaq HS performed well across all four human genes.

Associated Products	Cat. No.	Page
ISOLATE PCR and Gel Kit	BIO-52029	62
SureClean Plus	BIO-37047	68
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

MyTaq™ HS & MyTaq™ HS Red Mix

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
MyTaq HS Mix		
200 Reactions	2x	BIO-25045
1000 Reactions	2x	BIO-25046
MyTaq HS Red Mix		
200 Reactions	2x	BIO-21047
1000 Reactions	2x	BIO-21048

Components	200 Reactions	1000 Reactions
MyTaq HS Mix	4 x 1.25ml	20 x 1.25ml

Features:

- **Convenient all-in-one tube mastermix**
- **New generation of antibody-based hot-start polymerase**
- **Highest specificity and superior performance**
- **Fast PCR reactions**
- **Red dye for direct gel loading**

Applications:

- **High-throughput PCR**
- **Assays with prolonged reaction setup on the bench or liquid handling**
- **Amplification of challenging targets susceptible to mispriming**
- **Colony PCR**
- **Multiplexing**
- **Specific amplification of difficult templates (GC rich)**
- **Genotyping**
- **TA cloning**

Description: MyTaq™ HS Mix is a ready-to-use 2x mix for fast, highly-specific hot-start PCR. MyTaq HS Mix is powered by antibody mediated hot-start and does not possess polymerase activity during the reaction set-up, thus reducing non-specific amplification. The advanced formulation of MyTaq HS Mix allows very fast cycling conditions to be used (fig. 1), greatly reducing the reaction time without compromising PCR specificity and yield (fig. 2).

MyTaq HS Mix contains all the reagents including MyTaq buffer, dNTPs, $MgCl_2$, enhancers and stabilizers necessary for trouble-free PCR reaction set up. The product is supplied conveniently all-in-one tube to reduce the number of pipetting steps and to facilitate increased efficiency, throughput and reproducibility.

The specially designed MyTaq Red formulation does not interfere with the PCR reaction and allows users to load samples directly onto a gel after the PCR without the need to add loading buffer.

Concentration: 2x
Storage Conditions: MyTaq HS Mix can be stored for 6 months at -20°C.

Associated Products	Cat. No.	Page
ISOLATE PCR and Gel Kit	BIO-52029	62
SureClean Plus	BIO-37047	68
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

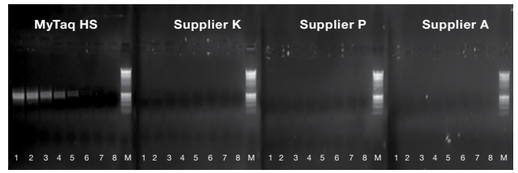
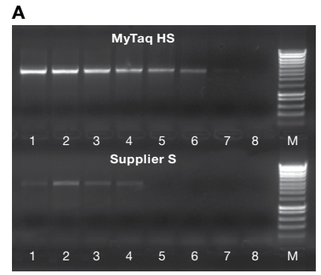


Fig. 1 Ultra-fast (12.3 minutes) amplification of the human AGFR1 gene
A 900bp fragment of the AGTR1 gene was amplified with MyTaq HS Mix and hot-start *Taq* from other suppliers. A serial dilution of human genomic DNA (100ng, 33ng, 10ng, 4ng, 1ng, 33pg, 10pg and 3pg, lanes 1-8 respectively) was used and incubated at 95°C for 3 min, followed by 35 cycles of 95°C for 5s, 55°C for 1s and 72°C for 15s. Marker is HyperLadder I (M) (Cat No. BIO-33025). Only MyTaq HS was capable of amplifying a 900bp fragment of human genomic DNA under such fast conditions.



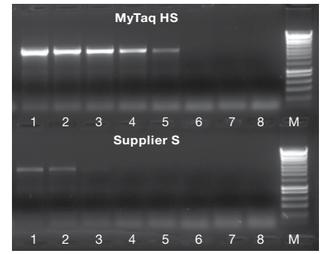


Fig. 2 Robustness of MyTaq HS in Colony PCR.
A 2.6Kb fragment of human genomic DNA was cloned into M13 vectors and transformed into *E. coli* cells. 1µl of a 1:16 dilution of an overnight culture of these cells was used directly in a 50µl PCR reaction.
A) 2µl increments of agar were added (Lanes 1-8 respectively).
B) 2µl increments of LB were added (Lanes 1-8 respectively).
Reaction conditions were 95°C for 3 min, followed by 35 cycles of 95°C for 15s, 60°C for 15s and 72°C for 2mins. Marker is HyperLadder I (M) (Cat No. BIO-33025). MyTaq HS DNA polymerase was more resistant to inhibition than that of supplier S, making it ideal for Colony PCR, even from liquid overnight cultures, offering improved workflows particularly for high-throughput assays.

IMMOLASE™ DNA Polymerase

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
250 Units	5u/µl	BIO-21046
500 Units	5u/µl	BIO-21047
5000 Units	5u/µl	BIO-21048

Components	250 Units	1000 Units	5000 Units
IMMOLASE DNA Polymerase	1 x 50µl	1 x 100µl	10 x 100µl
10x ImmoBuffer	1 x 1.2ml	2 x 1.2ml	20 x 1.2ml
50mM $MgCl_2$ Solution	1 x 1.2ml	1 x 1.2ml	10 x 1.2ml

Features:

- **Heat-activated thermostable DNA polymerase**
- **Outstanding and robust performance**
- **Excellent yield in quantitative assays**
- **Convenient setup at room temperature**
- **Leaves 'A' overhang**

Applications:

- **Ultra-high specificity for multiplex reactions**
- **Products suitable for TA cloning**
- **Low-copy number templates**

Description: IMMOLASE™ is a heat-activated thermostable DNA polymerase. IMMOLASE provides extremely high yield (fig. 1) and improved specificity as compared to standard polymerases and can eliminate the presence of non-specifics, such as primer-dimers and mis-primed products. IMMOLASE is inactive at room temperature and therefore prior to PCR cycling, requires activation by heat treatment for 10 minutes (fig. 2). This facilitates flexibility in reaction setup, including premixing of PCR reagents at room temperature. Subsequently, the reaction can be handled according to the user's existing protocols for thermostable DNA Polymerases.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: IMMOLASE DNA Polymerase: 5u/µl
Storage Conditions: IMMOLASE can be stored for 12 months at -20°C.

Product Citations:

1. Moore, I., *et al. BLOOD* **115(2)**, 379-387 (2010).
2. Crowder C.D., *et al. PLoS ONE* **5(5)**, e10650 (2010).
3. Trantow, C.M, *et al. PLoS Genet* **6(7)**, e1001008 (2010).
4. Schöbel, F., *et al. Eukaryot. Cell.* **9**, 878-893 (2010).
5. Pinto, F.M., *et al. Repro. Biol. Endo.* **8**, 104 (2010).
6. Takahashi, .H., *et al. BMC Evol. Biol.* **10**, 284 (2010).
7. Scoville, A. G. & Pfrender, M. E. *PNAS* **107(9)**, 4260-3 (2010).

Associated Products	Cat. No.	Page
ISOLATE PCR and Gel Kit	BIO-52029	62
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

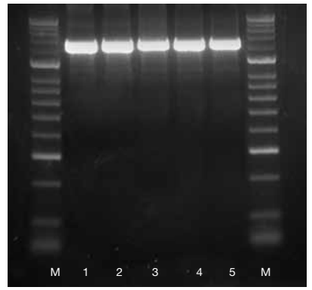


Fig. 1 Extremely high yield amplification
A 1.4kb mouse rn18s gene fragment was amplified with 2.5 Units of IMMOLASE DNA Polymerase (lanes 1-5). The rn18s fragment was amplified from 100ng of mouse genomic DNA. The PCR was performed in 50µl reaction mixtures containing 1.5mM $MgCl_2$. HyperLadder II (M). Extremely high yield is achieved with every replicate.

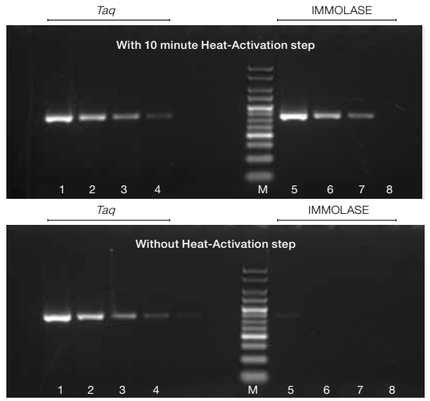


Fig. 2 Illustration of IMMOLASE Heat-activation.
A 125bp DNA fragment from plasmid pGEM was amplified with 1.0 Unit of *Taq* (lanes 1-4) and 1.0 Unit of IMMOLASE (lanes 5-8). The pGEM fragment was amplified from 0.25ng plasmid DNA (pGEM) followed by 2-fold serial dilutions in 50µl reactions containing 1.5mM $MgCl_2$. HyperLadder V (M). Two tests were conducted, one with hot-start and one without hot-start. *Taq* exhibited activity in both tests, whereas IMMOLASE only exhibited activity following a hot-start step.

VELOCITY DNA Polymerase

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
250 Units	2u/µl	BIO-21098
500 Units	2u/µl	BIO-21099

Components	250 Units	500 Units
VELOCITY DNA Polymerase	1 x 125µl	1 x 250µl
5x Hi-Fi Reaction Buffer	2 x 1.5ml	4 x 1.5ml
DMSO	1 x 1.25ml	1 x 1.25ml
50mM $MgCl_2$ Solution	1 x 1.2ml	1 x 1.2ml

Features:

- **High-speed, high fidelity DNA polymerase**
- **Intrinsic high processivity**
- **Fast amplification**
- **Shorter PCR runs for longer templates**
- **Robust, requires minimal optimization of the reaction**

Applications:

- **GC-rich templates**
- **Cloning techniques where high fidelity is desirable**
- **Blunt-end cloning**
- **Amplification of difficult templates**
- **Site directed mutagenesis**

Description: VELOCITY DNA Polymerase is an fast thermostable enzyme possessing 3'-5' proofreading exonuclease activity. VELOCITY delivers outstanding PCR yield with exceptional fidelity, even from low template concentrations (fig. 1). It also has high processivity, resulting in shorter extension times, higher yield and the ability to amplify long templates in a fraction of the time. Furthermore, the polymerase offers robust and reliable yields, even in assays in which PCR conditions are compromised with impurities or in complex assays, allowing it to be used with minimal optimization (fig. 2)

VELOCITY provides high fidelity (error-rate of 4.4 x 10^{-7}) and high processivity. This results in extension rates as fast as 15s/kb for templates of up to 5Kb and 30s/Kb for templates longer than 5kb. Reduction in PCR turnaround time makes VELOCITY the ideal choice for users who wish to generate long PCR products with high yield and no mutations.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: VELOCITY DNA Polymerase: 2u/µl
Storage Conditions: VELOCITY DNA Polymerase can be stored for 12 months at -20°C.

Product Citations:

1. Renaud, C., *et al. J. Clin. Virol.* **49(1)**, 21-25 (2010).
2. Huang, X.X., *et al. Am. J. Pathol.* **174(4)**, 1534–1543 (2009).
3. Norgate, M., *et al. PLoS One.* **4(11)**, e7950 (2009).

Associated Products	Cat. No.	Page
MyTaq HS Red Mix	BIO-25047	20
PCR Tailing Mix	BIO-21103	23
dNTP Set	BIO-39025	77
Agarose, Molecular Grade	BIO-41026	93

Fig. 1. Amplification of human genomic DNA
A/ a 1kb and B/ a 10kb fragment were amplified from 10ng, 2ng, 400pg, 80ng, 16pg, 3.2pg, 0.6pg and 0.1pg (lanes 1-8 respectively) of human genomic DNA using VELOCITY and Supplier P. Reactions were incubated at 98°C for 2 min followed by 30 cycles at 98°C for 30s, 55°C, for 30s, and 72°C for 1 or 10 min. HyperLadder I (M). VELOCITY exhibits yield even at low template concentrations.

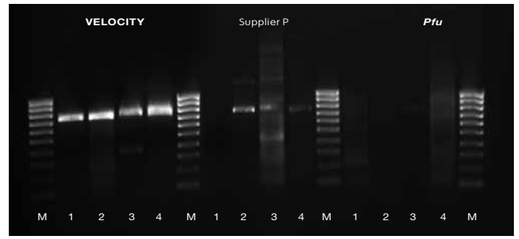


Fig. 2. VELOCITY, Supplier P and *Pfu*
VELOCITY, a competitor polymerase (P) and wild-type Pfu were compared with high GC content template amplification. Lanes 1–4 are a 728bp fragment of the GP150 gene (76.9% GC), a 724bp fragment of the MRGRE gene (68% GC), a 723bp fragment of the NM_022372.3 gene (66.9% GC) and a 788bp fragment of the NM_033178.2 gene (70.9% GC) respectively. PCR was performed in 50µl reaction mixes and 5µl was run on a 1.5% TAE agarose gel. HyperLadder IV (M). VELOCITY exhibits high yield in all GC contents as compared with other suppliers.

Tune into Perfect PCR

Bioline produces a broad portfolio of premium quality PCR enzymes.

Each DNA polymerase has different characteristics to achieve optimal results. It is important for the user to choose the polymerase most suited to their application. For your convenience and to achieve optimal PCR, many of our most popular PCR enzymes are also available in practical, ready-to-use 2x mastermixes which contain polymerase, dNTPs, $MgCl_2$, and additional additives. A polymerase selection guide is provided to facilitate your choice.

Proofreading enzymes offer high fidelity rates due to 3'-5' proofreading exonuclease activity, but also generates blunt-ended amplicons. The Bioline PCR Tailing Mix uses a polymerase with 3'-A overextension function along with an exonuclease inhibitor to reduce the 3'-5' exonuclease activity of proofreading polymerase, allowing the PCR product to be modified without the need for firstly purifying. The product can then be ligated directly into a TA cloning vector.

PCR Enzymes & Mixes

The PCR Company • BIOLINE since 1992 • The PCR Company

DNA Polymerase Selection Table

With over 19 years of experience, Bioline now produces one of the broadest portfolios of premium quality PCR Enzymes. This includes the new MyTaq DNA Polymerase product range, a new generation of very high performance PCR products, designed for significant improvements to yield, sensitivity and speed.

Each DNA Polymerase has different characteristics and for optimal results, it is crucial to choose the enzyme that suits your individual application. For your convenience and to achieve optimal PCR, many of our most popular PCR enzymes are also available in practical, ready-to-use 2x mastermixes which contain polymerase, dNTPs, $MgCl_2$ and additional additives.

	MyTaq™ HS	**IMMOLASE™**	**VELOCITY**	**ACCUZYME™**		**MyTaq™**	**BIOTAQ™**	**Mango*Taq*™**	**BIO-X-ACT™** Short	**BIO-X-ACT™** Long
Properties										
Template Length	Up to 5kb	Up to 5kb	Up to 10kb	Up to 5kb		Up to 5kb	Up to 5kb	Up to 5kb	Up to 7kb	Up to 10kb
Hot Start	✓	✓								
High-Fidelity			✓	✓					○	○
High Processivity			✓							
Available mixes										
Mixes	✓			✓		✓		✓	✓	
Applications										
Long Range PCR (over 5kb)			○						✓	✓
High Specificity Assays	✓	✓								
Blunt End Cloning			✓	✓					✓	✓
TA Cloning	✓	✓				✓	✓	✓		
GC-Rich Templates	✓		○						○	○
Low Copy Templates	✓	✓	○	○						
Site-Directed Mutagenesis			✓	✓						
Crude Sample PCR	○		✓			○			○	○
Fast PCR	✓		○			✓	○	○		
Direct Gel Loading	✓					✓		✓		
Multiplex PCR	✓									
Colony PCR	✓									

✓ Recommended
○ Suitable

For more information please visit **www.bioline.com/polymerases**

BIOLINE
A Meridian Life Science® Company

VELOCITY PCR Kit

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
250 Units	n/a	BIO-21104

Components	250 Units
VELOCITY DNA Polymerase (250 units)	125µl
5x Hi-Fi Buffer (contains 10mM Mg2+)	2 x 1.5ml
50mM $MgCl_2$ Solution	1 x 1.2ml
DMSO	1 x 1.25ml
10mM dNTP Mix	625µl
10x PCR Tailing Mix	100µl

Features:
- **High-speed, high fidelity DNA polymerase**
- **Robust performance with problematic GC and AT rich targets**
- **PCR Tailing Mix to improve the efficiency of cloning**

Applications:
- **Cloning techniques where high fidelity is desirable**
- **TA cloning of high fidelity products**

Description: To enhance the cloning efficiency of DNA amplified with VELOCITY, Bioline has developed a new VELOCITY PCR Kit. The kit contains VELOCITY DNA polymerase to generate error free PCR products and a PCR Tailing Mix to add a 3'-A overhang, allowing TA cloning.

VELOCITY PCR products are blunt-ended due to the 3'-5' exonuclease activity of the polymerase which removes 3'-A overhangs. A 3'-A overhang is useful, however, as it facilitates more efficient cloning into plasmid vectors and help prevent insert-to-insert ligation, eliminating possible tandem inserts. In order to generate a 3'-A overhang, the kit also contains a PCR Tailing Mix. This uses a uniquely blended Taq polymerase to add a single Adenine base as well as an exonuclease inhibitor to reduce the 3'-5' exonuclease activity of the VELOCITY, thus eliminating the need for purification of the PCR products prior to the addition of the overhang.

Storage Conditions: MyTaq Mix can be stored for 12 months at -20°C.

Associated Products	Cat. No.	Page
α-Select Bronze Efficiency	BIO-85025	48
BIO*Blue* 10^8 Chemically Competent Cells	BIO-85036	50
Quick-Stick Ligase	BIO-27027	53
dNTP Set	BIO-39025	77

PCR Tailing Mix

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
50 Reactions	10x	BIO-21103

Components	50 Reactions
10x PCR Tailing Mix	1 x 250µl

Features:
- **Fast addition of 3'-A overhang to blunt ended DNA fragments**
- **Uses exonuclease inhibitor so no post PCR purification is required**

Applications:
- **TA cloning techniques where high fidelity is desirable**

Description: Proofreading DNA Polymerases provide high fidelity with a low error-rate, however the resulting PCR product is blunt-ended, because the proofreading polymerases possess a 3'-5' exonuclease activity that removes the 3'-A overhangs normally added by the terminal transferase activity of polymerases. These 3'-A overhangs are however essential for TA cloning of these fragments into plasmids, and can be added to blunt-end fragments after amplification. To do this, we use a *Taq* DNA polymerase containing an exonuclease inhibitor to add a single A, whilst reducing the 3'-5' exonuclease activity of the proofreading DNA polymerase (fig. 1).

5µl of the PCR Tailing Mix is added directly to 50µl of the amplified product, and incubated at 72°C for 5 minutes. Prior purification is not required.

Storage Conditions: PCR Tailing Kit can be stored for 12 months at -20°C.

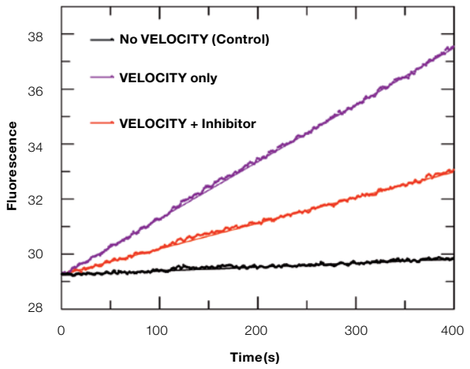


Fig. 1 VELOCITY Inhibition by PCR Tailing Mix.
Taq overextension is negated by the exonuclease activity from the VELOCITY DNA polymerase, reducing ligation/cloning efficiency. Here the *Taq* 3'-A overextension reaction contains an exonuclease inhibitor, which reduces the 3'-5' exonuclease activity of VELOCITY by more than 2-fold. Subsequently, it is not necessary to either clean-up the PCR product, before adding *Taq*, or maintain the post-PCR modified product on ice prior to ligation into a cloning vector.

ACCUZYME™ DNA Polymerase & Mix

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
ACCUZYME DNA Polymerase		
250 Units	2.5u/µl	BIO-21051
500 Units	2.5u/µl	BIO-21052
ACCUZYME Mix		
100 Reactions	2x	BIO-25027
500 Reactions	2x	BIO-25028

ACCUZYME Components	250 Units	500 Units
ACCUZYME DNA Polymerase	1 x 100µl	1 x 200µl
10x AccuBuffer	1 x 1.2ml	2 x 1.2ml
50mM $MgCl_2$ Solution	1 x 1.2ml	1 x 1.2ml
ACCUZYME Mix Components	**100 Reactions**	**500 Reactions**
ACCUZYME Mix	2 x 1.25ml	10 x 1.25ml
50mM $MgCl_2$ Solution	1 x 1.2ml	1 x 1.2ml

Features:
- **Very high yield**
- **High fidelity**
- **Amplifies fragments up to 5Kb**
- **Available as a convenient pre-mixed, pre-optimized solution (ACCUZYME Mix)**

Applications:
- **Ideal for ultra-high fidelity for subsequent cloning**
- **Blunt-end cloning**
- **Site-directed mutagenesis**

Description: ACCUZYME™ is a thermostable enzyme possessing 5'-3' DNA polymerase and 3'-5' proofreading exonuclease activities, offering high fidelity, even with demanding applications (fig. 1). ACCUZYME produces blunt-ended amplicons up to 5Kb in length.

ACCUZYME is supplied with 10x Reaction Buffer containing Mg, which provides optimal final reaction conditions for most experiments. In order to allow further optimization if necessary, additional $MgCl_2$ is provided.

ACCUZYME Mix dramatically reduces the time needed to set up reactions, thereby minimizing the risk of contamination. Greater reproducibility is ensured by the reduction in the number of pipetting steps that can lead to pipetting errors.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: ACCUZYME DNA Polymerase: 2.5u/µl
ACCUZYME Mix: 2x
Storage Conditions: ACCUZYME DNA Polymerase can be stored for 12 months at -20°C. ACCUZYME Mix can be stored for up to 6 months at -20°C, or up to 2 weeks at +4°C.

Product Citations:
ACCUZYME DNA Polymerase
1. Chakrabarti, M., *et al. Virol. J.* **7**, 181 (2010).
2. Silvestrini, F., *et al. Mol.Cell. Prot.*, **9**, 1437-48 (2010).
3. Williamson, D. S., *et al. Appl. Microbiol. Biotechnol.* **88**, 143-153 (2010).
4. Johnson M., *et al. NAR* **37(14)**, e98 (2009).
5. Pacheco, A., *et al. Microbiol.* **155**, 2021-2028 (2009).
6. Wilson, A. C., *et al. J. Bacteriol.* **190(15)**, 5522-5525 (2008).
ACCUZYME Mix
1. Potula, S. K., *et al. Transgen. Res.* **17(1)**, 19-32 (2008).

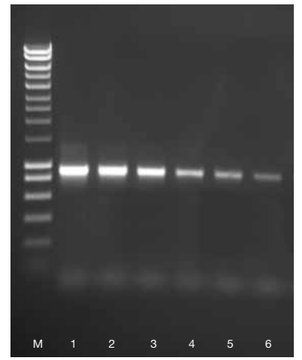


Fig 1. High performance even at low template concentrations.
An 800bp fragment from human genomic DNA was amplified using 25µl of ACCUZYME. The fragment was amplified from 0.5ng human genomic DNA (lane 1) followed by a 10-fold serial dilution series of template (lanes 2-6). PCR was performed in 50µl reaction mixtures. HyperLadder I (M).

Associated Products	Cat. No.	Page
MyTaq HS Red Mix	BIO-25047	20
dNTP Set	BIO-39025	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

MyTaq™ & MyTaq™ Red DNA Polymerase NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
MyTaq DNA Polymerase		
500 Units	5u/µl	BIO-21105
2500 Units	5u/µl	BIO-21106
5000 Units	5u/µl	BIO-21107
MyTaq Red DNA Polymerase		
500 Units	5u/µl	BIO-21108
2500 Units	5u/µl	BIO-21109
5000 Units	5u/µl	BIO-21110

Components	500 Units	2500 Units	5000 Units
MyTaq DNA Polymerase	1 x 50µl	2 x 250µl	4 x 250µl
5x MyTaq Reaction Buffer	4 x 1ml	14 x 1.5ml	9 x 5ml

Features:

- **New generation of polymerase with superior performance**
- **Increased sensitivity and speed**
- **Novel buffer system, including dNTPs and $MgCl_2$**
- **Robust and high yield across a wide range of templates**
- **Red dye for direct gel loading**
- **Easy optimization**

Applications:

- **Specific amplification of complex templates**
- **Robust amplification of GC-rich sequences**
- **Routine PCR applications**
- **TA cloning fast PCR**

Description: MyTaq™ DNA Polymerase is a high performance PCR reagent that exhibits more robust amplification than other commonly used polymerases. MyTaq DNA Polymerase delivers very high yield over a wide range of PCR templates and making it the ideal choice for most routine assays. This new enzyme preparation from Bioline is supplied with a 5x MyTaq red reaction buffer system, a proprietary formulation that saves time (fig. 1) and delivers superior results. MyTaq buffer contains dNTPs, $MgCl_2$ and enhancers at optimal concentrations which eliminates the need for optimization.

The specially designed MyTaq Red formulation does not interfere with the PCR reaction and enables users to load samples directly onto a gel after the PCR without the need to add loading buffer.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: MyTaq DNA Polymerase: 5u/µl
Storage Conditions: MyTaq can be stored for 6 months at -20°C.

MyTaq™ & MyTaq™ Red Mix NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
MyTaq Mix		
200 Reactions	2x	BIO-25041
1000 Reactions	2x	BIO-25042
MyTaq Red Mix		
200 Reactions	2x	BIO-21043
1000 Reactions	2x	BIO-21044

Components	200 Reactions	1000 Reactions
MyTaq Mix	4 x 1.25ml	20 x 1.25ml

Features:

- **Convenient all-in-one tube mastermix**
- **New generation *Taq* with superior performance**
- **Highest specificity and superior performance**
- **Robust and high yield across a wide range of templates**
- **Red dye for direct gel loading**

Applications:

- **High-throughput PCR**
- **Specific amplification of complex templates**
- **Robust amplification of GC-rich sequences**
- **Routine PCR applications**
- **TA cloning fast PCR**

Description: MyTaq™ Mix is a ready-to-use 2x mix for fast, highly-specific PCR. The advanced formulation of MyTaq Mix exhibits more robust amplification than other commonly used polymerases, delivering very high yield over a wide range of PCR templates (fig. 1) and making it the ideal choice for most routine assays. MyTaq Mix contains all the reagents including MyTaq buffer, dNTPs, $MgCl_2$, enhancers and stabilizers necessary for trouble-free PCR reaction set up.

The product is supplied conveniently all-in-one-tube only requires the addition of template, primers and water, reducing the number of pipetting steps and facilitating increased efficiency, throughput and reproducibility.

The specially designed MyTaq Red formulation does not interfere with the PCR reaction and allows users to load samples directly onto a gel after the PCR without the need to add loading buffer.

Concentration: 2x
Storage Conditions: MyTaq Mix can be stored for 6 months at -20°C.

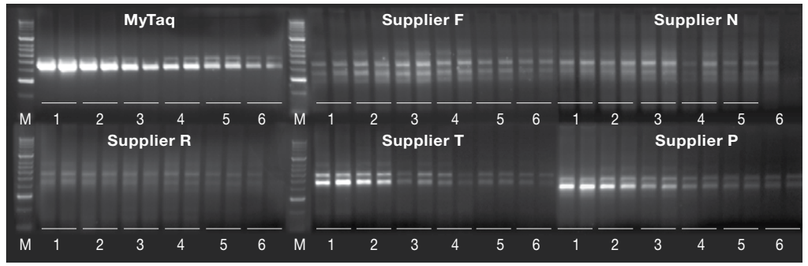


Fig. 1 Robust amplification of GC-rich human genomic DNA (61% GC content)
MyTaq was compared with DNA polymerases from other suppliers for the amplification of a 450bp fragment of the human myc gene. Decreasing amounts of human genomic DNA were used as a template (1µg, 200ng, 100ng, 50ng, 25ng and 12.5ng; lanes 1-6 respectively) in the PCR. The cycling was performed under the following conditions: 95°C for 5 min, followed by 30 cycles at 95°C for 30s, 60°C for 30s and 72°C for 50s. Marker is HyperLadder I (M) (Cat No. BIO-33025). MyTaq delivers higher yield and sensitivity as compared with all five competing products.

MangoTaq™ DNA Polymerase & MangoMix™

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
MangoTaq DNA Polymerase		
1000 Units	5u/µl	BIO-21083
2000 Units	5u/µl	BIO-21082
5000 Units	5u/µl	BIO-21078
MangoMix		
250 Reactions	2x	BIO-25033
1000 Reactions	2x	BIO-25034

MangoTaq Components	1000 Units	2000 Units	5000 Units
MangoTaq DNA Polymerase	1 x 200µl	2 x 200µl	5 x 200µl
50mM $MgCl_2$ Solution	2 x 1.2ml	4 x 1.2ml	10 x 1.2ml
5x MangoTaq Reaction Buffer Colored	4 x 1.5ml	8 x 1.5ml	20 x 1.5ml
5x MangoTaq Reaction Buffer Colorless	4 x 1.5ml	8 x 1.5ml	20 x 1.5ml

MangoMix Components	250 Reactions	1000 Reactions
MangoMix	5 x 1.25ml	20 x 1.25ml
50mM $MgCl_2$ Solution	1 x 1.2ml	4 x 1.2ml

Features:

- **Robust performance**
- **Easy visual recognition**
- **Direct loading onto agarose gels**
- **Available as a ready-to-use 2x reaction mix (MangoMix™)**

Applications:

- **Suited to a wide range of PCR assays**
- **Products suitable for TA cloning**

Description: MangoTaq™ DNA Polymerase is a formulation of Taq DNA Polymerase which offers consistent results across a wide range of DNA templates (fig. 1). MangoTaq DNA Polymerase possesses 5'-3' exonuclease activity and leaves an 'A' overhang such that the PCR product is suitable for effective integration into TA cloning vectors. For high-throughput applications, MangoTaq and the colored reaction buffer make an ideal choice, since this combination enables the user to load directly on a gel, and facilitates easy recognition (fig. 2).

The two reaction buffers supplied are: 5x Colored reaction buffer and 5x Colorless reaction buffer. The colored reaction buffer contains red and orange dyes (fig. 2), which separate during electrophoresis and provide quick reference points for monitoring the mobility of the DNA samples in the gel. The colored reaction buffer can be loaded directly onto an agarose gel for analysis, without the need for separate gel-loading buffer. The presence of the dyes has no effect on most routine enzymatic manipulations.

MangoMix™ is a complete ready-to-use 2x pre-optimized reaction mix containing MangoTaq DNA Polymerase, Mg^{2+}, dNTPs, red and orange reference dyes. MangoMix enables users to perform PCR assays of most common genomic and cDNA templates, simply requiring the addition of water, template and primers to perform the assays. MangoMix dramatically reduces the time required to set up reactions, thereby minimizing the risk of contamination.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: MangoTaq: 5u/µl
MangoMix: 2x
Storage Conditions: MangoTaq can be stored for 12 months at -20°C. MangoMix can be stored for up to 6 months at -20°C, or up to 2 weeks at +4°C.

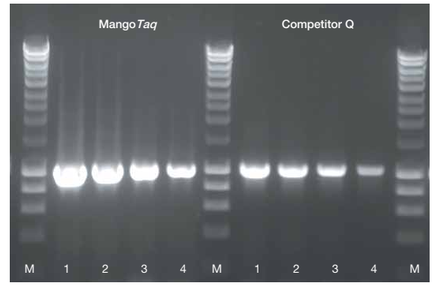


Fig. 1 Amplification of different human genes using MangoTaq DNA Polymerase and Supplier Q *Taq* DNA Polymerase.
The amplification products are as follows: 119bp (43% GC) from human glucocerebrosidase gene (1), 321bp (37% GC) from angiotensin receptor II gene (2), 635bp (56% GC) from rhodopsin gene (3), 762bp (33% GC) from -globin gene (4), 1200bp (54% GC) from α-1-antitrypsin gene (5). PCR was performed in 50µl reaction mixtures containing 50ng human genomic DNA and 1.5mM $MgCl_2$. HyperLadder II (M).

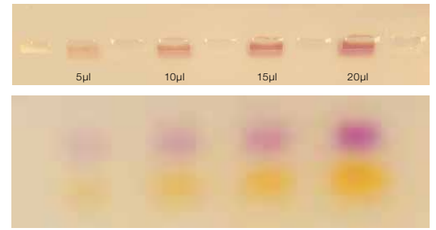


Fig. 2 MangoTaq reactions before and after electrophoresis.
Volumes below wells indicate loaded volumes of PCR reaction onto a 1% agarose gel using TAE buffer.

Product Citations:

MangoTaq DNA Polymerase

1. Lau, A., *et al. J. Clin. Microbiol.* **48(3)**, 811–816 (2010).
2. Thines, M., *et al. Eur. J. Plant Path.* **128(1)**, 81-9 (2010).
3. Knower , K. C., *et al. Mol. Cell. Endo.* **321(2)**, 123-130 (2010).
4. Nolan, M. J., *et al. Infection, Gene. Evol.* **10(8)**, 1179-1187 (2010).

MangoMix

1. O'Kelly, C. J., *et al. J. Phycol.* **46**, 728–35 (2010).
2. Hedtke, B. and Grimm, B. *NAR.* **37(11)**, 3739–3746 (2009).
3. Lau, A., *et al. J. Clin. Microbiol.* **46(9)**, 3021-3027 (2008).
4. Madadi, G., *et al. Biochem. Biophys. Res. Comm.* **376(4)**, 694-699 (2008).

Associated Products	Cat. No.	Page
MyTaq Red DNA Polymerase	BIO-21108	25
MyTaq Red Mix	BIO-21043	25
SureClean Plus	BIO-37047	68
dNTP Mix	BIO-39028	77

BIOTAQ™ DNA Polymerase

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
500 Units	5u/µl	BIO-21040
2500 Units	5u/µl	BIO-21060

Components	500 Units	2500 Units
BIOTAQ DNA Polymerase	1 x 100µl	5 x 100µl
10x NH_4 Reaction Buffer	2 x 1.2ml	10 x 1.2ml
50mM $MgCl_2$ Solution	1 x 1.2ml	5 x 1.2ml

Features:
- **Consistent delivery of high yield**
- **Minimum background**
- **Suited to a wide range of applications**
- **Processes fragments up to 5Kb**
- **Leaves 'A' overhang**

Applications:
- **TA cloning**
- **Routine PCR applications**

Description: BIOTAQ™ is widely used by molecular biologists that have come to depend upon the robust performance of this reagent.

BIOTAQ is a highly purified thermostable DNA polymerase offering very high yield over a wide range of PCR templates (fig. 1), and is the ideal choice for most assays. BIOTAQ is a robust preparation and consistently delivers high yields with minimal background especially when working with limited amounts of starting material (fig. 2). BIOTAQ possesses 5'-3' exonuclease activity and leaves an 'A' overhang such that the PCR product is suitable for effective integration into TA cloning vectors.

BIOTAQ is supplied with 10x NH_4-based reaction buffer, which provides optimal conditions for most experiments. Additional $MgCl_2$ is provided to allow reaction conditions to be adjusted to suit the template.

The specificity and performance of BIOTAQ can be further improved with the use of 2x PolyMate Additive (Cat No. BIO-37041), which is designed for GC- or AT-rich DNA, "dirty" templates or sequences with a high level of secondary structure.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: BIOTAQ DNA Polymerase: 5u/µl
Storage Conditions: BIOTAQ can be stored for 12 months at -20°C.

Product Citations:

1. del Hoyo, A. & Pedrola-Monfort, *Plant Systemat. Evol.* **273(3-4)**, 151-167 (2008).
2. López-Lluch, G., *et al. PNAS* **103(6)**, 1768-1773 (2006).
3. Cervero, A., *et al. Clin. Endocrinol. Metab.* **89**, 2442–2451 (2004).
4. Brigido, C., *et al. Vet. Parasitol.* **123(1-2)**, 17-23 (2004).
5. Knight, J.C., *et al. Nat. Gene.* **33(4)**, 469-475 (2003).
6. Ramalho, J.S., *et al. BMC Genet.* **2(2)**, (2001).

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
dNTP Set	BIO-39025	77
HyperLadder I	BIO-33025	85
PolyMate Additive	BIO-37041	102

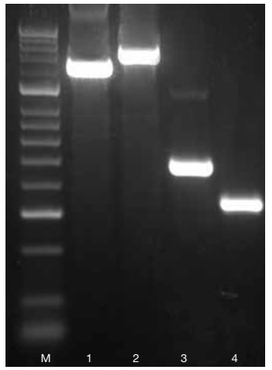


Fig. 1 Robust amplification of a variety of fragments.
BIOTAQ was used to amplify a variety of fragments from mouse genomic DNA. Four different genes were amplified using 2.5 Units of BIOTAQ DNA Polymerase: 1.4Kb fragment of rn18s gene (lane 1), 1.6Kb fragment of rn18s gene (lane 2), 500bp fragment of Fabpi gene (lane 3), 350bp fragment of IL-2 gene (lane 4). PCR was performed in 50µl reaction mixtures containing 1.5mM $MgCl_2$. HyperLadder II (M).

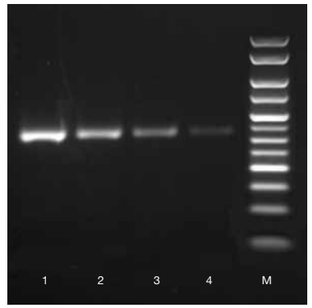


Fig. 2 High sensitivity with BIOTAQ Red.
A 125bp fragment of pGEM plasmid DNA was amplified using 1 Unit of BIOTAQ Red DNA Polymerase. The fragment was amplified from 15ng plasmid DNA (lane 1) followed by a 10-fold serial dilution of template (lanes 2-4). PCR was performed using 50µl reaction mixtures containing 1.5mM $MgCl_2$. HyperLadder V (M).

BIOTAQ™ PCR Kit

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
500 Units	5u/µl	BIO-21071

Components	500 Units
BIOTAQ DNA Polymerase @ 5u/µl	1 x 100µl
10x NH_4 Reaction Buffer	2 x 1.2ml
50mM $MgCl_2$ Solution	1 x 1.2ml
10mM dNTP Mix	1 x 1ml
2x PolyMate Additive	1 x 1.2ml

Features:
- **Ideal for setting up new procedures**
- **Designed for easy optimization**
- **High yield over a wide range of PCR templates**
- **Contains Bioline's ultra-pure dNTPs**
- **Supplied with 2x PolyMate Additive for difficult or "dirty" templates**

Applications:
- **Products recommended for TA cloning**
- **Routine PCR applications**

Description: The BIOTAQ™ PCR Kit contains all the necessary components to perform PCR assays on a wide range of DNA templates. Optimized levels of ultra-pure dNTPs and BIOTAQ™ DNA polymerase help ensure reproducible results.

BIOTAQ DNA Polymerase is a highly purified thermostable DNA polymerase offering very high yield over a wide range of PCR templates (fig. 1), and is the ideal choice for most assays. BIOTAQ is a robust preparation and consistently delivers high yields with minimal background. BIOTAQ possesses 5'-3' exonuclease activity and leaves an 'A' overhang such that the primer extension product is ideal for effective integration into TA cloning vectors.

The Kit includes:
- 10x NH_4 Buffer (Mg^{2+} free): Specially developed for BIOTAQ to provide optimal reaction conditions.
- 50mM $MgCl_2$ Solution: For individual reaction optimization.
- 10mM dNTP Mix: Ultra-pure dNTPs are manufactured by Bioline (pH 7.5).
- 2x PolyMate Additive: Provides an optimized composition of reagents, and is ideally suited to dirty/difficult templates with GC or AT-rich DNA, repetitive sequences or sequences with a high level of secondary structure. PolyMate acts as a melting agent that enables the DNA polymerase and oligonucleotides to provide greater access to the template DNA.

Concentration: BIOTAQ DNA Polymerase: 5u/µl
Storage Conditions: BIOTAQ PCR Kit can be stored for 12 months at -20°C.

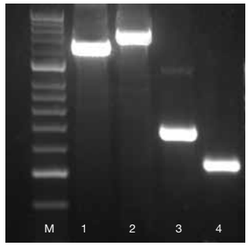


Fig. 1 Robust amplification over a variety of fragments.
BIOTAQ was used to amplify a variety of fragments from mouse genomic DNA. Four different genes were amplified using 2.5 Units of BIOTAQ DNA Polymerase: 1.4Kb fragment of rn18s gene (lane 1), 1.6Kb fragment of rn18s gene (lane 2), 500bp fragment of Fabpi gene (lane 3), 350bp fragment of IL-2 gene (lane 4). PCR was performed in 50µl reaction mixtures containing 1.5mM $MgCl_2$. HyperLadder II (M).

Product Citations:

1. Bower, N. I. & Johnston, I. A. *Physiol. Genom.* **42A**, 114-130 (2010).
2. Longo, G., *et al. Surface and Coatings Technol.* **204(16)**, 2605-2612 (2010).
3. Schaerli, Y., *et al. Anal. Chem.* **81(1)**, 302-306 (2009).
4. Wu, B., *et al. Mol. Ecol. Res.* **8(4)**, 814 - 817 (2008).
5. Yen-Ping, L., *et al. J. Nutrition* **138**, 996-1003 (2008).
6. Bower, N. I., *et al. J. Exp. Biol.* **211(24)**, 3859-3870 (2008).
7. Melo, M. & Hansson, *B. Mol. Ecol. Notes* **6(4)**, 1266 (2006).

Associated Products	Cat. No.	Page
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

BIO-X-ACT™ Short DNA Polymerase & Mix

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
BIO-X-ACT Short DNA Polymerase		
250 Units	4u/µl	BIO-21064
500 Units	4u/µl	BIO-21065
BIO-X-ACT Short Mix		
100 Reactions	2x	BIO-25025
500 Reactions	2x	BIO-25026

BIO-X-ACT Short Components	250 Units	500 Units
BIO-X-ACT Short DNA Polymerase	1 x 62.5µl	1 x 125µl
10x OptiBuffer	1 x 1.2ml	2 x 1.2ml
50mM $MgCl_2$ Solution	1 x 1.2ml	1 x 1.2ml
5x Hi-Spec Additive	1 x 1.2ml	1 x 1.2ml
BIO-X-ACT Short Mix Components	**100 Reactions**	**500 Reactions**
BIO-X-ACT Short Mix	2 x 1.25ml	10 x 1.25ml
50mM $MgCl_2$ Solution	1 x 1.2ml	1 x 1.2ml

Features:
- **Ideal for problematic templates**
- **Higher fidelity than *Taq* due to proofreading activity**
- **Perfect for templates that fail with standard *Taq* DNA Polymerases**
- **Available as a ready-to-use 2x reaction mix (BIO-X-ACT Short Mix)**

Applications:
- **High-fidelity PCR**
- **Suitable for TA cloning**
- **GC-rich templates**
- **Crude sample PCR**
- **Forensic applications**

Description: BIO-X-ACT™ Short DNA Polymerase is a high-performance proprietary complex of enzymes specifically designed for difficult/problematic PCR applications requiring high processivity and fidelity (fig. 1). BIO-X-ACT Short is recommended for short genomic DNA fragments of up to 2Kb, or Lambda DNA fragments up to 5Kb. Using Lambda DNA as template, the best performance is achieved within the 100bp-5Kb range. BIO-X-ACT Short possesses 5'-3' polymerase activity and 3'-5' proofreading activity, which in combination with other properties, provides higher fidelity than *Taq*.

BIO-X-ACT™ Short Mix is a complete ready-to-use 2x reaction mix, with the simple addition of water, template and primers. In order to achieve optimal reaction conditions, the BIO-X-ACT Short Mix contains BIO-X-ACT Short DNA Polymerase, $MgCl_2$, ultra-pure dNTPs manufactured by Bioline as well as further additives. The mix has been optimized for a wide variety of templates, and an additional 50mM $MgCl_2$ solution is included should any fine adjustments be required.

Concentration: BIO-X-ACT Short DNA Polymerase: 4u/µl
Storage Conditions: BIO-X-ACT Short DNA Polymerase can be stored for 12 months at -20°C.

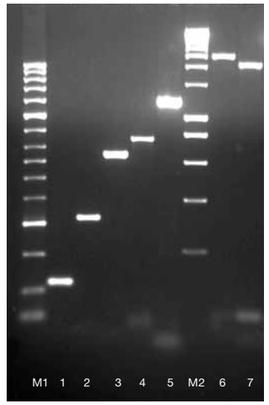


Fig. 1 High specificity on problematic templates.
A range of fragments, varying in length and GC content, were amplified using 25µl of 2x BIO-X-ACT Short. These problematic templates originate from a variety of human genes. PCR was performed in 50µl reaction mixtures containing 2.5mM $MgCl_2$. HyperLadder II (M1)and HyperLadder I (M2). The amplification products are: 119bp (43% GC) from human glucocerebrosidase gene (1), 321bp (37% GC) from angiotensin receptor II gene (2), 626bp (56% GC) from rhodopsin gene (3), 762bp (33 % GC) from β-globin gene (4), 1200bp (54% GC) from α-1-antitrypsin gene (5), 2256bp (52%GC) from the p53 gene (6), 2000bp (52% GC) from the angiotensin receptor I gene (7). BIO-X-ACT Short exhibited robust yield for all amplicons.

Product Citations:

BIO-X-ACT Short DNA Polymerase

1. Falvella, F. S., *et al. JNCI J. Natl. Cancer Inst.* **102(17)**,1367-1370. (2010).
2. Matic, M., *et al. Intl. J. Biochem. Cell Biol.* **42(5)**, 672-82 (2010).
3. Lim, T. S., *et al. New Biotechnol.* **27(2)**, 108-17 (2010).
4. Solomon, E., *et al. JBC* **285**, 21969-77 (2010).
5. Hedman, J., *et al. BioTechniques* **47**, 951-8 (2009).
6. Dhivya, K. & Ghosh, G. J. *Forensic Dental Sci.* **1(2)**, 104-6 (2009).

BIO-X-ACT Short Mix

1. Salame, T. M., *et al. Micro. Biotech.* **3(1)**, 93–106 (2010).
2. Sharbati, S., *et al. BMC Microbiol.* **9**, 31 (2009).
3. Maruvada, R., *et al. The FASEB J.* **23** 3967-3977 (2009).
4. Ondzigjhi, C. A., *et al. Plant Cell* **20(8)**, 2205–2220 (2008).
5. Eastham, R. T., *et al. Mol. Biochem. Parasitol.* **152(1)**, 66-71 (2007).
6. Caffaro, C. E., *et al. PNAS* **103(44)**, 16176-16181 (2006).

Associated Products	Cat. No.	Page
SureClean Plus	BIO-37047	68
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

BIO-X-ACT™ Long DNA Polymerase

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
250 Units	4u/µl	BIO-21049
500 Units	4u/µl	BIO-21050

Components	250 Units	500 Units
BIO-X-ACT Long DNA Polymerase	1 x 62.5µl	1 x 125µl
10x OptiBuffer	1 x 1.2ml	2 x 1.2ml
50mM $MgCl_2$ Solution	1 x 1.2ml	1 x 1.2ml
5x Hi-Spec Additive	1 x 1.2ml	1 x 1.2ml
DMSO	1 x 1.25ml	1 x 1.25ml

Features:
- **Amplifies fragments up to 20Kb**
- **High processivity**
- **Reproducible results**

Applications:
- **PCR of long DNA fragments**
- **GC-rich templates**

Description: BIO-X-ACT Long is recommended for long genomic DNA fragments of up to 10Kb, or Lambda DNA fragments up to 30Kb (fig. 1). BIO-X-ACT Long has been optimized for a wide variety of templates.

For enhanced specificity, BIO-X-ACT Long is supplied with a vial of 5x Hi-Spec Additive. Hi-Spec Additive is a very efficient enhancer, which helps to prevent the formation of flase background and smearing.

Unit Definition: One unit will incorporate 10nmoles of dNTPs in 30min at 72°C.
Concentration: BIO-X-ACT Long DNA Polymerase: 4u/µl
Storage Conditions: BIO-X-ACT Long DNA Polymerase can be stored for 12 months at -20°C.

Product Citations:

1. Glover, R. H., *et al. Mol. Ecol. Res.* **10**, 51-9 (2010).
2. Pagnamenta, A. T., *et al. Biol. Psychiatry* **68(4)**, 320-8 (2010).
3. Slade, I., *et al. J. Med. Genet.* **47**, 342-7 (2010).
4. Chester, M., *et al. Cyto. Genome Res.* **129**, 1-3 (2010).
5. McMahon, D. P., *et al. BMC Genomics* **10**, 603 (2009).
6. Haim-Vilmovsky, L. & Gerst, J. E. *Nature Protocols* **4**, 1274-84 (2009).
7. Mullane, N., *et al. Appl. Environ. Microbiol.* **74(12)**, 3783–3794 (2008).

Associated Products	Cat. No.	Page
BIO-X-ACT Short DNA Polymerase	BIO-21064	29
SureClean Plus	BIO-37047	68
dNTP Mix	BIO-39028	77
Agarose, Molecular Grade	BIO-41026	93

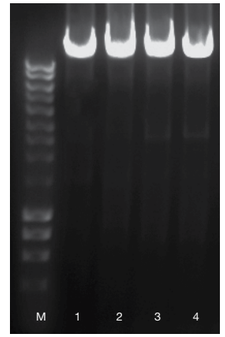


Fig. 1 High yield from long amplifications.
A 10Kb fragment from Lambda DNA was amplified using 25µl of 2x BIO-X-ACT Long Mix. The fragment was amplified from 0.25ng of DNA (lanes 1-4) in a 50µl reaction containing 3.5mM $MgCl_2$. Extremely high yield is achieved reproducibly. HyperLadder I (M).

Carrying The Message

Bioline's range of RNA Analysis products are manufactured and packaged under the most stringent conditions and are guaranteed to be RNase/DNase free. The range includes TRIsure and RNA ISOLATE kits, for column-free and spin-column isolation of total RNA from cells and tissues, generating pure, intact, high-quality RNA suited to any downstream application.

Bioline products for first-strand cDNA synthesis include Tetro Reverse Transcriptase, MyTaq One-Step RT-PCR Kit, Tetro cDNA Synthesis Kit, Oligo $(dT)_{18}$ and Random Hexamer Primers, and ultra-pure NTPs.

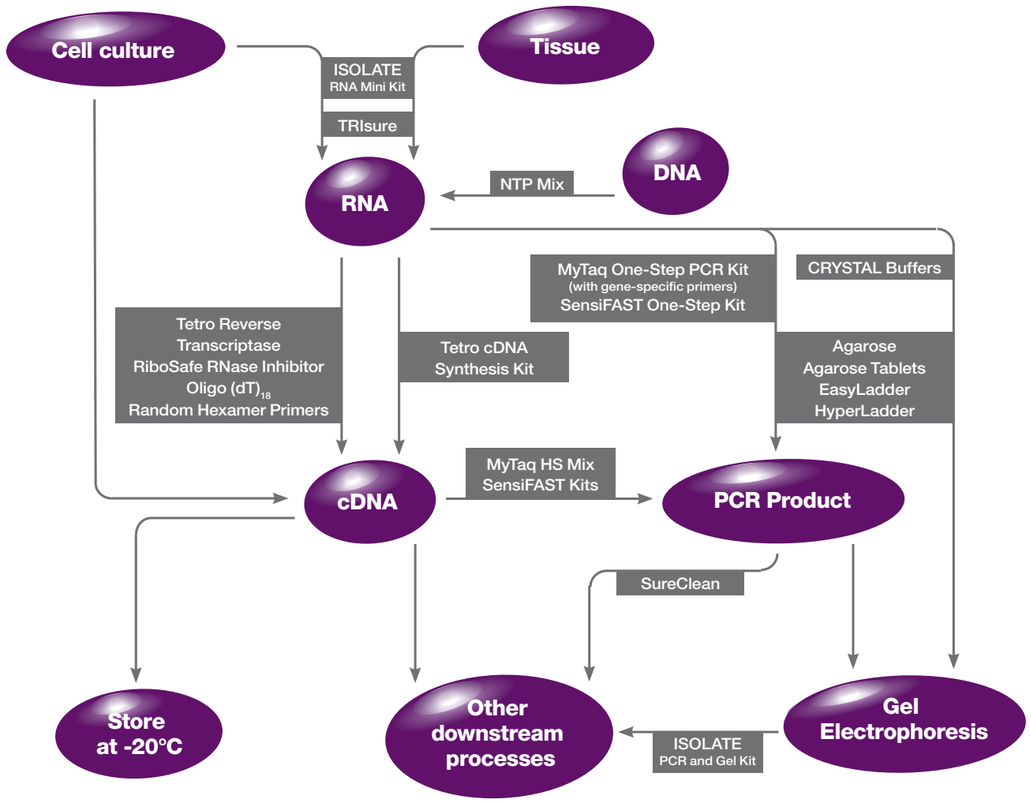
For an RNase free environment, our RiboSafe RNase Inhibitor provides complete inhibition of RNases A, B and C, and our agaroses, in powder or the convenient ready-to-use pre-weighed tablets are also RNase free.

RNA Analysis

The PCR Company • BIOLINE since 1992 • The PCR Company

RNA Analysis

In the laboratory, obtaining full length, high quality RNA often proves to be a daunting task. There are two main reasons for RNA degradation during RNA analysis. Firstly, RNA, by its very structure, is inherently weaker than DNA. RNA is made up of ribose units, which have a highly reactive hydroxyl group on C2 that takes part in RNA-mediated enzymatic events. This makes RNA more chemically labile than DNA. RNA is also more prone to heat degradation than DNA. Secondly, enzymes that degrade RNA, ribonucleases (RNases) are so ubiquitous and hardy, that eliminating them often proves to be virtually impossible. For example, autoclaving a solution containing bacteria will destroy the bacterial cells, but not necessarily the RNases released from the cells.



Schematic diagram of RNA Analysis

How to maintain an RNase-free environment

For correct storage of RNA it is very important to avoid RNA degradation. In the short term, RNA may be stored in RNase-free H_2O or TE buffer at -80°C for 1 year without degradation. For long term storage RNA samples may be stored as ethanol precipitates at -20°C. However, when dissolved in ethanol, RNA is not dispersed evenly in the solution and cannot be used directly in quantitative experiments. Instead, precipitates should be pelleted and redissolved in an aqueous buffer before pipetting.

Gloves: Always wear sterile gloves before handling anything that is going to be used for RNA analysis. It is however important to remember that once the gloves have touched equipment in the lab such as centrifuges, pipettes and door handles, they are no longer RNase-free.

Decontamination techniques: Heat-proof glassware can be baked at 180°C for several hours to inactivate RNases. Polycarbonate or polystyrene materials can be decontaminated by soaking in 3% hydrogen peroxide for 15 minutes, followed by thorough rinsing with RNase-free water.

DEPC-treated Water: Use DEPC-treated water instead of regular PCR grade water. DEPC inactivates RNase by histidine modification of the bases. If DEPC-treated water is made in-house, always remember to autoclave before use to degrade the DEPC.

RNase inhibitors: The use of RNase inhibitors is highly recommended with samples containing endogenous RNase. Most RNase inhibitors are suitable for use in any application where RNases are a potential problem.

Good quality reagents: Always ensure that all reagents and chemicals purchased commercially are guaranteed to be RNase free. Testing each batch before use may be a prudent step.

Disposable plasticware: Disposable plasticware greatly reduce the possibility of contaminating your samples. In the event of a contamination, they also minimize the spread of the contamination. The use of disposable tips, tubes, etc. is therefore highly recommended.

Tetro Reverse Transcriptase

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
10,000 Units	BIO-65060
4 x 10,000 Units	BIO-65051

Components	10,000 Units
Tetro Reverse Transcriptase	1 x 50µl
5x Reaction Buffer	1 x 1.2ml

Features:
- **Unrivalled stability**
- **Working temperature range 37-42°C**
- **Highly sensitive for enhanced cDNA yield**
- **Produces high quality cDNA ideal for real-time PCR**
- **Reverse transcribes RNA templates up to 9Kb**

Applications:
- **First strand cDNA synthesis for real-time PCR**
- **cDNA library construction**
- **mRNA 5' end mapping by primer extension**
- **Dideoxynucleotide sequencing**
- **End-labelling of DNA**

Description: Tetro Reverse Transcriptase is a Moloney Murine Leukaemia Virus (MMLV) Reverse Transcriptase, which exhibits high stability, with no loss of activity following 1 week at room temperature. Tetro Reverse Transcriptase is highly sensitive even when the amount of template is a limiting factor (fig. 1), with highly efficient and sensitive transcription, from as little as 100pg, up to 2mg of RNA (fig. 2).

Many RNA transcripts form stable secondary structures at lower temperatures, making them less suitable as templates for RT-PCR at those temperatures.

Tetro Reverse Transcriptase is suitable for first-strand cDNA synthesis, with total RNA, mRNA and *in vitro* transcribed RNA and shows excellent performance with gene-specific primers, Oligo (dT) as well as random hexamers, making it perfect for cDNA library construction and the production of templates for RT-PCR analysis of gene expression.

Concentration: 200u/µl.

Storage Conditions: Tetro Reverse Transcriptase can be stored for 12 months at -20°C. 1x solutions should be prepared fresh before use.

Product Citations:

1. Kemp, M. W., *et al. Reproductive Sci.* **18(1)**, 88-98 (2010).
2. Baxter, S. W., *et al. PLoS Genet.* **6(1)**, e1000802 (2010).
3. Comerford, I., *et al. Blood* **116(20)**, 4130-4140 (2010).
4. Corripio-Miyar, Y., *et al. Mol. Immunol.* **46(10)**, 2098-2106 (2009).
5. Chen, Y., *et al. Blood* **114(1)**, 40-48 (2009).
6. Le, H. K., *et al. Can. Immunol. Immunother.* **58(10)**, 1565-1576 (2009).

Associated Products	Cat. No.	Page
Tetro cDNA Synthesis Kit	BIO-65042	37
Oligo $(dT)_{18}$ Primer Mix	BIO-38029	38
Random Hexamer Primer Mix	BIO-38028	38
RiboSafe RNase Inhibitor	BIO-65027	39
dNTP Set	BIO-39025	77

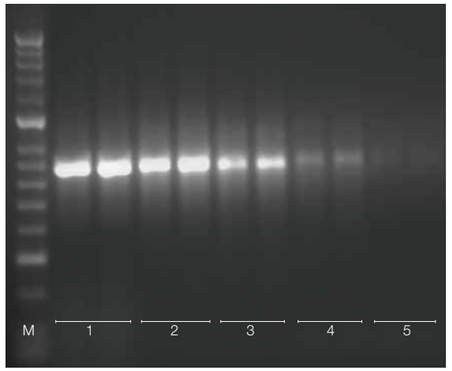


Fig. 1 High sensitivity on Mouse Total RNA.
A ten-fold serial dilution of Elite Mouse NIH3T3 Total RNA (1µg to 100pg) was reverse transcribed using 50 Units of Tetro Reverse Transcriptase and oligo $dT_{(18)}$ in a 20µl reaction volume. The resultant cDNA was then used as template in a PCR using primers for amplification of a 700bp fragment from mouse β-actin. PCR was performed using IMMOLASE in a 50µl reaction. Lanes 1-5 correspond to PCR product from the serial dilution above, reactions were carried out in duplicate. Hyperladder II (M).

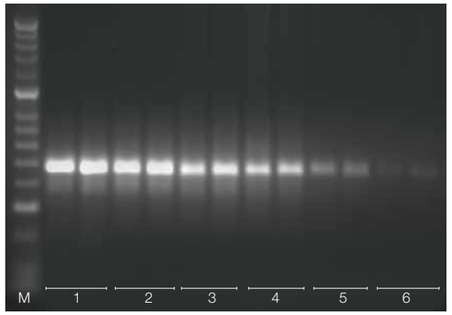


Fig. 2 High sensitivity on Human DNA.
A ten-fold serial dilution of Elite Human HeLa Total RNA (1µg to 10pg) was reverse transcribed using 50 Units of Tetro Reverse Transcriptase and oligo $dT_{(18)}$ in a 20µl reaction volume. The resultant cDNA was then used as a template in a PCR using primers for amplification of a 470bp fragment from human GAPDH. PCR was performed using IMMOLASE in a 50µl reaction. Lanes 1-5 correspond to PCR product from the serial dilution above, reactions were carried out in duplicate. Hyperladder II (M).

MyTaq™ One-Step RT-PCR Kit

NEW

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
10 Reactions	BIO-65047
25 Reactions	BIO-65048
100 Reactions	BIO-65049

Components	10 Reactions	25 Reactions	100 Reactions
MyTaq One-Step Mix (2x)	1 x 250µl	1 x 625µl	2 x 1.25ml
RiboSafe Inhibitor (10u/µl)	1 x 10µl	1 x 25µl	1 x 100µl
Reverse transcriptase	1 x 5µl	1 x 12.5µl	1 x 50µl
DEPC-treated Water	1 x 1.8ml	1 x 1.8ml	1 x 1.8ml

Features:
- **Extremely sensitive blend of RT and novel hot-start MyTaq**
- **Highly optimized for detection of low-copy genes**
- **Overcomes secondary structure in difficult and GC-rich targets**
- **High-quality, full-length cDNA from as little as 3pg of total RNA**

Application:
- **Gene-expression analysis**
- **Transcription analysis**
- **cDNA cloning**
- **Multiplex RT-PCR**

Description: MyTaq™ One-Step RT-PCR Kit has been designed for extremely sensitive and highly reproducible first-stand cDNA synthesis and subsequent PCR in a single tube (fig. 1). The kit contains the latest advances in buffer chemistry, including Bioline's ultra-pure dNTPs, together with reverse transcriptase (RT) and our new generation of very high performance, antibody-mediated hot-start DNA polymerase (MyTaq HS). This ensures that MyTaq One-Step RT-PCR Kit produces fast, highly-specific and ultrasensitive products for downstream applications.

MyTaq One-Step Kit consists of reverse transcriptase, 2x MyTaq HS Mix and a potent RNase Inhibitor, RiboSafe, that are added together to create a simple to use all-in-one mix.

The kit is ideal for determining the presence or absence of RNA templates and quantifying expression through qualitative, semi-quantitative or quantitative analysis of RNA transcription levels, and the one-step format is also perfect for the synthesis of double-stranded cDNA products for subsequent gene-expression analysis.

The cDNA can be synthesized with starting amounts of RNA template from 3pg to 1µg, over a broad temperature range (up to 50°C (fig. 1) to overcome secondary structure and GC-rich sequences), prior to heating to 95°C to inactivate reverse transcriptase and simultaneously to activate the MyTaq™ HS.

Storage Conditions: MyTaq One-Step RT-PCR Kit can be stored for 6 months at -20°C.

Associated Products	Cat. No.	Page
CH3-Blue 10^8 Chemically Competent Cells	BIO-85039	49
Quick-Stick Ligase	BIO-27027	53
HyperLadder I	BIO-33025	85
Agarose Tablets	BIO-41028	94

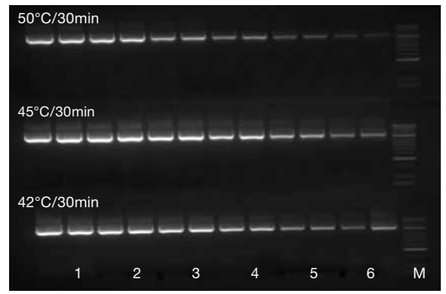


Fig. 1. Broad temperature range of MyTaq One-Step RT-PCR Kit
A serial dilution of mouse total RNA in duplicate (10ng, 2ng, 400pg, 80pg, 16pg and 3pg; lanes 1-6 respectively), was used in a reverse transcription reaction for 30min and then amplified with RN18S-1000 primers to produce a 1kb fragment. The cycling was performed under the following conditions: 95°C for 2min, followed by 40 cycles at 95°C for 30s and 58°C for 60s. HyperLadder II (M) (BIO-33039). The reverse transcriptase in the MyTaq One-Step RT-PCR Kit was able to deliver high quality cDNA even at 50°C over a broad dynamic range.

Tetro cDNA Synthesis Kit

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
30 Reactions	BIO-65042
100 Reactions	BIO-65043

Components	30 Reactions	100 Reactions
5x RT Buffer	1 x 120µl	1 x 400µl
Reverse Transcriptase (200u/µl)	1 x 30µl	1 x 100µl
RiboSafe RNase Inhibitor (10u/µl)	1 x 30µl	1 x 100µl
dNTP Mix, 10mM Total	1 x 30µl	1 x 100µl
Oligo $(dT)_{18}$ Primer Mix	1 x 30µl	1 x 100µl
Random Hexamer Primer Mix	1 x 30µl	1 x 100µl
DEPC-treated Water	1 x 1.2ml	1 x 1.2ml

Features:

- **Generate high quality cDNA for any downstream application**
- **Highly suited to low concentrations of total RNA down to 100pg**
- **Convenient, reliable, cost-effective**
- **Reverse transcribes RNA templates up to 9Kb**

Applications:

- **First-strand cDNA synthesis for real-time PCR**
- **Construction of cDNA libraries**
- **2-step RT-PCR assays**
- **Generation of probes for hybridization**
- **Gene cloning**

Description: The Tetro cDNA Synthesis Kit contains all necessary components to generate cDNA from any RNA template. The generated cDNA is suitable for PCR with gene-specific primers or for other downstream applications. The kit contains reverse transcriptase and is suitable for first-strand cDNA synthesis, cDNA library construction, and the production of templates for PCR amplification (fig. 1).

The Tetro cDNA Synthesis Kit is optimized for reverse transcriptase reactions over a wide range of total RNA concentrations (100pg-2µg), such that long and low-abundance transcripts can be detected by amplification after cDNA synthesis. The kit contains oligo $(dT)_{18}$ and random hexamer primers together with control RNA template. The kit components are fully optimized to generate maximum yields of full-length cDNA. The dNTPs included in the kit are manufactured by Bioline and are 99% pure.

Storage Conditions: The Tetro cDNA Synthesis Kit can be stored for 12 months at -20°C.

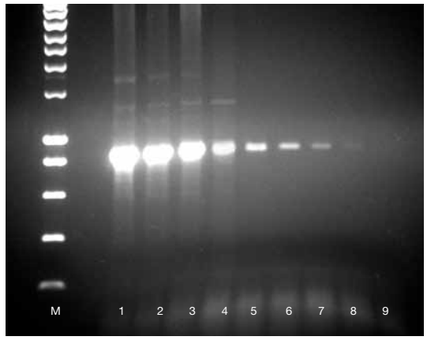


Fig. 1 High Sensitivity.
Total HeLa RNA was reverse-transcribed using Reverse Transcriptase and Oligo $(dT)_{18}$ primer in a 20µl reaction. Lanes: 50ng (1), 25ng (2), 10ng (3), 1ng (4), 500pg (5), 250pg (6), 100pg (7), 50pg (8) and 0pg (9). Subsequently, 5µl of each reaction was used in conjunction with β-actin specific primers to amplify an 860bp band from human mRNA. HyperLadder I (M). High sensitivity was observed with this serial dilution experiment.

Product Citations:

1. Morrow, C. A., *et al. Acta Cryst* **66(9)**, 1104-1107 (2010).
2. Kerr, B., *et al. PLoS ONE* **5(7)**, e11534 (2010).
3. Paliege, A., *et al. Kidney Int.* **77**, 312–318 (2010).
4. Harwich, M. D., *et al. BMC Genomics* **11**, 375 (2010).
5. Giordani, L., *et al. J. Leukocyte Biol.* **86**, 261-271 (2009).
6. Passante, E., *et al. Immflam. Res.* **58(9)**, 611-618 (2009).

Associated Products	Cat. No.	Page
SensiFAST SYBR No-ROX Kit	BIO-98002	5
ISOLATE RNA Mini Kit	BIO-52042	66
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

Oligo $(dT)_{18}$

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	FINAL CONC.	PRESENTATION	CAT NO.
27µg	270ng/µl	100µl	BIO-38029

Application:

- **cDNA synthesis with a reverse transcriptase**

Description: Oligo $(dT)_{18}$ primer is suitable for use as a primer for first strand cDNA synthesis with a reverse transcriptase. The primer hybridizes to the poly-adenylated tail found on the 3' end of most eukaryotic mRNAs. Oligo $(dT)_{18}$ ensures that the 3' end of mRNAs are represented. The primer is supplied as 100µl at 270ng/µl. Use 1µl in a 20µl reverse transcription reaction.

Primer sequence:
5'-d (TTT TTT TTT TTT TTT TTT)-3'

Storage Conditions: Oligo $(dT)_{18}$ can be stored for 12 months at -20°C.

Product Citations:

1. Singh, N., *et al. Development. Biol.* **350**, doi:10.1016/j.ydbio.2011.01.017 (2011).
2. Kisiswa, L., *et al. Experimental Eye Res.* **91(5)**, 739-747 (2010).
3. Min, D., *et al. Am. J. Physiol. Renal. Physiol.* **299**, C1212-C1219 (2009).
4. Domin, N., *et al. Microbiol.* **155**, 3903-3912 (2009).

Random Hexamer Primers

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	FINAL CONC.	PRESENTATION	CAT NO.
25µg	50ng/µl	500µl	BIO-38028

Application:

- **cDNA synthesis using a reverse transcriptase**
- **DNA synthesis using Klenow Fragment**
- **DNA probe synthesis for use in Northern and Southern blots, and *in situ* hybridization applications**

Description: Random Hexamer Primers consist of a mixture of oligonucleotides representing all possible hexamer sequences. Random Hexamer Primers are commonly used for priming single-stranded DNA or RNA for extension by DNA polymerases or reverse transcriptases. During cDNA generation, random priming gives random coverage to all regions of the RNA to generate a cDNA pool containing various lengths of cDNA. Random priming is incapable of distinguishing between mRNA and other RNA species present in the reaction. Supplied in 500µl at a concentration of 50ng/µl.

Primer sequence:
5' - d (NNNNNN) -3' N = G, A, T or C

Storage Conditions: Random Hexamer Primers can be stored for 12 months at -20°C.

Product Citations:

1. Belteki, G., *et al. J, Clin. Endo. Met.* **95(8)**, 3798-3805 (2010).
2. Glanville, E. J. & Seebacher, F. *Comp. Biochem. Physiol.* **155(3)**, 383-391 (2010).
3. Walter, I & Seebacher, *F. J. Expt. Biolo.* **212**, 2328-2336 (2009).
4. Konrad, A., *et al. J. Virol.* **83(6)**, 2563-2574 (2009).

NTP Set & Mix

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	FINAL CONC.	PRESENTATION	CAT NO.
NTP Set			
4 x 25µmol	100mM	4 x 250µl	BIO-39052
NTP Mix			
100µmol	100mM	1ml	BIO-39050

Features:

- **Validated for *in vitro* transcription**
- **DNase, RNase and Nickase free**
- **98% pure by HPLC**
- **Convenient, pre-optimized mix available**

Applications:

- ***In vitro* transcription reactions**
- **Production of RNA probes and transcripts**

Description: Manufactured by Bioline in a purpose-built facility, the ultra-pure NTP Set consists of 4 separate 100mM solutions (ATP, GTP, CTP, and UTP, (pH 7.5)) as sodium salts. For *in vitro* RNA synthesis, mix equal volumes of all separate NTP solutions.

The ultra-pure NTP Mix is a solution containing 25µmol of each ATP, GTP, CTP and UTP (pH 7.5) as sodium salts in a convenient mix at 100mM (total NTP concentration).

Storage Conditions: NTPs and NTP mix can be stored for 12 months at -20°C. Avoid multiple freeze/thaw cycles. For long-term storage, aliquoting is recommended.

Product Citations:

1. Llarena, M., *et al. Biochim. Biophys. Acta* **1760(12)**, 1819-1826 (2006).
2. Peyvandi, F., *et al. Blood* **97(4)**, 960-965 (2001).

DEPC-treated Water

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 x 10ml	BIO-38030
1 Liter	BIO-38031

Features:

- **Ideal for RNA work**
- **DNase/RNase free**
- **Ultra-pure 18.2MΩ**

Applications:

- **For use in RNA applications**

Description: Bioline DEPC-treated water is deionised, high-quality molecular grade water, which is ready-to-use with RNA and requires no preparation, mixing or autoclaving. DEPC-treated water is prepared by treating ultra-pure 18.2MΩ PCR water with diethylpyrocarbonate (DEPC), and is then autoclaved to inactivate the DEPC.

Storage Conditions: DEPC-treated water can be stored for 12 months at -20°C.

Product Citations:

1. Boldorini, R., *et al. J. Med. Virol.* **82(12)**, 2127-32 (2010).
2. Burrows, C., *et al. NAR* **38(16)**, 5542-5553 (2010).
3. Cervelló, I., *et al. Human Reprod.* **22(1)**, 45-51 (2007).
4. Carrigg, C., *et al. Appl. Microbiol. Biotechnol.* **77(4)**, 955-964 (2007).

RiboSafe RNase Inhibitor

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
2500 Units	40u/µl	BIO-65027
10,000 Units	40u/µl	BIO-65028

Features:
- **Complete inhibition of RNase A, B and C**
- **Significantly increases RT-PCR sensitivity**
- **DNase/RNase and Nickase free**
- **No inhibition of polymerase/transcriptase activity**
- **Stable over a wide range of pH, temperatures and DTT concentrations**

Applications:
- **RNA purification**
- **cDNA preparation by reverse transcription**
- **RNA sequencing**
- ***in vitro* RNA transcription**

Description: Bioline Ribonuclease Inhibitor (RiboSafe RNase Inhibitor) is a recombinant protein which completely inhibits a broad spectrum of eukaryotic RNases, including RNases A, B and C by binding non-covalently in a 1:1 ratio (fig. 1 & 2). RiboSafe shows no inhibition of polymerase (fig. 3) or transcriptase activity (fig. 4) and it is not effective against RNase H, T1, S1-nuclease or RNase from *Aspergilus*. With an association constant of 10^{14}M, RiboSafe is useful in any applications where the presence of RNases is a potential problem. RiboSafe RNase Inhibitor is tested for activity, SDS-PAGE purity, and the absence of endonucleases, nickases and exonucleases. The enzyme is supplied at a concentration of 40u/µl.

Storage Conditions: RiboSafe RNase Inhibitor can be stored for 12 months at -20°C.

Product Citations:

1. Gollan, P. J. & Bhave, M. *Plant Physiol. Biochem.* **48(8)**, 655-662 (2010).
2. Wu, Y-C., *et al. Blood* **116(7)**, 1070-1078 (2010).
3. Chatterjee, A. & Chatterji, U. *Reprod. Biol. Endocrinol.* **8**, 80 (2010).
4. Lamprecht, R.L., *et al. Eur. J. Plant Pathol.* **123**, 105–110 (2009).
5. Castro, R., *et al. Mol. Immunol.* **45(2)**, 428-437 (2008).
6. Das, B.K., *et al. Fish & Shellfish Immunol.* **23(4)**, 825-830 (2007).

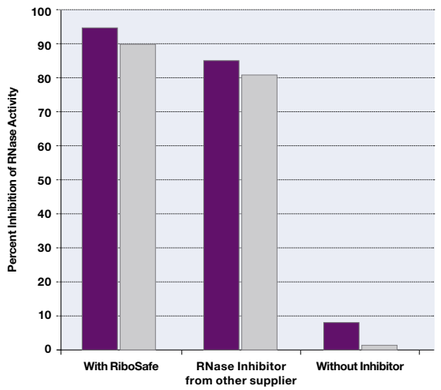


Fig. 1 RiboSafe RNase Inhibitor provides superior RNA protection.
Inhibition of RNase A by RiboSafe RNase Inhibitor and RNase Inhibitor from another supplier was assessed with the total Yeast RNA assay for the measurement of RNase activity (purple columns) and the pre-incubation-assay (grey columns). RiboSafe RNase Inhibitor blocks RNase A with higher efficiency than other commercially available RNase inhibitors.

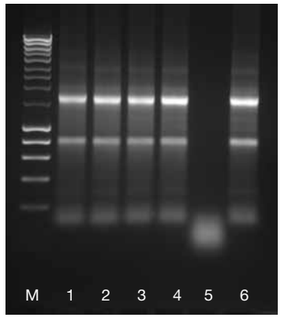


Fig. 2 RiboSafe inhibits increasing amounts of RNase A with high efficiency.
2µg of total human HeLa cell RNA was incubated with 20 Units of RiboSafe RNase Inhibitor and 2ng, 750pg, 250pg and 125pg of RNase A (lanes 1-4) at 37°C for 30 min. Controls were no RiboSafe RNase Inhibitor (lane 5) and total HeLa cell RNA (lane 6) and 2µg of total human HeLa cell RNA incubated with 125pg RNase A. HyperLadder I (M).

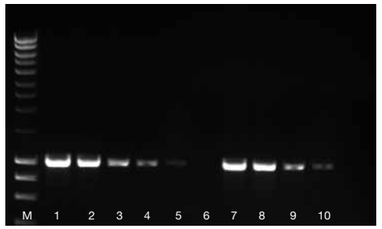


Fig. 3 RiboSafe shows no inhibition of polymerase.
A two-fold serial dilution of Total HeLa cell RNA (1µg - 0.075µg) was reverse transcribed in the presence and in the absence of RiboSafe RNase Inhibitor, followed by the amplification of a 1Kb fragment of the Angiotensin receptor II gene using (lanes 1-10). HyperLadder I (M).

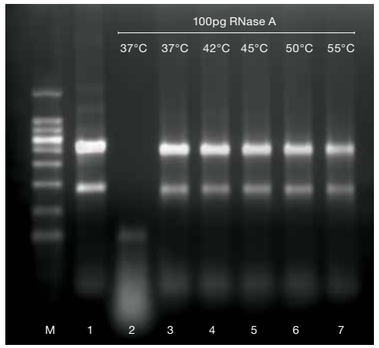


Fig. 4 RiboSafe RNase Inhibitor is active up to temperatures of 55°C.
2µg aliquots of total mouse RNA were incubated with 40 Units of RiboSafe RNase Inhibitor and 100pg of RNase A at various temperatures for 30 minutes. Lanes: RiboLadder Long (M), Total mouse RNA (1), Total mouse RNA with RNase A only (2), Total mouse RNA with RiboSafe RNase Inhibitor and RNase A (3-7).

Associated Products	Cat. No.	Page
dNTP Set	BIO-39025	77

Agarose, Molecular Grade

See page 93 for full product details

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
100g	BIO-41026
500g	BIO-41025

Features:
- **Excellent value and clarity**
- **Extremely pure**
- **DNase/RNase-free**

Applications:
- **DNA/RNA electrophoresis**
- **Ideal for separating nucleic acids of a wide range of sizes, especially large fragments ≥1000bp**

Description: Bioline's Agarose, Molecular Grade is ideally suited for routine analysis of nucleic acids by gel electrophoresis and blotting. Bioline's extremely pure molecular biology grade agarose has no detectable DNase or RNase activity and forms strong gels with low background.

Storage Conditions: Agarose can be stored for 12 months in a cool, dry place.

Agarose Tablets

See page 94 for full product details

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	PRESENTATION	CAT NO.
150g	300 x 0.5g	BIO-41028
300g	600 x 0.5g	BIO-41027

Features:
- **Exact pre-weighed tablets**
- **DNase/RNase free**
- **Fast and convenient**
- **Greater gel-to-gel consistency**

Applications:
- **DNA/RNA electrophoresis**
- **Ideal for separating nucleic acids of a wide range of sizes**

Description: Bioline's Agarose Tablets (DNase/RNase free) are designed to provide a cleaner, safer, no-mess environment and a more convenient option than powdered agarose. Each tablet contains a pre-determined amount of agarose (0.5g), eliminating the need to weigh out loose agarose powder.

Storage Conditions: Agarose tablets can be stored for 12 months in a cool dry place.

Agarose, HiRes Grade

See page 93 for full product details

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
100g	BIO-41029

Features:
- **Excellent value and clarity**
- **High gel strength for easy-to-handle flexible gels**
- **DNase/RNase-free**

Applications:
- **DNA/RNA Electrophoresis**
- **Ideal for separating nucleic acid fragments ≤1000bp**

Description: Agarose HiRes Grade offers consistent high resolution of nucleic acid fragments below 1000bp. The agarose is capable of separating DNA/RNA fragments differing by only a few basepairs. Agarose HiRes Grade offers high gel strength, which provides easy-to-handle, flexible gels for electrophoresis of small DNA and RNA fragments.

Storage Conditions: Agarose can be stored for 12 months in a cool, dry place.

TRIsure™

See page 69 for full product details

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
TRIsure	
100ml	BIO-38032
200ml	BIO-38033
TRIsure Plus Bacterial RNA Isolation Kit	
100 Preps	BIO-38038
200 Preps	BIO-38039
Bacterial Enhancement Reagent	
20ml	BIO-38037

Features:
- **Column-free, ready-to-use solution**
- **Isolation of high-quality RNA in 60 minutes**
- **Perfect for a wide variety cells, tissues and bacteria**
- **Isolated RNA is ready for downstream applications**

Applications:
Isolation of RNA from:
- **Animal tissues**
- **Cultured cells**
- **Bacteria**
- **Plant tissues**

Description: TRIsure is a ready-to-use reagent for the isolation of high quality total RNA from diverse biological materials, including animal tissues, bacteria and cells, as well as plant tissues rich in polysaccharides and proteoglycans. TRIsure maintains the integrity of the extracted RNA, while disrupting cells and subsequently dissolving cell components. High yields of high quality RNA with minimal genomic DNA contamination, is extracted from various samples (fig. 1).

To enhance the isolation of RNA from hard-to-lyse Gram-positive and Gram-negative bacterial cells, Bioline has developed **TRIsure Plus Bacterial RNA Isolation Kit**. The kit contains a proprietary **Bacterial Enhancement Reagent**, in addition to TRIsure, greatly improving the isolation of RNA by promoting protein degradation and inactivating endogenous RNases.

Storage Conditions: TRIsure is stored at +4°C and Bacterial Enhancement Reagent is stored at room temperature for up to 12 months.

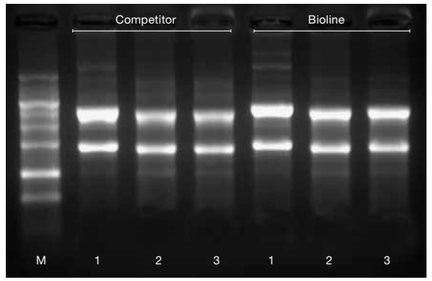


Fig. 1 High quality and yield of RNA extracted using TRIsure.
RNA extracted from 3T3 cells and mouse tissue, using TRIsure and Competitor reagent. Lanes: 4µg of total RNA from 3T3 cells (1), 4µg of total RNA from mouse kidney tissue (2), 4µg of total RNA from mouse liver tissue (3), RiboLadder Long (M)

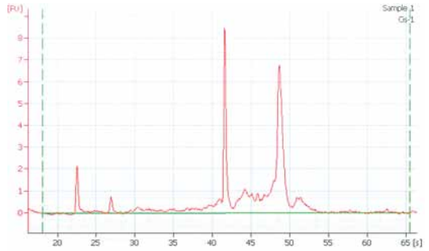


Fig. 2 Isolation of high quality RNA.
Log phase culture of *Bacillus subtilis* was pre-treated with Bacterial Enhancement Reagent, followed by isolation of RNA using TRIsure. The RNA was analyzed using Bioanalyzer 2100 (Agilent Technologies) and was found to be of high quality and purity.

ISOLATE RNA Mini Kit

See page 66 for full product details

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52042
50 Preps	BIO-52043
250 Preps	BIO-52044

Features:
- **Rapid protocol: 15-20 minutes**
- **High purity RNA**
- **Complete removal of genomic DNA**
- **Isolated RNA is ready for downstream applications**

Applications:
Isolation of RNA from:
- **Animal tissue**
- **Eukaryotic cells**
- **Bacterial cells**

Description: ISOLATE RNA Mini Kit is specially designed for the fast and efficient isolation of extremely pure total RNA from a variety of samples. The kit is compatible with animal tissues, cultured cells and bacterial cells. Following lysis the RNA is applied to a spin column to selectively remove genomic DNA and cell debris, to yield pure, high quality RNA.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

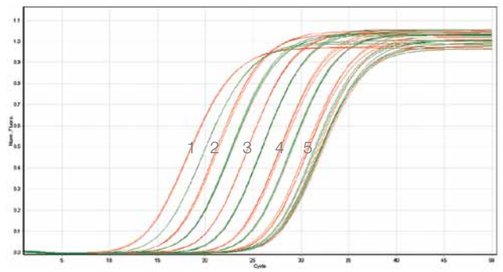


Fig. 1 Superior performance in real time PCR applications.
RNA was isolated from mouse 3T3 cells diluted 10-fold (14000 cells, 1400 cells, 140 cells, 14 cells, 1.4 cells, Lanes 1-5 respectively) using ISOLATE RNA Mini Kit and Supplier Q's kit. Subsequently, real-time reverse transcriptase reactions were performed using SensiFAST SYBR No-Rox One-Step Kit.
Red traces: RNA isolated using ISOLATE RNA Mini Kit.
Green traces: RNA isolated using Supplier Q's kit.

ISOLATE Plant RNA Mini Kit

See page 67 for full product details

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52039
50 Preps	BIO-52040
250 Preps	BIO-52041

Features:
- **Rapid protocol: 30 minutes after homogenization**
- **High purity and integrity plant RNA**
- **Complete removal of genomic DNA**
- **Isolated RNA is ready for downstream applications**

Applications:
Isolation of RNA from:
- **Fresh plant tissues**
- **Frozen plant tissues**

Description: ISOLATE Plant RNA Mini Kit is specially designed for the fast and efficient isolation of extremely pure total RNA from a variety of plant tissues, including leaves, bark, roots, fruits, etc. (fig. 1). Up to 100mg starting material can be processed per spin column. Following lysis the RNA is applied to a spin column to selectively remove genomic DNA and cell debris, to yield pure, high quality RNA.

The isolated RNA shows excellent performance in downstream applications such as real-time PCR reverse transcription, Northern blot analysis, microarrays and RNA protection assays.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

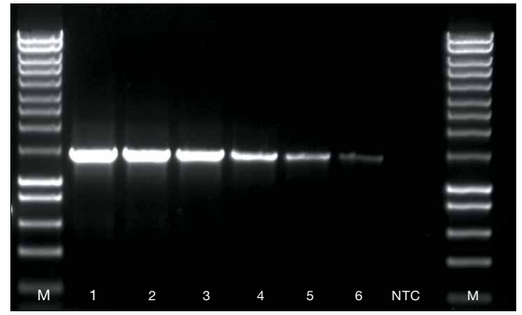


Fig. 2 High yield cDNA obtained from isolated RNA .
RNA was isolated from 20mg freeze-dried budding leaves of *Arabidopsis thaliana* using ISOLATE Plant RNA Mini Kit. cDNA was synthesized using Tetro cDNA Synthesis Kit and diluted serially. PCR was performed using MangoMix to amplify a 1.4Kb fragment of the allene oxide synthase gene. Products were run on a 1.5% agarose gel. Lanes: HyperLadder I (M), 1µl cDNA (1), 2-fold dilution (2), 4-fold dilution (3), 8-fold dilution (4), 16-fold dilution (5), 32-fold dilution (6), negative control, showing no genomic DNA carryover (NTC).

Capture the Gene, Express the Protein

Bioline offers a wide range of chemically competent and electrocompetent cells for cloning, which include α-Select Bronze Efficiency Competent Cells for subcloning, α-Select Gold Efficiency Competent Cells for library construction and competent cells for specialized applications. In general, lower efficiency competent cells are suitable for most purposes, such as transforming purified plasmid DNA, whereas high-efficiency competent cells are suitable for more difficult cloning and library construction.

Our BL21 competent cells are for protein expression from vectors containing *E. coli* promotors and are available for either T7 promotor or non-T7 promotor expression. The *E. coli* Strain B derived BL21 competent cells are suitable for high-level expression of a variety of recombinant proteins, grown in minimal media BL21 cells are deficient in key proteases.

In addition to competent cells, this chapter contains additional reagents for cloning, such as ready-to-use antibiotic solutions.

Cloning and Protein Expression

The PCR Company • BIOLINE since 1992 • The PCR Company

Competent Cell Selection Table

Efficient DNA transformation of competent cells is essential for successful Cloning and Protein Expression applications. Bioline offers a wide range of *E. coli* host strains to meet your requirements.

We maintain rigorous quality control standards to ensure lot-to-lot consistency and the highest transformation efficiencies possible.

The Bioline Competent Cell Guide is designed to help you select the most appropriate competent cells for your cloning or expression application. Each host strain of *E. coli* has different characteristics and for optimal results, it is important to use the strain that best suits your application.

The Bioline Competent Cell Selection Table below provides a summary of the efficiencies, traits and ideal applications for each Bioline competent cell strain.

Cloning

Strain	Efficiency cfu/µg pUC19	Competency: Chemical C Electrocomp E	Strain background	Blue white screening (*lacZ*)		Recombination deficient (*rec*A)	Endonuclease deficient (*end*A)	Restriction deficient ($hsdR_{K-}$)	Methyl restriction deficient (*mcr*A, *mcr*B, *mrr*)	Single-strand ability (F' episome)	Phage resistance (*fhu*A, *ton*A *or*T1R)	Unmethylated DNA (*dam dcm*)
α-**Select** Gold Efficiency	≥1 x 10^9	C	K12	✓		✓	✓	✓				
α-**Select** Silver Efficiency	≥1 x 10^8	C	K12	✓		✓	✓	✓				
α-**Select** Bronze Efficiency	≥1 x 10^7	C	K12	✓		✓	✓	✓				
α-**Select** Electrocompetent	≥5 x 10^9	E	K12	✓		✓	✓	✓				
α-**Select** Gold Efficiency T1-Res	≥1 x 10^9	C	K12	✓		✓	✓	✓			✓	
α-**Select** Silver Efficiency T1-Res	≥1 x 10^8	C	K12	✓		✓	✓	✓			✓	
CH3-Blue 10^8 Chemically competent cells	≥1 x 10^8	C	K12	✓		✓	✓		✓			
CH3-Blue 10^9 Chemically competent cells	≥1 x 10^9	C	K12	✓		✓	✓		✓			
ElectroSHOX Electrocompetent cells	≥1 x 10^{10}	E	K12	✓		✓	✓		✓			
BIO*Blue* 10^8 Chemically competent cells	≥1 x 10^8	C	K12	✓		✓	✓	✓		✓		
BIO*Blue* 10^9 Chemically competent cells	≥1 x 10^9	C	K12	✓		✓	✓	✓		✓		
dam-/dcm- Chemically competent cells	≥1 x 10^7	C	K12					✓	✓		✓	✓

Protein Expression

Strain	Efficiency cfu/µg pUC19	Competency: Chemical C Electrocomp E	Strain background	Restriction deficient ($hsdS_B$)		Protease deficient (*omp*T)	T7 RNA polymerase	Deficient in cytosine metabolism (*dcm*)	Deficient in galactose metabolism (*gal*)	Ideal applications
BL21	≥1 x 10^7	C	B	✓		✓		✓	✓	Non T7 promoter expression
BL21 (DE3)	≥1 x 10^7	C	B	✓		✓	✓	✓	✓	T7 promoter expression
BL21 (DE3) PlysS	≥1 x 10^7	C	B	✓		✓	✓	✓	✓	Regulation of T7 promoter expression
BL21 (DE3) PlysE	≥1 x 10^7	C	B	✓		✓	✓	✓	✓	Regulation of T7 promoter expression

✓ Recommended

Transformation Efficiency of α-Select Competent Cells

Comparison of the transformation efficiency of α-Select Competent Cells with increasing size of DNA is shown in the table below. Transformations were performed with supercoiled DNA of the indicated size using 50-100µl of α-Select Chemically Competent Cells (100µl for Silver and 50µl for Gold) and 40µl of α-Select Electrocompetent Cells. Results are in colony-forming units (cfu)/µg of DNA and represent the average of three or more tests.

Comparison Table of the transformation efficiency of α-Select Competent Cells with increasing size of DNA.

DNA	α-Select Silver Chemically Competent	α-Select Gold Chemically Competent	α-Select Electrocompetent
pUC19 - 2.7Kb	2.2 x 10^8	1.8 x 10^9	2.8 x 10^9
8.2Kb plasmid	3.6 x 10^7	3.8 x 10^8	6.2 x 10^8
13.3Kb plasmid	2.8 x 10^7	3.0 x 10^8	4.4 x 10^8
50Kb cosmid	3.6 x 10^5	3.8 x 10^7	5.6 x 10^7

pUC 19 transformed α-Select Competent cells, diluted and grown on agar containing ampicillin.

α-Select Competent Cells

Storage -80°C | Shipped under Dry Ice

PACK SIZE	EFFICIENCY	CAT NO.
α-Select Bronze Efficiency		
2ml (10 x 200µl)	≥1 x 10^7 cfu/µg pUC19	BIO-85025
α-Select Silver Efficiency		
2ml (10 x 200µl)	≥1 x 10^8 cfu/µg pUC19	BIO-85026
α-Select Gold Efficiency*		
1ml (20 x 50µl)	≥1 x 10^9 cfu/µg pUC19	BIO-85027
α-Select Electrocompetent		
1ml (10 x 100µl)	≥5 x 10^9 cfu/µg pUC19	BIO-85028

*single use aliquots

Features:
- **Comparable to DH5α™**
- **Chemically Competent or Electroporation Grade**
- **Choice of efficiencies: ≥10^7, ≥10^8, or ≥10^9 cfu/µg of pUC19**
- **Accommodates larger plasmids**

Applications:
- **Transformation of cloned DNA into bacterial cells**
- **Ideal for subcloning**
- **Generating cDNA libraries**
- **Ideal for difficult clone construction/blunt end ligations**
- **Blue/white color screening**

Description: α-Select Competent Cells contain a *lac*Z marker that provides α -complementation of the ß-galactosidase gene for blue/white color screening. The cells are ideal for generating cDNA libraries and subcloning. α-Select Competent Cells also provide *rec*A1 and *end*A1 markers to minimize recombination and enhance the quality of plasmid DNA. pUC19 DNA is also provided as a positive control.

Genotype: F- *deo*R *end*A1 *rec*A1 *rel*A1 *gyr*A96 *hsd*R17(r_k^-, m_k^+) *sup*E44 *thi*-1 *pho*A Δ(*lac*ZYA-*arg*F)U169 ϕ80*lac*ZΔM15 λ$^-$

α-Select Competent Cells are available in a range of transformation efficiencies:
Bronze Efficiency ≥10^7 cfu/µg of pUC19
Silver Efficiency ≥10^8 cfu/µg of pUC19
Gold Efficiency ≥10^9 cfu/µg of pUC19 in convenient 50µl aliquots
Electrocompetent ≥5 x 10^9 cfu/µg of pUC19

Storage Conditions: α-Select Competent Cells can be stored for 6 months at -80°C.

Product Citations:

1. Zane, G. M., *et al. Appl. Environ. Microbiol.* **76(16)**, 5500-09 (2010).
2. Hornsey, M., *et al. J. Antimicrob. Chemother.* **65 (8)**, 1589-1593 (2010).
3. Broeham, G., *et al. Insect Biochem. Mol. Biol.* **40(3)**, 274-283 (2010).
4. Goldfinch, N., *et al. Vet. Res.* **41(5)**, 62 (2010).
5. Thaler, A. D., *et al. Conservation Gene. Res.* DOI: 10.1007/s12686-010-9174-9 (2010).
6. Allerston, C.K., *et al. Mol. Gene. Metab.* **98(1-2)**, 198-202 (2009).

Associated Products	Cat. No.	Page
Quick-Stick Ligase	BIO-27027	53
T4 DNA Ligase	BIO-27026	54
X-GAL	BIO-37035	95
IPTG	BIO-37036	96

α-Select Competent Cells Bacteriophage T1-Resistant

Storage -80°C | Shipped under Dry Ice

PACK SIZE	EFFICIENCY	CAT NO.
α-Select Silver Efficiency T1-Resistant		
2ml (10 x 200µl)	≥1 x 10^8 cfu/µg pUC19	BIO-85029
α-Select Gold Efficiency T1-Resistant		
1ml (20 x 50µl)	≥1 x 10^9 cfu/µg pUC19	BIO-85030

Features:
- **Bacteriophage T1-Resistant**
- **≥10^8 and ≥10^9 transformation efficiencies available**
- **Reduced recombination of cloned DNA (recA)**
- ***end*A1 mutation for improved plasmid quality**

Applications:
- **Blue/white color screening**
- **Construction of libraries**
- **Generation of cDNA libraries using plasmid-derived vectors**
- **High quality plasmid preparation**
- **Hosting H13mp cloning vectors**

Description: α-Select Competent Cells contain a *lac*Z marker that provides α-complementation of the ß-galactosidase gene for blue/white color screening. The cells are ideal for generating cDNA libraries and subcloning. α-Select Competent Cells also provide *rec*A1 and *end*A1 markers to minimize recombination and enhance the quality of plasmid DNA. pUC19 DNA is also provided as a positive control.

Both Silver and Gold Efficiency Chemically Competent Cells are available as bacteriophage T1-Resistant strains. Many laboratories have experienced bacteriophage T1 outbreaks, as T1 attacks *E. coli* and spreads rapidly. α-Select T1-Resistant cells protect samples from bacteriophage infection.

Genotype: F- *deo*R *end*A1 *rec*A1 *rel*A1 *gyr*A96 *hsd*R17(r_k^-, m_k^+) *sup*E44 *thi*-1 *pho*A Δ(*lac*ZYA-*arg*F)U169 ϕ80*lac*ZΔM15 λ$^-$

Bacteriophage T1-Resistant Chemically Competent Cells are available in two transformation efficiencies:
T1-Resistant Silver Efficiency ≥10^8 cfu/µg of pUC19
T1-Resistant Gold Efficiency ≥10^9 cfu/µg of pUC19 in convenient 50µl aliquots

Storage Conditions: α-Select Competent Cells Bacteriophage T1-Resistant can be stored for 6 months at -80°C.

Product Citations:

1. Stat, M., *et al. PLoS One* **6(1)**, e15854 (2011).
2. Hornsey, M. *et al. J. Antimicro. Agents* **35(5)**, 478-81 (2010).
3. Almeida-Vega, S., *et al. Am. J. Physiol. Gastrointest. Liver Physiol*, **296**, 414-23 (2009).
4. Schultz, J. K., *et al. J. Heredity* **100(1)**, 25-33 (2009).
5. Catlow, K., *et al. JBC* **282**, 17069-77 (2007).
6. Donato, J. J., *et al. PLoS Genet* **2(9)**, e141 (2006).

Associated Products	Cat. No.	Page
Quick-Stick Ligase	BIO-27027	53
T4 DNA Ligase	BIO-27026	54
X-GAL	BIO-37035	95
IPTG	BIO-37036	96

dam-/dcm- Chemically Competent Cells Bacteriophage T1-Resistant

Storage -80°C | Shipped under Dry Ice

PACK SIZE	EFFICIENCY	CAT NO.
1ml (10 x 100µl)	≥10^7 cfu/µg	BIO-85044

Features:
- **Lacks *dam* and *dcm* methylases**
- **Bacteriophage T1-Resistant**
- **≥10^7 transformation efficiency**
- **Convenient size**

Applications:
- **Generate plasmid DNA devoid of *dam* and *dcm* methylation**
- **Enable restriction digestion of plasmid DNA by methylation-sensitive endonucleases**
- **Stud methylation on expression or DNA repair**

Description: dam-/dcm- Chemically Competent Cells are an ideal host to generate plasmid DNA lacking in *dam* and *dcm* methylation. The absence of *dam* and *dcm* methylases in this strain prevents methylation at GATC and CC(A/T)GG sites, respectively. Plasmid DNA propagated and purified from this host can be digested by the many restriction enzymes otherwise inhibited by *dam* or *dcm* methylation. pUC19 DNA is also provided as a positive control. The transformation efficiency of the dam-/dcm- Chemically Competent Cells is 10^7 cfu/µg of pUC19.

Genotype: F$^-$ *dam*-13::*Tn*9(Cam^R) *dcm*-6 *ara*-14 *hisG*4 *leuB*6 *thi*-1 *lacY*1 *galK*2 *galT*22 *glnV*44 *hsdR*2 *xyl*A5 *mtl*-1 *rpsL* 136(Str^R) *rfb*D1 *ton*A31 *tsx*78 *mcr*A *mcr*B1

Storage Conditions: dam-/dcm- Chemically Competent Cells can be stored for 6 months at -80°C.

Associated Products	Cat. No.	Page
SureClean	BIO-37042	68
Quick-Stick Ligase	BIO-27027	53
IPTG	BIO-37036	96
X-GAL	BIO-37035	95

CH3-Blue Chemically Competent Cells

Storage -80°C | Shipped under Dry Ice

PACK SIZE	EFFICIENCY	CAT NO.
1ml (10 x 100µl)	≥1 x 10^8 cfu/µg pUC19	BIO-85039
1ml (20 x 50µl)	≥1 x 10^9 cfu/µg pUC19	BIO-85040

Features:
- **Lack *mcr*A, *mcr*BC, *mrr* and *hsd*RMS restriction systems**
- **≥10^8 and ≥10^9 transformation efficiencies available**
- **Convenient single use 50µl aliquots**
- **Minimum recombination events**

Applications
- **Cloning of methylated DNA**
- **Ideal for subcloning**
- **Generation of cDNA libraries**
- **Blue/white color screening**

Description: CH3-Blue Chemically Competent Cells are a highly efficient derivative of *E. coli* K12, ideal for the construction of cDNA libraries using plasmid derived vectors. To facilitate the cloning of DNA that contains methylcytosine or 5-hydroxymethylcytosine, CH3-Blue lacks the *E. coli* restriction systems *mcr*A, *mcr*BC, *mrr* and *hsd*RMS. The *lacZ* mutation allows blue/white color screening and α-complementation of recombinants. The *rec*A1 and *end*A1 markers minimize recombination events and improve the quality and yield of plasmid DNA.

Genotype: F$^-$ Δ*mcr*A Δ(*mrr-hsd*RMS-*mcr*BC) ϕ80*lacZ*ΔM15 Δ*lac*X74 *rec*A1 *end*A1 *ara* Δ139 Δ(*ara*, *leu*)7697 *galU galK rpsL*(Str^R) *nupG* λ$^-$

Storage Conditions: CH3-Blue Chemically Competent Cells can be stored for 6 months at -80°C.

Product Citations:
1. Thompson, K. M. *et al. FEMS Micro. Lett.* **305(2)**, 143-7 (2010).

Selection of pUC 19 with inserts (white colonies) from those with no inserts (blue) using transformed α-Select competent cells grown in agar containing ampicillin, X-GAL and IPTG.

Associated Products	Cat. No.	Page
IPTG	BIO-37036	96
Quick-Stick Ligase	BIO-27027	53
T4 DNA Ligase	BIO-27026	54
X-GAL	BIO-37035	95

ElectroSHOX Competent Cells

Storage -80°C | Shipped under Dry Ice

PACK SIZE	EFFICIENCY	CAT NO.
1ml (10 x 100µl)	≥10^{10} cfu/µg pUC19	BIO-85038

Features:
- **Highest efficiency available: >10^{10} cfu/µg**
- ***rec*A1 and *end*A1 markers to minimize recombination events**
- **Lacks *E. coli* K restriction-modification system, to facilitate cloning of methylated genomic DNA**
- **Convenient size**

Applications:
- **Construction of cDNA and genomic DNA libraries**
- **Ideal for transformation of large plasmids (>30Kb)**
- **Blue/white color screening**
- **Construction of libraries**
- **Efficient plasmid rescue from eukaryotic genomes**

Description: ElectroSHOX Competent Cells are highly efficient *E. coli*, ideal for the construction of cDNA or genomic libraries using electroporation. The *lacZ* mutation allows blue/white color screening and α-complementation of recombinants. The *rec*A1 and *end*A1 markers minimize recombination events and improve the quality and yield of plasmid DNA. In order to facilitate cloning of methylated genomic DNA, ElectroSHOX lacks *E. coli* K restriction-modification systems and is ideal for the transformation of large plasmids (>30Kb).

Genotype: F$^-$ *mcr*A Δ(*mrr-hsd*RMS-*mcr*BC) ϕ80*lacZ*ΔM15 Δ*lac*X74 *rec*A1 *end*A1 *ara* Δ139 Δ(*ara*, *leu*)7697 *galU galK rpsL*(Str^R) *nupG* λ$^-$

Storage Conditions: ElectroSHOX Competent Cells can be stored for 6 months at -80°C.

ElectroSHOX Competent Cells electroporated with plasmid and grown on MacConkey's agar.

Associated Products	Cat. No.	Page
Quick-Stick Ligase	BIO-27027	53
T4 DNA Ligase	BIO-27026	54
X-GAL	BIO-37035	95
IPTG	BIO-37036	96

BIO*Blue* Chemically Competent Cells

Storage -80°C | Shipped under Dry Ice

PACK SIZE	EFFICIENCY	CAT NO.
1ml (10 x 100µl)	≥1 x 10^8 cfu/µg pUC19	BIO-85036
1ml (20 x 50µl)	≥1 x 10^9 cfu/µg pUC19	BIO-85037

Features:
- **No need to select on minimal media plates**
- **≥10^9 transformation efficiencies available**
- **Convenient single use 50µl aliquots**
- **Premium quality DNA**

Applications
- **Blue/white color screening**
- **Single-stranded plasmid rescue**
- **Excellent host for M13 and related filamentous phage**
- **Ideal strain for preparation of high-quality plasmid DNA**
- **Routine cloning, using Lambda DNA or plasmid vectors**

Description: BIO*Blue* Chemically Competent Cells provide an ideal host for optimal preparation of both high-quality plasmid and Lambda phage vectors. The BIO*Blue* strain allows blue/white color screening through α-complementation of the ß-galactosidase gene. The *end*A1 phenotype allows production of high-quality plasmid DNA. Single-stranded DNA can be produced from plasmids containing a phage f1 origin. BIO*Blue* is also an excellent host for M13 and related filamentous phage, and supports blue/white plaque screening and phage production. Maintenance of the F' episome in this strain is facilitated via selection with tetracycline, unlike strains such as JM101 which require growth on minimal media. This strain is available in efficiencies of both >10^8 and >10^9 cfu/µg of pUC19.

Genotype: *rec*A1 *end*A1 *gyr*A96 *thi*-1 *hsd*R17(r_k^-, m_k^+) *sup*E44 relA1 *lac* [F' *pro*AB *lacI*^{q}ZΔM15 Tn*10*(Tet^r)]

Storage Conditions: BIO*Blue* Chemically Competent Cells can be stored for 6 months at -80°C.

Associated Products	Cat. No.	Page
Quick-Stick Ligase	BIO-27027	53
T4 DNA Ligase	BIO-27026	54
X-GAL	BIO-37035	95
IPTG	BIO-37036	96

BL21 Competent Cells

In order to express a given construct and synthesize large amounts of an encoded protein, specially engineered *E. coli* cells are often used. In such experiments the main points to consider are the type of promotor being used and the level of promotor control required.

Bioline offers a series of BL21 competent cells for optimal control of protein expression. BL21 is a general expression host allowing the use of a variety of different promotors for protein expression. BL21 (DE3) cells contain the T7 promotor expression system, which is under the control of the *lacUV*5 promotor and inducible by the addition of IPTG.

For the expression of proteins, which may be toxic prior to induction and therefore lethal to *E. coli*, the use of a system with tighter control of the T7 promotor, such as BL21 (DE3) pLysS, or BL21 (DE3) pLysE is recommended. Recombinant proteins that are non-toxic to *E. coli* are generally expressed at higher levels in BL21 (DE3) cells rather than in BL21 (DE3) pLysS or BL21 (DE3) pLysE. The pLysE plasmid provides the highest level of repression of the T7 RNA polymerase gene prior to induction.

The BL21 Competent Cell Selection Chart below is designed to help you select the most appropriate BL21 competent cells for your application.

Strain	BL21	BL21 (DE3)	BL21 (DE3) plysS	BL21 (DE3) plysE
Efficiency	dATP lithium 100mM solution	dCTP lithium 100mM solution	dGTP lithium 100mM solution	dGTP lithium 100mM solution
cfu/µg pUC19	≥1 x 10^7	≥1 x 10^7	≥1 x 10^7	≥1 x 10^7
Competency	Chemical	Chemical	Chemical	Chemical
Strain background	B	B	B	B
Restriction deficient (*hsdS$_B$*)	YES	YES	YES	YES
Protease deficient (*ompT*)	YES	YES	YES	YES
T7 RNA polymerase	NO	YES	YES	YES
Deficient in cytosine metabolism (*dcm*)	YES	YES	YES	YES
Deficient in galactose metabolism (*gal*)	YES	YES	YES	YES
Ideal applications	Non T7 promotor expression	T7 promotor expression	Regulation of basal T7 promotor expression	Regulation of basal T7 promotor expression
Stability	≤24 months	≤24 months	≤24 months	≤24 months

BL21 Competent Cells

Storage -80°C | Shipped under Dry Ice

PACK SIZE	EFFICIENCY	CAT NO.
BL21		
1ml (10 x 100µl)	≥1 x 10^7 cfu/µg pUC19	BIO-85031
BL21 (DE3)		
1ml (10 x 100µl)	≥1 x 10^7 cfu/µg pUC19	BIO-85032
BL21 (DE3) pLysS		
1ml (10 x 100µl)	≥1 x 10^7 cfu/µg pUC19	BIO-85033
BL21 (DE3) pLysE		
1ml (10 x 100µl)	≥1 x 10^7 cfu/µg pUC19	BIO-85034
BL21 Combo Pack		
1.5ml (15 x 100µl)	≥1 x 10^7 cfu/µg pUC19	BIO-85035

Features:
- **High-level protein expression**
- **Protease deficient**
- **Transformation efficiency: ≥1 x 10^7 cfu/µg of pUC19**
- **IPTG inducibility helps miminize toxic effects of some proteins**

Applications:
- **Non-T7 promotor protein expression: BL21**
- **T7 promotor expression: BL21 (DE3)**
- **Regulation of basal T7 promotor expression: BL21 (DE3) pLysS, BL21 (DE3) pLysE**

Description: BL21 is an all purpose strain used for protein expression from vectors containing *E. coli* promotors such as *trc*, *tac*, *lPL* and *ara*D. (This strain lacks a T7 polymerase gene and can be used for non-T7 RNA polymerase protein expression systems. For T7 promotor driven protein expression, this strain requires infection with Lambda CE6 bacteriophage, which provides the T7 RNA polymerase).

Genotype: F$^-$ *ompT hsdS$_B$*($r_B^-m_B^-$) *gal dcm*

BL21 (DE3) is a general-purpose host for T7 vector driven protein expression. This strain contains the T7 RNA polymerase gene controlled by the *lacUV*5 promotor. T7 RNA polymerase expression is induced by IPTG, which then targets the T7 promotor in the expression vector.

Genotype: F$^-$ *ompT hsdS$_B$*($r_B^-m_B^-$) *gal dcm* (DE3)

BL21 (DE3) pLysS contains the T7 RNA polymerase gene but also carries the plasmid pLysS that constitutively expresses T7 lysozyme, a natural inhibitor of T7 RNA Polymerase. This strain is used to minimize basal level expression of potentially toxic gene products before induction with IPTG. When induced with IPTG, the T7 RNA polymerase is produced in excess, overcoming the inhibition of T7 RNA polymerase by T7 lysozyme.

Genotype: F$^-$ *ompT hsdS$_B$*($r_B^-m_B^-$) *gal dcm* (DE3) pLysS (Cam^R)

BL21 (DE3) pLysE contains the T7 RNA polymerase gene as well as the plasmid pLysE that constitutively expresses T7 lysozyme, a natural inhibitor of T7 RNA Polymerase. This strain is used to minimize basal level expression of potentially toxic gene products before induction with IPTG. When induced with IPTG, the T7 RNA polymerase is produced in excess, overcoming the inhibition of T7 RNA polymerase by T7 lysozyme. The pLysE plasmid provides the highest level of repression of the T7 RNA polymerase prior to induction.

Genotype: F$^-$ *ompT hsdS$_B$*($r_B^-m_B^-$) *gal dcm* (DE3) pLysE (Cam^R)

BL21 Competent Cells Combo Pack provides everything you need for T7 promotor driven protein expression, whether you are setting up new protein expression experiments or need to express a set of proteins with different properties.

The BL21 Competent Cell Combo Pack contains five aliquots of each of the following:
BL21 (DE3)
BL21 (DE3) pLysS
BL21 (DE3) pLysE

Storage Conditions: BL21 Competent Cells should be stored at -80°C for 6 months.

Product Citations:
1 Debdip Ghosh, G. & Berg, J. M. *J. Am. Chem. Soc.* **132(11)**, 3973–3979 (2010).
2. Diekmann, S., *et al. Eur. J. Human Gene.* **18**, 985-92 (2010).
3. Jensen, K. K., *Euro. J. Pharmacol.* doi:10.1016/j.ejphar.2010.09.080 (2010).
4. Markham, A. P., *et al. Biochem.* **48(43)**, 10353-61 (2009).
5. Nayeem, N., *et al. Mol. Pharmacol.* **76(3)**, 534-542 (2009).
6. Allerston, C., *et al. Mol. Gen. Metab.* **98(2)**, 198-202 (2009).

Associated Products	Cat. No.	Page
Quick-Stick Ligase	BIO-27027	53
T4 DNA Ligase	BIO-27026	54
X-GAL	BIO-37035	95
IPTG	BIO-37036	96

Quick-Stick Ligase

Storage -20°C | Shipped on Blue Ice

PACK SIZE	CONC.	CAT NO.
50 Reactions	10u/µl	BIO-27027
100 Reactions	10u/µl	BIO-27028

Components	50 Reactions	100 Reactions
Quick-Stick Ligase	1 x 50µl	1 x 100µl
4x QS Buffer	1 x 250µl	2 x 250µl
DNA Dilution Buffer	1 x 1.2ml	1 x 1.2ml

Features:

- **Dramatically decreases time for DNA cloning**
- **Rapid 5 to 15 minute protocol at room temperature**
- **Efficient and reliable ligations of cohesive and blunt-ended DNA**
- **No loss of transformation efficiency**

Applications:

- **Cloning of DNA from: PCR products, Plasmids, Cosmids, Genomic, phage and viral DNA**
- **Linker ligation**
- **Re-ligation of linearized plasmids**
- **Ligation of double-stranded oligonucleotides into vectors (plasmid and phage)**

Description: Quick-Stick Ligase is designed to carry out fast and efficient ligation of both cohesive and blunt-ended DNA at room temperature. Quick-Stick Ligase is a T4 DNA Ligase that has been mutated to improve enzyme activity, and contains a specially developed 4x Quick-Stick Buffer. The enzyme catalyses the joining of two strands of DNA between the 5'-phosphate and the 3'-hydroxyl groups of adjacent nucleotides in either a blunt-ended or cohesive-ended configuration.

Quick-Stick Ligase will ligate 99% of λ*Hind*III cohesive-ended fragments, or 80% of λ*Eco*RV blunt-ended fragments, in 5 minutes at room temperature. 100% ligation of blunt-ended fragments can be achieved by increasing the ligation time to 15 minutes at room temperature (fig. 1).

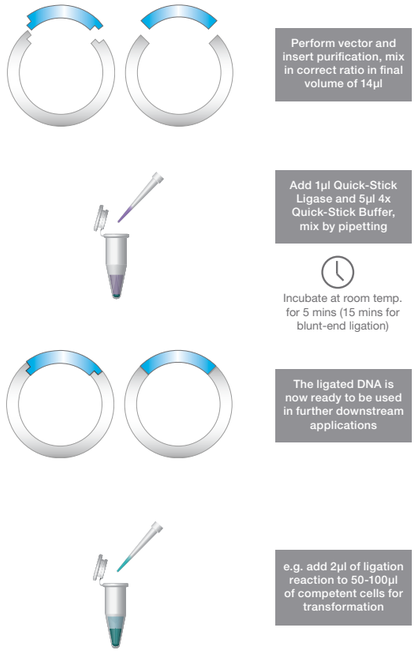
Concentration: 10u/µl

Storage Conditions: Quick-Stick Ligase can be stored for 12 months at -20°C.

Product Citations:

1. Schrettl M.,*et al. PLoS Pathog* **6(6)**, e1000952 (2010).
2. Burton, N, A., *et al. J. Mol. Biol.* **401(5)**, 726-42 (2010).
3. Fagan, R. P., *et al. Mol. Microbiol.* **71**, 1308-1322 (2009).
4. Eloe, E. A., *et al. Appl. Envir. Microbiol.* **74**, 6298-6305 (2008).
5. Nettleship, J. E., *et al. Prot. Express. Purif.* **62(1)**, 83-89 (2008).
6. Hermann, B. P., *et al. Mol. Cell. Endocrinol.* **260**, 49-58 (2007).

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
CH3-Blue 10^8 Chemically Competent Cells	BIO-85039	49
ISOLATE PCR and Gel Kit	BIO-52029	62
dUTP	BIO-39035	78



Schematic of Quick-Stick Ligation procedure

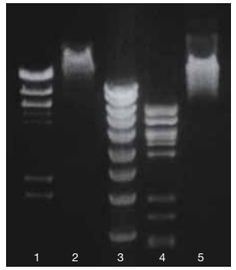


Fig. 1 Ligation of cohesive or blunt-ended fragments with Bioline Quick-Stick Ligase.
Lambda DNA was 10x over-digested with *EcoRV* or *Hind* III, followed by heat inactivation. DNA fragments were ligated using the Bioline protocol for 5 minutes at room temperature.
Lane 1. *Hind* III-digested Lambda DNA (cohesive ends)
Lane 2. *Hind* III-digested Lambda DNA ligated with Quick-Stick Ligase
Lane 3. HyperLadder I
Lane 4. *Eco*RV-digested Lambda DNA (blunt ends)
Lane 5. *Eco*RV-digested Lambda DNA ligated with Quick-Stick Ligase

T4 DNA Ligase

Storage -20°C | Shipped under Blue Ice

PACK SIZE	CONC.	CAT NO.
500 Units	10u/µl	BIO-27026

Components	500 Units
T4 DNA Ligase	1 x 50µl
10x Reaction Buffer	1 x 1.2ml
ATP Solution	1 x 1.2ml

Features:

- **Catalyzes the joining of double-stranded DNA**
- **Supplied with 10x reaction buffer and ATP**
- **No loss of transformation efficiency**

Applications:

- **Ligation of cohesive and blunt-ended DNA fragments**
- **Sealing nicks in double-stranded DNA**
- **Ligation of synthetic linkers to blunt-ended DNA**

Description: T4 DNA Ligase catalyzes the joining of two strands of DNA between the 5'-phosphate and the 3'-hydroxyl groups of adjacent nucleotides in either a blunt-ended or cohesive-ended configuration. T4 DNA Ligase catalyses the joining of RNA to either DNA or RNA strands in a duplex molecule but will not join single-stranded nucleic acids. T4 DNA Ligase is ATP dependent.

Concentration: 10u/µl

Storage Conditions: T4 DNA Ligase can be stored for 12 months at -20°C. ATP solution should be aliquoted to avoid repeated freeze/thawing.

Product Citations:

1. Lopez, M., *et al. Am. J. Enol. Vitic.* **60(2)**, 215-222 (2009).
2. Celis, P., *et al. Mol. Ecol. Notes* **7(2)**, 251–253 (2007).
3. An, J., *et al. Conserv. Genet.* **5(1)**, 121-125 (2004).
4. Garaizar, J., *et al. App. Environ. Microbiol.* **66(12)**, 5273-81 (2000).
5. Normand-Sdiqui, N. & Akhtar, S. *J. Pharma.* **163**, 63-71 (1998).

Associated Products	Cat. No.	Page
α-Select Bronze Efficiency	BIO-85025	48
Quick-Stick Ligase	BIO-27027	53
X-GAL	BIO-37035	95
IPTG	BIO-37036	96

Uracil DNA Glycosylase

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
500 Units	1u/µl	BIO-27044

Components	500 Units
Uracil DNA Glycosylase	1 x 500µl
10x Reaction Buffer	1 x 1.2ml

Features:

- **Removal of uracil from uracil-containing DNA**
- **Novel temperature sensitive mutant, irreversibly inactivated after heating**

Applications:

- **UDG treatment of uracil-containing DNA to prevent amplification by DNA polymerases**
- **Used to investigate features of protein-DNA interactions**

Description: Uracil DNA glycosylase (UDG) catalyses the release of uracil from uracil-containing single- or double-stranded DNA, but not from RNA or oligonucleotides (6 or fewer bases). UDG is active over a broad pH range with an optimum at pH 8.0, does not require a divalent cation, and is inhibited by high ionic strength (>200mM).

Bioline UDG is purified to SDS-PAGE purity and is free of endonucleases, exonucleases, nickases and RNases.

Unit Definition: One unit is the amount of enzyme that catalyses the release of 60µmol of uracil per minute from uracil-containing double-stranded DNA.

Concentration: 1u/µl

Storage Conditions: Uracil DNA glycosylase can be stored for 6 months at -20°C.

Product Citations:

1. Stivers, J.T. & Drohat, A.C. *Arch. Biochem. Biophys.* **396(1)**, 1-9 (2001).
2. Rashtchian, A., *et al. PCR Meth. Appli.* **2(2)**, 124-130 (1992).

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
CH3-Blue 10^8 Chemically Competent Cells	BIO-85039	49
ISOLATE PCR and Gel Kit	BIO-52029	62
dUTP	BIO-39035	78

SOC Medium

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
10 x 10ml	BIO-86033

Features:
- **Improved stability of cells**
- **Maximize transformation efficiency**
- **Sterile, ready-to-use solution**
- **Time saving and cost effective**

Applications:
- **For use in the recovery step of bacterial-cell transformation**

Description: SOC Medium is a rich medium used primarily to aid recovery of bacterial competent cells following transformation. Use of SOC medium improves the molecular uptake whilst stabilizing the cells rapidly and so maximizing the transformation efficiency.

Storage Conditions: SOC Medium can be stored for up to 24 months at -20°C, or up to 12 months at 2-8°C.

Product Citations:
1. Von Der Schulenberg J. H., *et al. Appl. Environ. Microbiol.* **67(1)**, 270-277 (2001).
2. Natarajan, D. & Boulter, C. A., *Gene* **161(2)**, 195-198 (1995).

X-GAL

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
1g	BIO-37035

Features:
- **Extremely pure**
- **Intense blue precipitate upon hydrolysis**

Applications:
- **Blue/white cloning systems**
- **Immunoblotting**
- **Immunocytochemical assays**
- **Microbiology and cell culture media**

Description: 5-bromo-4-chloro-3-indolyl ß-D-galactopyranoside (X-GAL) is a chromogenic substrate for ß-galactosidase that forms an intense blue precipitate upon hydrolysis. It can be used in molecular biology to detect the gal gene product, and also in microbiology where it is used to detect micro-organisms which have ß-Galactosidase activity (usually coliforms). It can be combined with R-substrates to differentiate between two species of organisms on the same plate. X-GAL is soluble in N, N-dimethylformamide.

Storage Conditions: X-GAL can be stored for 24 months at -20°C. Store protected from light.

Product Citations:
1. Merino, N., *et al. J. Bacteriol.* **191**, 832-843 (2009).
2. Chan, C-H., *et al. Con. Gen.* **9(4)**, 1067-1070 (2008).
3. Maruta, F., *et al. J. Drug Targ.* **15(4)**, 311-318 (2007).
4. Taelman, V., *et al. Development* **133**, 2961-2971 (2006).
5. Campenhout, C. V., *et al. Developmental Biol.* **294**, 203-19 (2006).
6. Toledo-Arana, A., *et al. J. Bacteriol.* **187(15)**, 5318-29 (2005).

IPTG & IPTG Solution

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
IPTG		
5g	-	BIO-37036
IPTG Solution		
10ml	240mg/ml	BIO-37082
5 x 10ml	240mg/ml	BIO-37083

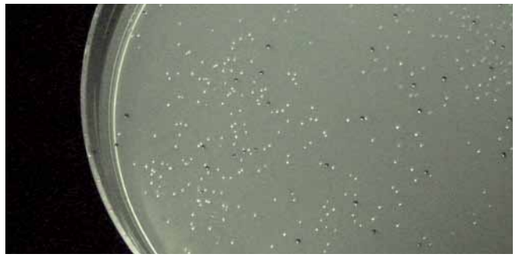
Features:
- **Induces *E. coli lac* operon activity**
- **Ultra pure**
- **Available as powder and stabilized stock solution**

Applications:
- **Blue/white color screening**
- **Induction of *lac* operon for protein expression**
- **Genes controlled by the *lac* or *tac* promotor/operator sequences are expressed to high levels in the presence of IPTG**

Description: Isopropyl-ß-D-thiogalactopyranoside (IPTG) is a chemical analogue of galactose, which cannot be hydrolyzed by the enzyme ß-Galactosidase. Hence, it induces *E. coli lac* operon activity by binding and inhibiting the *lac* repressor without being degraded. Genes controlled by the *lac* or *tac* promotor/operator sequences are expressed to high levels in the presence of IPTG.

Storage Conditions: IPTG can be stored for 24 months at -20°C.

Product Citations:
1. Maruta, F., *et al. J. Drug Targ.* **15(4)**, 311-318 (2007).
2. Ilag, L. L., *et al. Structure.* **12(2)**, 269–275 (2004).
3. Ross, P. J., *et al. Infect. Immun.* **72(3)**, 1568–1579 (2004).
4. Meng, G. & Fütterer, K. *Nat. Struct I. Biol.* **10**, 935-941 (2003).
5. Maruta, F., *et al. J. Drug Targ.* **11(1)**, 53-59 (2003).
6. Zhang, Y., *et al. Parasite Immunol.* **20(12)**, 583 - 594 (2002).



Blue/white selection
Addition of a piece of foreign DNA into *lacZα* gene of a vector disrupting the production of functional -galactosidase, this prevents the metabolism of X-gal in the presence of IPTG (a *Lac* operon inducer). Hydrolysis of X-gal by the ß-galactosidase causes the characteristic blue color in the colonies, so white colonies indicate vectors carrying the inserted foreign DNA.

Associated Products	Cat. No.	Page
CH3-Blue 10^8 Chemically Competent Cells	BIO-85039	49
BIO*Blue* 10^8 Chemically Competent Cells	BIO-85036	50
Quick-Stick Ligase	BIO-27027	53
IPTG	BIO-37036	96

Antibiotic Solutions

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
Ampicillin		
10ml	100mg/ml	BIO-87025
Carbenicillin		
10ml	100mg/ml	BIO-87026
Chloramphenicol		
10ml	50mg/ml	BIO-87027
Kanamycin		
10ml	100mg/ml	BIO-87028
Neomycin		
10ml	50mg/ml	BIO-87029
Tetracycline		
10ml	12.5mg/ml	BIO-87030

Associated Products	Cat. No.	Page
X-GAL	BIO-37035	95
Quick-Stick Ligase	BIO-27027	53
T4 DNA Ligase	BIO-27026	54

Features:
- **Cost effective ready-to-use solutions**
- **Time saving**
- **Stable at -20°C**
- **Avoids handling of toxic or harmful substances**
- **No sterile filtration required**

Applications:
- **Cell culture**
- **Plasmid selection**
- **Gene regulation**

Storage Conditions: Antibiotic Solutions can be stored at -20°C, in a constant temperature freezer for 12 months. Antibiotic Solutions will remain stable if stored as specified.
Note: For Research Use Only.

Product Citations:
1. Lança, A, S. C., *et al. Exp. Parasitol.* doi:10.1016/j.exppara.2010.06.017 (2010).
2. Dassanayake, R.P., *et al. Vet. Microbiol.* **133(4)**, 366-371 (2009).
3. Silva, M. S., *et al. Parasitol. Res.* **105(5)**, 1223-1229 (2009).

Antibiotic Properties

Antibiotics	Mode of Action	Mechanism of Resistance	Working Concentration	Stock Solution
Ampicillin	Ampicillin is a derivative of penicillin that causes cell death by interfering with bacterial cell wall synthesis.	Ampicillin resistance is mediated by cleavage of the ß-lactam ring by ß-lactamase (bla gene).	50-200µg/ml	100mg/ml in water
Carbenicillin	Carbenicillin is an ampicillin analogue that inhibits bacterial cell wall synthesis, and is commonly used in place of ampicillin to reduce the production of satellite colonies. Carbenicillin is more stable than ampicillin.	Carbenicillin resistance is mediated by cleavage of the ß-lactam ring by ß-lactamase (bla gene).	20-200µg/ml	100mg/ml in 50% ethanol
Chloramphenicol	Chloramphenicol bacteriostatic agent that inhibits translation on the 50S ribosomal subunit, preventing peptide bond formation.	Chloramphenicol resistance is mediated by acetyltransferase (cat gene), which inactivates chloramphenicol by acetylation.	25-170µg/ml	50mg/ml in 100% ethanol
Kanamycin	Kanamycin sulfate causes cell death by binding to 70S ribosomal subunits, which inhibits ribosomal translocation and causes miscoding.	Kanamycin resistance is mediated by aminoglycoside phosphotransferase (kan gene), which inactivates kanamycin by phosphorylation.	10-50µg/ml	100mg/ml in water
Neomycin	Neomycin causes cell death by blocking protein synthesis. High concentrations of neomycin can cause toxicity in eukaryotic cells by interacting with mitochondrial ribosomes, and with reduced affinity, other eukaryotic ribosomes.	Neomycin resistance is mediated by aminoglycoside phosphotransferase (nptII gene), which inactivates neomycin by phosphorylation.	50µg/ml	50mg/ml in water
Tetracycline	Tetracycline inhibits protein synthesis by preventing binding of aminoacyl-tRNA to the 30S ribosomal subunit.	Tetracycline resistance is mediated by a protein (tet gene), which modifies the bacterial membrane and prevents transport of tetracycline into the cell.	12.5-50µg/ml	12.5mg/ml in 90% ethanol

A Precious Find

ISOLATE Kits are designed for fast and efficient isolation of DNA or RNA from a wide range of biological materials, including animal tissue, cultured cells, buccal swabs, fecal material, bacterial cells, plant tissue, PCR products and agarose gels. Based on proprietary filter membrane spin column technology the ISOLATE Kits perfectly complement our well known range of reagents such as DNA polymerases, polymerase mixes, real-time PCR kits, as well as our column-free products for RNA (TRIsure) and DNA (SureClean) isolation.

The nucleic acid is isolated and ready to use in downstream applications such as PCR, real-time PCR, cloning, sequencing, genotyping, etc. allowing more time for experiments and interpreting results.

Nucleic Acid Isolation

The PCR Company • BIOLINE since 1992 • The PCR Company

Nucleic Acid Isolation

Bioline ISOLATE Kits are the perfect way to purify your nucleic acid samples before downstream analysis. The kits are designed for fast and efficient isolation of DNA and RNA from a wide range of biological materials, including animal tissue, cultured cells, buccal swabs, fecal material, bacterial cells (plasmid and genomic DNA), plant tissue, PCR products and agarose gels.

ISOLATE Kits are based on a proprietary filter membrane spin column technology which selectively binds the nucleic acids. Nucleic acids are specifically bound to membrane, before wash steps to remove impurities and finally elution of highly purified nucleic acid. The isolated products are ready to use in downstream applications such as PCR, real-time PCR, cloning, sequencing, genotyping, RT-PCR, etc.

Each kit is supplied with a comprehensive Product Manual which contains detailed protocols and additional helpful information. The kit also includes a separate, splash-proof sheet with bench-top protocols for quick reference.

ISOLATE Kits perfectly complement our well known range of downstream reagents such as DNA polymerases and mixes, real-time PCR kits, as well as our column-free products for RNA (TRIsure™) and DNA (SureClean) isolation.

Bioline ISOLATE Kits provide:

- **High yields and high quality**
- **Reproducible results**
- **7 kits to cover a wide range of starting materials**
- **14 detailed protocols**
- **Bench-top protocols on separate, splash-proof sheets**

Nucleic Acid Isolation Kit Selection Table

Designed for a wide range of biological materials, including animal tissue, cultured cells, buccal swabs, fecal material, bacterial cells, plant tissue, PCR products and agarose gels, use the Nucleic Acid Isolation Selection Table below to choose the most suitable ISOLATE kit for your samples.

	Page No.	Animal Tissue	Rodent Tail	Paraffin Embedded Tissue	Cultured Cells	Buccal Swabs	Bacterial Cells	Fecal Material	Plant Tissue	TAE Gel	TBE Gel	PCR Products	Enzymatic Digests
Spin Column Isolation													
DNA Kits													
ISOLATE Plasmid Mini Kit	61						✓						
ISOLATE PCR and Gel Kit	62									✓	✓	✓	✓
ISOLATE Fecal DNA Kit	63							✓					
ISOLATE Genomic DNA Mini Kit	64	✓	✓	✓	✓	✓							
ISOLATE Plant DNA Mini Kit	65								✓				
RNA Kits													
ISOLATE RNA Mini Kit	66	✓			✓		✓						
ISOLATE Plant RNA Mini Kit	67								✓				
Column-free Isolation													
TRIsure	69	✓			✓				✓				
TRIsure Plus Bacterial RNA Isolation Kit	70						✓						
SureClean	68											✓	✓

✓ Recommended

For more information please visit **www.bioline.com/isolate**

BIOLINE
A Meridian Life Science® Company

ISOLATE Plasmid Mini Kit

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52025
50 Preps	BIO-52026
250 Preps	BIO-52027

Components	10 Preps	50 Preps	250 Preps
Resuspension Buffer	2 x 2ml	1 x 15ml	1 x 75ml
Lysis Buffer P	2 x 2ml	1 x 15ml	1 x 75ml
Neutralization Buffer	2 x 2ml	1 x 20ml	1 x 100ml
Wash Buffer AP	1 x 6ml	1 x 30ml	1 x 140ml
Wash Buffer BP	1 x 4ml	1 x 20ml	1 x 80ml
Elution Buffer	1 x 2ml	2 x 2ml	1 x 15ml
Spin Column P	1 x 10	1 x 50	5 x 50
Collection Tube	1 x 10	1 x 50	5 x 50
Elution Tube	1 x 10	1 x 50	5 x 50

Features:

- **Rapid protocol: 15 minutes/5 preps**
- **High purity plasmid DNA: typical A_{260}/A_{280} ratio >1.8**
- **High yields: up to 13µg from 5ml culture**
- **Isolated DNA is ready for downstream applications**

Applications:

- **Isolation of high copy plasmid DNA**
- **Isolation of low copy plasmid DNA**

Description: ISOLATE Plasmid Mini Kit is designed for the rapid and efficient isolation of highly pure plasmid DNA from bacterial cultures using proprietary filter membrane spin column technology. The isolation process combines alkaline lysis of the harvested bacteria, followed by clarification and subsequent specific binding of plasmid DNA directly to the filter of a spin column. Contaminants such as cellular debris, RNA and salts are efficiently removed during the washing steps. In the final step, highly pure plasmid DNA is eluted in a low-salt buffer. The kit shows excellent recovery of plasmid DNA, even from low culture volumes (fig. 1) and gives reproducible results (fig. 2).

Separate protocols are provided for the isolation of high copy and low copy plasmids. In each case, intact, high purity plasmid DNA is isolated within 15 minutes. Typically, up to 13µg and 18µg plasmid DNA is obtained from 5ml and 10ml cultures, respectively.

The isolated DNA shows excellent performance in downstream molecular biology applications such as PCR, transformation, cloning, sequencing (fig. 3), restriction analysis, etc.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

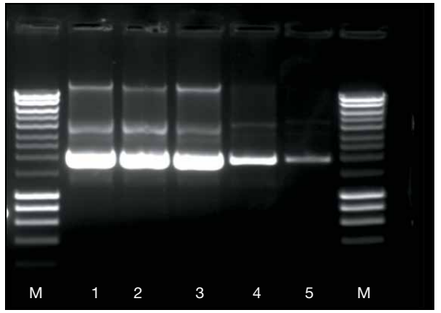


Fig. 1 Excellent recovery of plasmid DNA.
pGEM3Z plasmid was isolated from decreasing culture volumes of *E. coli* using ISOLATE Plasmid Mini Kit and run on 1.1% TAE agarose gel. Lanes: HyperLadder I (M), 5ml (1), 3ml (2), 1ml (3), 0.1ml (4), 0.05ml (5).

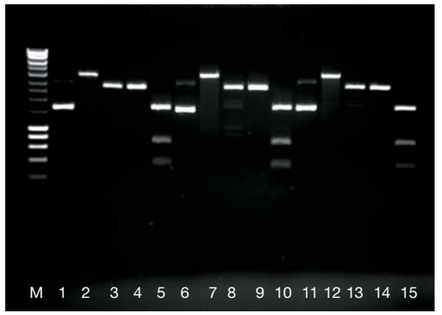


Fig. 2 Reproducible results.
pUC19 plasmids were isolated from 5ml *E. coli* overnight culture and cut with various restriction enzymes before analysis on 1% TAE agarose gel. Each restriction digest was performed in triplicate. Each lane represents an individual miniprep. HyperLadder I (M).

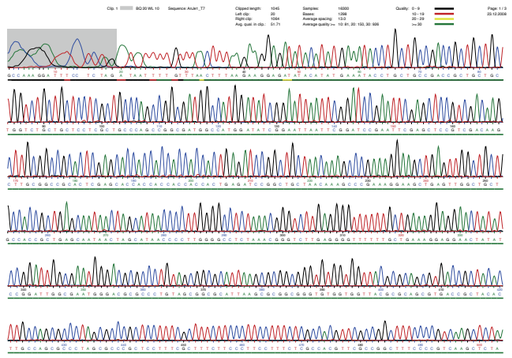


Fig. 3 Excellent performance of isolated plasmid DNA in downstream applications.
pET19 plasmid (Novagen) was transformed in DH5α *E. coli* cells. A single colony was picked and grown overnight. Plasmids were isolated from 3ml culture using ISOLATE Plasmid Mini Kit. Sequencing was carried out based on standard T7 promoter and terminator primers.

ISOLATE PCR and Gel Kit

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52028
50 Preps	BIO-52029
250 Preps	BIO-52030

Components	10 Preps	50 Preps	250 Preps
Gel Solubilizer	1 x 8ml	1 x 40ml	1 x 200ml
Binding Optimizer	1 x 0.7ml	1 x 4ml	1 x 18ml
Binding Buffer A	1 x 6ml	1 x 30ml	1 x 140ml
Wash Buffer A	1 x 4ml	1 x 16ml	2 x 40ml
Elution Buffer	1 x 2ml	2 x 2ml	1 x 20ml
Spin Column A	1 x 10	1 x 50	5 x 50
Collection Tube	1 x 10	1 x 50	5 x 50
Elution Tube	1 x 10	1 x 50	5 x 50

Features:

- **3-minute protocol for purification of PCR products**
- **15-minute protocol for DNA isolation from gels**
- **Excellent recovery rate**
- **Isolated DNA is ready for downstream applications**

Applications:

- **Purification of PCR products**
- **Isolation of DNA from TAE and TBE agarose gels**
- **Purification of DNA from enzymatic reactions**

Description: ISOLATE PCR and Gel Kit is designed for the purification of PCR products (fig. 1), and for the isolation of DNA fragments from TAE and TBE agarose gel slices (fig. 2). A fast and easy-to-follow protocol is given for each application.

PCR products are purified in 3 minutes using simple binding and elution steps. Concentrated PCR products ranging between 60bp and 30Kb can be eluted in as little as 10µl buffer with a recovery rate of 75-95%. DNA fragments between 100bp and 30Kb can be extracted from agarose gel slices with an excellent recovery rate of 75-90%.

The isolated DNA is suitable for downstream applications such as transformation, cloning, sequencing, restriction analysis, etc.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93
SureClean	BIO-37042	68

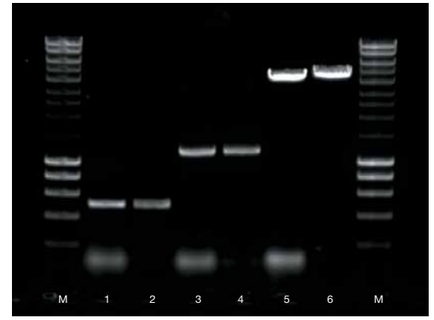


Fig. 1 Purification of PCR products.
PCR was performed to amplify 500bp, 1.2Kb and 5Kb fragments of Lambda DNA. The products were purified with ISOLATE PCR and Gel Kit and run on a 1.5% TAE agarose gel. The gel shows complete cleanup of primer-dimers combined with a high percentage of recovery. Lanes: HyperLadder I (M), PCR products before cleanup (1, 3, 5), PCR products after cleanup using ISOLATE PCR and Gel Kit (2, 4, 6).

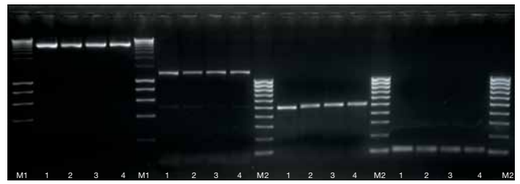


Fig. 2 Isolation of DNA from agarose gel.
Various sized DNA fragments were run on 1% TAE agarose gel and extracted using ISOLATE PCR and Gel Kit. The isolated fragments were again run on 1% TAE agarose gel along with the original fragments. Lanes: HyperLadder I (M1), HyperLadder IV (M2), Not extracted (1), ISOLATE PCR and Gel Kit (2), Supplier A (3), Supplier B (4).

ISOLATE Fecal DNA Kit

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
25 Preps	BIO-52037
100 Preps	BIO-52038

Components	25 Preps	100 Preps
Lysis Buffer	1 x 20ml	1 x 80ml
DNA Pre-Wash Buffer	1 x 7.5ml	1 x 30ml
Fecal DNA Wash Buffer	1 x 25ml	1 x 100ml
Fecal DNA Binding Buffer	1 x 50ml	1 x 200ml
DNA Elution Buffer	1 x 5ml	1 x 20ml
Bashing Bead Lysis Tubes	1 x 25	1 x 100
Spin Filters (orange caps)	1 x 25	1 x 100
Spin Filters (green caps)	1 x 25	1 x 100
Spin Columns	1 x 25	1 x 100
Collection Tubes	2 x 50	8 x 50

Features:

- **15-minute isolation protocol**
- **High quality, inhibitor-free DNA**
- **No need for organic denaturants or proteinases**
- **Non-invasive**

Applications:

Isolation of fecal DNA from:

- **Human origin**
- **Birds**
- **Rats, mice**
- **Rabbits**
- **Cattle**

Description: The use of fecal material is advantegous as it is non-invasive, and large amounts can be collected. The isolation of DNA from feces can be challenging. ISOLATE Fecal DNA Kit is specifically developed for the simple, rapid isolation of high quality DNA from a variety of fecal samples including humans, birds, rats, mice (fig. 1), rabbits, cattle, etc. Bacterial, protist, as well as host DNA can be effectively isolated from ≤150mg sample of mammalian feces. The easy to follow procedure can be completed in as little as 15 minutes. Fecal samples are added directly to a Bashing Beads Lysis Tube and rapidly lysed by bead beating in a vortex, without the use of organic denaturants or proteinases. The DNA is then bound, isolated and purified using spin columns.

The eluted DNA, free from contaminants and inhibitors, is ideal for downstream molecular biology applications including PCR (fig. 2), microarrays, sequencing, genotyping, etc.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

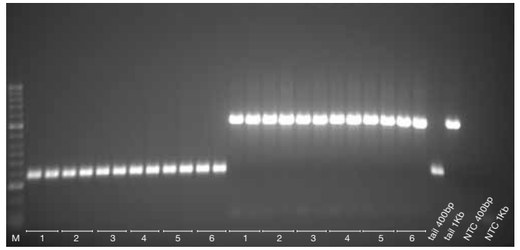


Fig. 1 PCR amplification from mouse fecal DNA.
Genomic DNA was extracted from various amounts of mouse fecal matter using ISOLATE Fecal DNA Kit. PCR was performed using IMMOLASE along with DNA extracted from mouse tail (as a control) on 2µl and 5µl DNA extract. 400bp and 1Kb fragments of the rn18s gene were amplified and analyzed on 1.5% TAE agarose gel. Lanes: HyperLadder I (M), 6mg (1), 12.5mg (2), 29mg (3), 53.6mg (4), 104mg (5), 139mg (6).

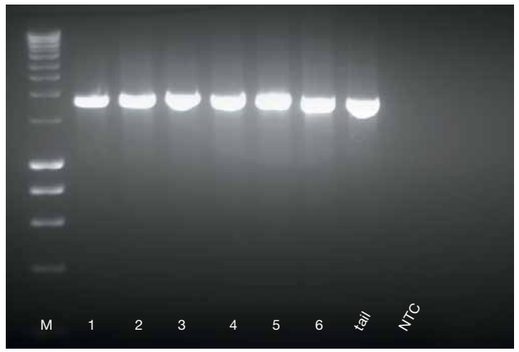


Fig. 2 PCR amplification from mouse fecal DNA.
DNA was extracted from various amount of mouse fecal matter and mouse tail (as a control) amplified from 2µl extract as described in fig. 1 to obtain a 1.8Kb product from the rn18s gene. HyperLadder I (M).

ISOLATE Genomic DNA Mini Kit

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52031
50 Preps	BIO-52032
250 Preps	BIO-52033

Components	10 Preps	50 Preps	250 Preps
Lysis Buffer D	1 x 5ml	1 x 25ml	1 x 120ml
Binding Buffer D	2 x 2ml	1 x 15ml	1 x 70ml
Proteinase K	1 x 0.3ml	1 x 1.5ml	5 x 1.5ml
Wash Buffer D	1 x 6ml	1 x 24ml	2 x 60ml
Elution Buffer	2 x 2ml	1 x 25ml	1 x 110ml
Spin Column D	1 x 10	1 x 50	5 x 50
Collection Tube	1 x 20	2 x 50	10 x 50
Elution Tube	1 x 10	1 x 50	5 x 50

Features:

- **Rapid protocol: 15 minutes after lysis**
- **High purity DNA: typical A_{260}/A_{280} ratio > 1.7**
- **High yields: up to 100µg genomic DNA**
- **Isolated DNA is ready for downstream applications**

Applications:

- **Animal tissue (up to 50mg)**
- **Rodent tail (up to 1cm)**
- **Paraffin embedded tissue (up to 25mg)**
- **Buccal swabs**
- **Eukaryotic cells (up to 5 x 10^6 cells)**

Description: ISOLATE Genomic DNA Mini Kit is designed for the rapid and efficient isolation of highly pure genomic DNA from a variety of starting materials such as animal tissue, paraffin embedded tissue, mouse or rodent tail, buccal swabs and eukaryotic cells and bacteria (fig. 1). Four optimized protocols are provided for different starting materials. The kit generates reproducible results with every sample (fig. 2).

ISOLATE Genomic DNA Mini Kit uses a proprietary filter membrane spin column technology. The isolation process combines fast lysis of the starting material with Proteinase K, followed by specific binding of DNA directly to the filter in a spin column. After washing, high quality DNA is eluted.

The isolated DNA is suitable for downstream molecular biology applications such as PCR, genotyping, cloning, sequencing, restriction analysis, etc.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

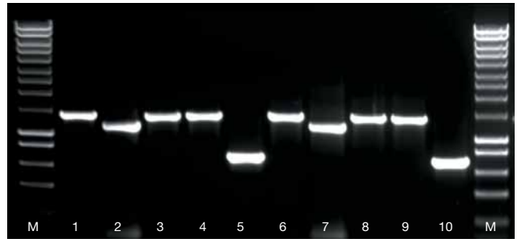


Fig. 1 Excellent results from a variety of samples.
Genomic DNA was isolated from different sample types using ISOLATE Genomic DNA Mini Kit and targets were amplified by PCR using MangoMix (BIO-25033). The products were run on 1.5% TAE agarose gel. Lanes: HyperLadder I (M), 18s RNA gene PCR from 3T3 cell genomic DNA (1, 6), Rhodopsin gene PCR from HeLa cell genomic DNA (2, 7), 18s RNA gene PCR from mouse lung tissue (3, 8), 18s RNA gene PCR from mouse tail clipping (4, 9), 16s RNA gene PCR from *E. coli* (5, 10).

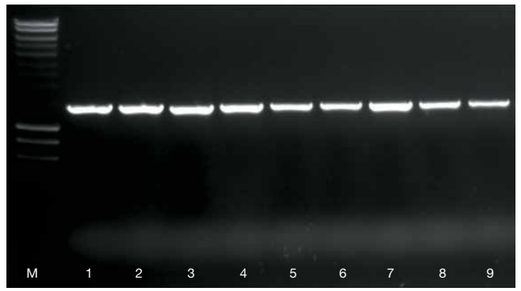


Fig. 2 Reproducible results.
Mouse genomic DNA was isolated using ISOLATE Genomic DNA Mini Kit and kits from competitors A and B. PCR using MangoMix (BIO-25033) was subsequently performed to amplify a 1.4Kb fragment of the 18s rRNA gene. Lanes: HyperLadder I (M), PCR from DNA isolated using ISOLATE Genomic DNA Mini Kit (1-3), PCR from DNA isolated using Mini Kit from Competitor A (4-6), PCR from DNA isolated using Mini Kit from Competitor B (7-9).

ISOLATE Plant DNA Mini Kit

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52034
50 Preps	BIO-52035
250 Preps	BIO-52036

Components	10 Preps	50 Preps	250 Preps
Lysis Buffer PD	1 x 5ml	1 x 25ml	1 x 120ml
Binding Buffer PD	2 x 2ml	1 x 15ml	1 x 70ml
Precipitation Buffer	1 x 1.5ml	1 x 6ml	1 x 30ml
Wash Buffer PD	1 x 6ml	1 x 24ml	2 x 60ml
Elution Buffer	2 x 2ml	1 x 25ml	1 x 110ml
Spin Column PD1	1 x 10	1 x 50	5 x 50
Spin Column PD2	1 x 10	1 x 50	5 x 50
Collection Tube	1 x 30	3 x 50	15 x 50
Elution Tube	1 x 10	1 x 50	5 x 50

Features:

- **DNA isolated in 30 minutes**
- **High purity DNA: typical A_{260}/A_{280} > 1.7**
- **Clear, easy to follow instructions**
- **Isolated DNA is ready for downstream applications**

Applications:
Isolation of genomic DNA from:

- **Fresh plant tissue**
- **Frozen plant tissue**
- **Lyophilized plant tissue**
- **Herbarium specimens**

Description: ISOLATE Plant DNA Mini Kit is designed for the rapid purification of genomic DNA from a variety of wet or dry plant material, including leaves, bark, roots, fruits, etc. Up to 180mg wet plant material and up to 100mg dry plant material can be processed per spin column. The protocol does not require the use of Proteinase K, which means that all components can be conveniently stored at room temperature.

ISOLATE Plant DNA Mini Kit shows excellent recovery of plant DNA when different homogenization techniques are used (fig. 1). High yields are obtained with every miniprep (fig. 2).

The isolated DNA is ready for use in downstream applications such as PCR, real-time PCR, cloning, genotyping, etc.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

Product Citation:

1. Curro, S., *et al. Am.J.Botany* **97**, e58-60 (2010).

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

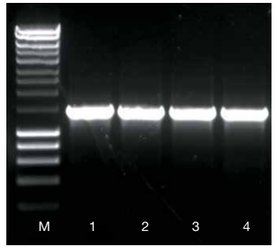


Fig. 1 Excellent recovery of plant DNA with different homogenization techniques.
20mg freeze-dried budding leaves of *Arabidopsis thaliana* were homogenized using liquid nitrogen and with a rotor stator homogenizer. Genomic DNA was isolated using ISOLATE Plant DNA Mini Kit. A 1.4Kb fragment of allene oxide synthase gene was amplified from the isolated DNA using MangoMix. Lanes: HyperLadder I (M), liquid nitrogen ground material (1, 3), rotor stator homogenized material (2, 4).

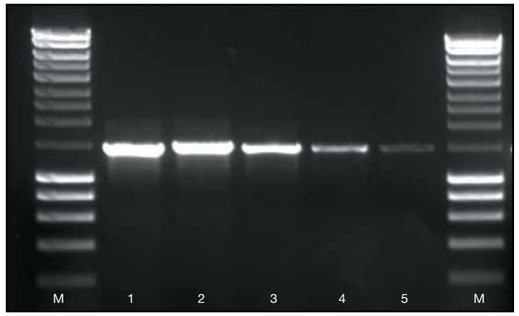


Fig. 2 High yields of plant genomic DNA.
Genomic DNA was isolated from 20mg freeze-dried budding leaves of *Arabidopsis thaliana* using ISOLATE Plant DNA Mini Kit. Using a 2-fold dilution of the miniprep, a 1.4Kb fragment of allene oxide synthase gene was amplified from the isolated DNA with MangoMix (BIO-25033). Lanes: HyperLadder I (M), 100ng plant genomic DNA (1), 50ng plant genomic DNA (2), 25ng plant genomic DNA (3), 12.5ng plant genomic DNA (4), 6.25ng plant genomic DNA (5).

ISOLATE RNA Mini Kit

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52042
50 Preps	BIO-52043
250 Preps	BIO-52044

Components	10 Preps	50 Preps	250 Preps
Lysis Buffer R	1 x 6ml	1 x 30ml	1 x 125ml
Wash Buffer AR	1 x 3ml	1 x 15ml	1 x 170ml
Wash Buffer BR	1 x 2ml	1 x 8ml	1 x 40ml
RNase-free Water	1 x 1.5ml	1 x 6ml	2 x 15ml
Spin Column R1	1 x 10	1 x 50	5 x 50
Spin Column R2	1 x 10	1 x 50	5 x 50
Collection Tube	1 x 50	5 x 50	25 x 50
Elution Tube	1 x 10	1 x 50	5 x 50

Features:

- **Rapid protocol: 15-20 minutes**
- **High purity RNA**
- **Complete removal of genomic DNA**
- **Isolated RNA is ready for downstream applications**

Applications:
Isolation of RNA from:

- **Animal tissue**
- **Eukaryotic cells**
- **Bacterial cells**

Description: ISOLATE RNA Mini Kit is specially designed for the fast and efficient isolation of extremely pure total RNA from a variety of samples. The kit is compatible with animal tissues, cultured cells and bacterial cells.

The cells are lysed with an optimized lysis buffer, which simultaneously inactivates RNases thus protecting the released RNA. The lysate is then applied to a spin column to selectively remove genomic DNA. There is no need to perform a separate DNase digestion step. The RNA is then bound to a silica membrane. Subsequent wash steps remove the remaining cell debris and pure, high quality RNA is eluted in the final step with RNase-free water (fig. 1).

The isolated RNA shows excellent performance in downstream applications such as reverse transcription, real-time PCR (fig. 2), Northern blot analysis, microarrays and RNA protection assays.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

Associated Products	Cat. No.	Page
SensiFAST SYBR No-ROX One-Step Kit	BIO-72001	09
MyTaq One-Step RT-PCR Kit	BIO-65047	36
Tetro cDNA Synthesis Kit	BIO-65042	37
RiboSafe RNase Inhibitor	BIO-65027	39
Agarose Tablets	BIO-41028	94

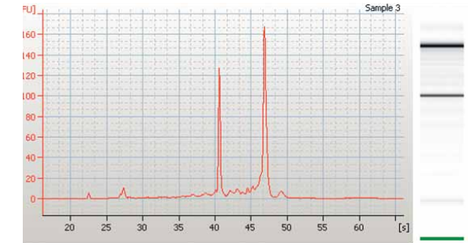


Fig. 1 High quality RNA.
RNA was isolated from HeLa cells using ISOLATE RNA Mini Kit and analyzed using the Bioanalyzer 2100 (Agilent Technologies). The quality of RNA was found to be exceptional (RIN: 9.2).

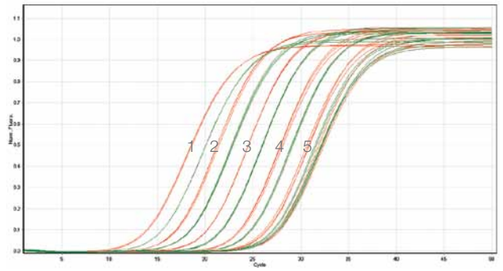


Fig. 2 Superior performance in real time PCR applications.
RNA was isolated from mouse 3T3 cells diluted 10-fold (14000 cells, 1400 cells, 140 cells, 14 cells, 1.4 cells, Lanes 1-5 respectively) using ISOLATE RNA Mini Kit and Supplier Q's kit. Subsequently, real-time reverse transcriptase reactions were performed using SensiFAST SYBR No-Rox One-Step Kit.
Red traces: RNA isolated using ISOLATE RNA Mini Kit.
Green traces: RNA isolated using Supplier Q's kit.

ISOLATE Plant RNA Mini Kit

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Preps	BIO-52039
50 Preps	BIO-52040
250 Preps	BIO-52041

Components	10 Preps	50 Preps	250 Preps
Lysis Buffer APR	1 x 6ml	1 x 30ml	1 x 125ml
Lysis Buffer BPR	1 x 6ml	1 x 30ml	1 x 125ml
Wash Buffer APR	1 x 3ml	1 x 15ml	1 x 70ml
Wash Buffer BPR	1 x 3ml	1 x 15ml	2 x 40ml
RNase-free Water	1 x 1.5ml	1 x 6ml	2 x 15ml
Spin Column PR1	1 x 10	1 x 50	5 x 50
Spin Column PR2	1 x 10	1 x 50	5 x 50
Collection Tube	1 x 60	6 x 50	30 x 50
Elution Tube	1 x 10	1 x 50	5 x 50

Features:
- **Rapid protocol: 30 minutes after homogenization**
- **High purity RNA**
- **Complete removal of genomic DNA**
- **Isolated RNA is ready for downstream applications**

Applications:
Isolation of RNA from:
- **Fresh plant tissue**
- **Frozen plant tissue**

Description: ISOLATE Plant RNA Mini Kit is specially designed for the fast and efficient isolation of extremely pure total RNA from a variety of plant tissues, including leaves, bark, roots, fruits, etc. Up to 100mg starting material can be processed per spin column.

The protocol is easy to follow on a step-by-step basis. Two lysis buffers are provided to ensure lysis of different sample types. The buffers also inactivate RNases, thus protecting the released RNA. The lysate is applied to a spin column to selectively remove genomic DNA, eliminating the need to perform a separate DNase digestion step. The RNA is then bound to a silica membrane. Subsequent wash steps remove the remaining cell debris and pure RNA is eluted in the final step with RNase-free water.

The isolated RNA shows excellent performance in downstream applications such as RT- PCR (fig. 1), reverse transcription (fig. 2), Northern blot analysis, microarrays and RNA protection assays.

Storage Conditions: ISOLATE Kit contents should be stored dry at room temperature. Under these conditions, the kit is stable for 12 months.

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
MyTaq Red DNA Polymerase	BIO-21108	25
BIO-X-ACT Short DNA Polymerase	BIO-21064	29
TRIsure	BIO-38032	69

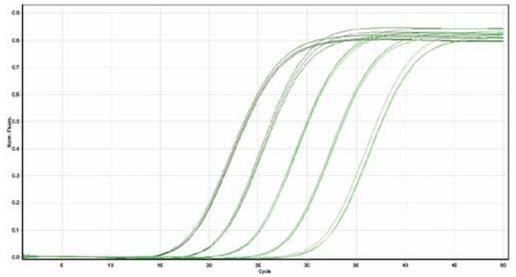


Fig. 1 Superior performance in real-time applications.
RNA was isolated from 20mg freeze-dried budding leaves of *Arabidopsis thaliana* using ISOLATE Plant RNA Mini Kit. cDNA was synthesized using Tetro cDNA Synthesis Kit (BIO-65043) and diluted serially 10-fold. Real-time PCR was performed using primers designed against the UBQ10 gene and SensiFAST SYBR Lo-Rox Kit(BIO-74001).

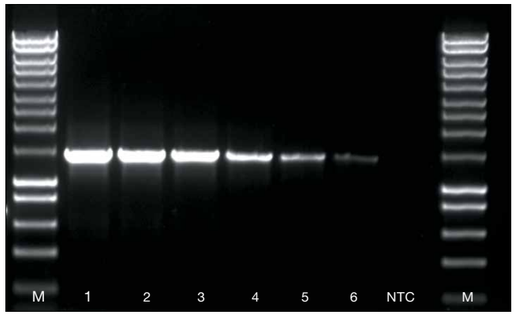


Fig. 2 High yield cDNA obtained from isolated RNA .
RNA was isolated from 20mg freeze-dried budding leaves of *Arabidopsis thaliana* using ISOLATE Plant RNA Mini Kit. cDNA was synthesized using Tetro cDNA Synthesis Kit and diluted serially. PCR was performed using MangoMix to amplify a 1.4Kb fragment of the allene oxide synthase gene. Products were run on a 1.5% agarose gel. Lanes: HyperLadder I (M), 1µl cDNA (1), 2-fold dilution (2), 4-fold dilution (3), 8-fold dilution (4), 16-fold dilution (5), 32-fold dilution (6), negative control, showing no genomic DNA carryover (no-RT control (NTC)).

SureClean

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
5ml	BIO-37042
25ml	BIO-37046

Components	5ml	25ml
SureClean	1 x 5ml	1 x 25ml

Features:
- **Column-free PCR clean-up**
- **Post-PCR recovery up to 98%**
- **Cost-effective and simple protocol**
- **Isolated products are suitable for downstream applications**

Applications:
- **Removes primers, non-specifics, dNTPs and enzymes**
- **DNA or dsRNA purification or concentration**
- **Buffer exchange**

Description: SureClean is a novel, inexpensive solution, which provides a column-free method for nucleic acid purification. Using a simple and rapid procedure, SureClean can be used to purify or concentrate DNA or dsRNA from PCR reactions or any enzymatic digests. This method is easy to follow, combining convenience, speed and excellent recovery rates.

A very straightforward protocol allows the precipitation of nucleic acids ≥75bp with up to 98% recovery of the original sample, without the need for organic solvents, glass milk or expensive spin columns (fig. 1). SureClean purifies nucleic acids without the use of chaotropic salts (which often contribute to denaturation of the DNA duplex). SureClean enables the researcher to re-suspend the cleaned-up nucleic acids in any buffer and volume of choice, thus permitting the purification process to be tailored specifically to suit downstream experiments.

SureClean is compatible with all downstream applications, such as cloning and sequencing.

Product Citations:

1. Aldhoun, J. A., *et al. Parasitol. Int.* **58(3)**, 314-317 (2009).
2. Ward, E. *Meth. Mol. Biol.* **508**, 1-13 (2009).
3. Pecyna, M. J., *et al. Appl.Microbiol. Biotechnol.* **84(5)**, 885-897 (2009).
4. Liapis, E., *et al. NAR* **36(18)**, 5933-5945 (2008).
5. Huang, D., *et al. J. Mol. Evolution* **66(2)**, 167-174 (2008).
6. Shefer, K., *et al. Mol Cell Biol.* **27(6)**, 2130-2143 (2007).
7. Barberi, M., *et al. Reprod.* **134,** 281-292 (2007).
8. D'Amelio, S., *et al. Parasitol.* **134**, 1041-1051 (2007).

Associated Products	Cat. No.	Page
MyTaq HS DNA Polymerase	BIO-21111	19
ACCUZYME DNA Polymerase	BIO-21051	24
MyTaq DNA Polymerase	BIO-21105	25
BIO-X-ACT Short DNA Polymerase	BIO-21064	29

SureClean Plus

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
5ml	BIO-37047
25ml	BIO-37048

Components	5ml	25ml
SureClean	1 x 5ml	2 x 12.5ml
Co-precipitant Pink	1 x 0.8ml	2 x 2ml

Features:
- **Column-free PCR clean-up**
- **Post-PCR recovery up to 98%**
- **Cost-effective and simple protocol**
- **Easy visualization of the purified pellet**

Applications:
- **Removes primers, non-specifics, dNTPs and enzymes**
- **DNA or dsRNA purification or concentration**
- **Buffer exchange**

Description: SureClean is a novel, inexpensive solution, which provides a column-free method for nucleic acid purification. Using a simple and rapid procedure, SureClean can be used to purify or concentrate DNA or dsRNA from PCR reactions or any enzymatic digests. This method is easy to follow, combining convenience, speed and excellent recovery rates.

SureClean Plus incorporates a pink co-precipitant that offers the distinct advantage of easy visualization of the purified pellet. Co-precipitant Pink is a synthetic polyacrylamide, designed to aid recovery of nucleic acids. Co-precipitant Pink does not contain any detectable amounts of nucleic acids, and is suitable for use in standard PCR, RT-PCR, and other enzymatic reactions.

Note: Nucleic acids purified with SureClean Plus are not suitable for spectral determination of nucleic acids within the 260nm - 280nm range. Should you wish to carry out such experiments, the use of SureClean is recommended.

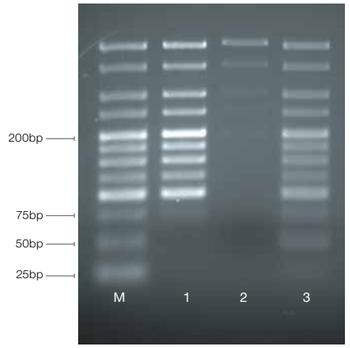


Fig. 1 DNA purification using SureClean and Supplier Q's & X's spin column purification methods.
30µl of HyperLadder V was purified using the manufacturer's protocols.
For each of the methods DNA was resuspended in 30µl TE, of which 5µl was loaded on to a 3.5% agarose gel. Lanes: HyperLadder V (M), HyperLadder V purified using SureClean (1), HyperLadder V purified using spin-columns from Supplier X (2), HyperLadder V purified using spin-colums from Supplier Q (3).

TRIsure™

Storage +4°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
100ml	BIO-38032
200ml	BIO-38033

Features:
- **Isolation of high-quality RNA in 60 minutes**
- **Ready-to-use solution for a wide variety cells and tissues**
- **Cost-effective and simple protocol**
- **Isolated RNA is ready for downstream applications**

Applications:
Isolation of RNA from:
- **Animal tissues**
- **Cultured cells**
- **Plant tissues**
- **Bacterial cells**

Description: TRIsure is a ready-to-use reagent for the isolation of high quality total RNA from diverse biological materials, including animal tissues and cells, as well as plant tissues rich in polysaccharides and proteoglycans. TRIsure maintains the integrity of the extracted RNA, while disrupting cells and subsequently dissolving cellular components.

The biological sample is homogenized or lysed in TRIsure and then separated into organic and aqueous phases. The RNA remains in the aqueous phase and is subsequently recovered by precipitation with isopropyl alcohol. High yields (Table 1) and high quality RNA with minimal genomic DNA contamination, is extracted from various samples (fig. 1).

A volume of 1ml of TRIsure is sufficient to isolate total RNA from 1 x 10^7 cells or 100mg of tissue. The isolation method is rapid and straightforward.

Using intact RNA as provided by TRIsure, is a key element in obtaining reliable gene expression data in downstream applications such as RT-PCR, microarray, hybridization assays, and *in vitro* translation.

Storage Conditions:: TRIsure can be stored for 6 months at +4°C.

Product Citations:

1. Hedtke, B., *et al. NAR* **37(11)**, 3739-3746 (2009).
2. Tsuda, M., *et al. J. Cell. Mol . Med.* **13**, 412-603 (2009).
3. Schroeckh. V., *et al. PNAS* **106**, 14558-14563 (2009).
4. Yamazaki, S., *et al. Biochim. Biophys. Acta* **1779**, 2108-2114 (2009).
5. Yamazaki, S., *et al., J. Biol. Chem.* **283**, 32404-32411 (2008).
6. Ohmori, Y., *et al. Plant Cell Physiol.* **49(8)**,1176-1184 (2008).
7. Yamauchi, M., *et al. Gene* **426**, 81-90 (2008).
8. Tozaki-Saitoh, H., *et al. J. Neurosci.* **28(19)**, 4949-4956 (2008).
9. Chincinska, I. A., *et al. Plant Physiol.* **146**, 515-528 (2008).

Associated Products	Cat. No.	Page
SensiFAST SYBR No-ROX One-Step Kit	BIO-72001	9
MyTaq One-Step RT-PCR Kit	BIO-65047	36
Tetro cDNA Synthesis Kit	BIO-65044	37
Agarose Tablets	BIO-41028	94

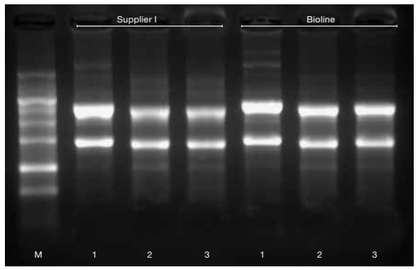


Fig. 1 High quality and yield of RNA extracted using TRIsure.
RNA extracted from 3T3 cells and mouse tissue, using TRIsure and Supplier I reagent. Lanes: 4µg of total RNA from 3T3 cells (1), 4µg of total RNA from mouse kidney tissue (2), 4µg of total RNA from mouse liver tissue (3), RiboLadder Long (M).

Table 1. Expected yield of RNA from different samples using TRIsure

Sample type	Sample quantity	Expected yield
Cultured epithelial cells	1 x 10^6	8-15µg
Cultured fibroblasts	1 x 10^6	20-25µg
Mouse kidney tissue	1mg	2-5µg
Mouse liver tissue	1mg	5-10µg

TRIsure™ Plus Bacterial RNA Isolation Kit

Storage +4°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
TRIsure Plus Bacterial RNA Isolation Kit	
100 Preps	BIO-38038
200 Preps	BIO-38039
Bacterial Enhancement Reagent	
20ml	BIO-38037

Features:
- **Improved lysis of bacterial cells for RNA isolation**
- **Increase yield and quick isolation of high-quality RNA**
- **No mechanical or enzymatic lysis steps required**
- **RNA isolation from Gram-positive and Gram-negative bacteria**

Applications:
- **RT-PCR**
- **Hybridization assays**
- ***in vitro* translation**

Description: The TRIsure Plus Bacterial RNA Isolation Kit is designed to enhance the isolation of high-quality RNA from hard-to-lyse Gram-positive and Gram-negative bacteria. Bioline has developed TRIsure Plus Bacterial RNA Isolation Kit. The kit contains a proprietary Bacterial Enhancement Reagent, in addition to TRIsure, this greatly improves the isolation of RNA by promoting protein degradation and inactivating endogenous RNases (fig. 1).

The bacterial cells are initially pre-treated with the Bacterial Enhancement Reagent and incubated at high temperature. TRIsure reagent is then added to dissolve the cell components and maintain the integrity of the extracted RNA (fig. 2).

Storage Conditions:: TRIsure Plus Bacterial RNA Isolation Kit can be stored for 12 months at +4°C and Bacterial Enhancement Reagent can be stored for 6 months at room temperature.

Associated Products	Cat. No.	Page
SensiFAST SYBR No-ROX One-Step Kit	BIO-72001	9
MyTaq One-Step RT-PCR Kit	BIO-65047	36
Tetro cDNA Synthesis Kit	BIO-65044	37
Agarose Tablets	BIO-41028	94

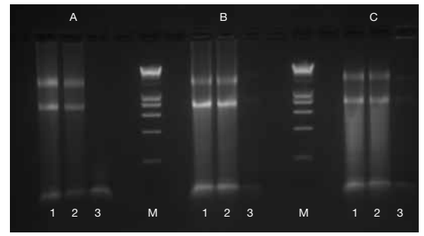


Fig. 1 Increased RNA yield using Bacterial Enhancement Reagent.
RNA was extracted from three different strains of log phase bacterial cultures using TRIsure with and without Bacterial Enhancement Reagent. One tenth of the RNA was separated on a 2% agarose TBE gel. Starting volume was 500µl of culture. Lanes 1 & 2: Using Bacterial Enhancement Reagent. Lane 3: Without Bacterial Enhancement Reagent. Lanes: HyperLadder I (M), *E. coli* K12 strain JM109 (A), *Bacillus subtilis* (B), *E. coli* B strain BL21 (C).

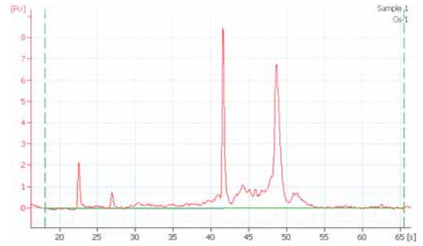


Fig. 2 Isolation of high quality RNA.
1.5ml log phase culture of *Bacillus subtilis* was pre-treated with Bacterial Enhancement Reagent, followed by isolation of RNA using TRIsure. The RNA was analyzed using Bioanalyzer 2100 (Agilent Technologies) and was found to be of high quality and purity.

Table 2. Expected yield of RNA from different bacteria using TRIsure Plus Bacterial RNA Isolation Kit

Sample type	Sample quantity	Expected yield
Gram-negative bacteria (e.g. *E. coli*)	1 x 10^8	>30µg
Gram-positive bacteria (e.g. *Lactococcus lactis*)	1 x 10^8	~3µg

The Core of Successful PCR Reactions

Bioline ultra-pure dNTPs are enzymatically synthesized from premium-quality dNMPs by phosphorylation, using high-throuput, highly specific production systems in our purpose-built facilities.

This manufacturing process eliminates impurities and PCR-specific inhibitors, such as modified nucleotides, tetraphosphates and inorganic pyrophosphates, which are commonly observed in other commercially available dNTP products.

Bioline dNTPs undergo stringent purification steps including quantitative HPLC and possess at least 99% purity.

Nucleotides

Specifications of Ultra-pure dNTPs

The purity of dNTPs is one of the most important parameters for their use in clinical, diagnostic and by molecular biology laboratories. Even trace amounts of impurities present in dNTP preparations may interfere with sensitive technologies, such as low-copy real-time PCR and long range PCR assays. These impurities include deaminated/methylated dNTPs and other deoxynucleoside phosphates, such as dNMP, dNDP, or their tetra- and polyphosphates that can compete with or completely inhibit a PCR reaction; chemicals used during production that may interfer with fluorescence detection in real-time PCR, as well as traces of enzymatic activities (DNase, RNase, and Nickase activity) that will compromise cDNA synthesis. Bioline's ultra-pure dNTPs are enzymatically synthesized from premium quality dNMPs, and purified with quantitative HPLC and possesses at least 99% purity.

Validated Applications:
- **Standard PCR assays**
- **Long range PCR assays**
- **cDNA synthesis/RT-PCR**
- **Real-time PCR**
- **Microarrays**
- **DNA sequencing**
- **Site-directed mutagenesis**

Features:
- **99% pure by HPLC**
- **Extended shelf-life of 24 months at -20°C**
- **Free from PCR inhibitors**
- **DNase, RNase and Nickase free**
- **Supplied as individual dNTPs, in sets and mixes**
- **Genotyping**
- **Labeling**

Custom, bulk and OEM nucleotides service available

	dATP	dCTP	dGTP		dTTP	dUTP	Hydroxymethyl dCTP
Product	dATP lithium 100mM solution	dCTP lithium 100mM solution	dGTP lithium 100mM solution		dTTP lithium 100mM solution	dUTP lithium 100mM solution	Hydroxymethyl dCTP lithium 100mM solution
Nomenclature	2'-deoxyadenosine-5'-triphosphate	2'-deoxycytidine-5'-triphosphate	2'-deoxyguanosine-5'-triphosphate		2'-deoxythymidine-5'-triphosphate	2'-deoxyuridine-5'-triphosphate	5 hydroxymethyl 2'-deoxycytidine-5'-triphosphate
Formula	$C_{10}H_{12}N_5O_{12}P_3Li_4$	$C_9H_{12}N_3O_{13}P_3Li_4$	$C_{10}H_{12}N_5O_{13}P_3Li_4$		$C_{10}H_{13}N_2O_{14}P_3Li_4$	$C_9H_{12}N_2O_{14}P_3Li_4$	$C_{11}H_{12}N_3O_{14}P_3Li_4$
Molecular Weight	514.9g/mol	490.9g/mol	530.9g/mol		505.9g/mol	492.884g/mol	520.9g/mol
λmax pH 7.0	259nm	272nm	252nm		267nm	262nm	275nm
ε at λmax @ pH7.0	15.4 E x $mmol^{-1}$ x cm^{-1}	9.1 E x $mmol^{-1}$ x cm^{-1}	13.7 E x $mmol^{-1}$ x cm^{-1}		9.6 E x $mmol^{-1}$ x cm^{-1}	10.0 E x $mmol^{-1}$ x cm^{-1}	7.7 E x $mmol^{-1}$ x cm^{-1}
A_{250}/A_{260}	0.78 ± 0.03	0.82 ± 0.03	1.16 ± 0.05		0.65 ± 0.03	0.75 ± 0.03	0.90 ± 0.03
A_{280}/A_{260}	0.15 ± 0.02	0.98 ± 0.03	0.66 ± 0.03		0.73 ± 0.02	0.38 ± 0.02	1.33 ± 0.03
Concentration	100mM ± 2%	100mM ± 2%	100mM ± 2%		100mM ± 2%	100mM ± 2%	100mM ± 2%
Appearance	Clear Colorless Solution	Clear Colorless Solution	Clear Colorless Solution		Clear Colorless Solution	Clear Colorless Solution	Clear Colorless Solution
pH of Solution	7.5	7.5	7.5		7.5	7.5	7.5
dNTP (HPLC Area)	≥99%	≥99%	≥99%		≥99%	≥99%	≥99%
dNDP (HPLC Area)	<1%	<1%	<1%		<1%	<1%	<1%
DNase, RNase, Nicking Activity	Negative	Negative	Negative		Negative	Negative	Negative
Storage	at -20°C	at -20°C	at -20°C		at -20°C	at -20°C	at -20°C
Stability	≤24 months	≤24 months	≤24 months		≤24 months	≤24 months	≤24 months

dNTPs Directly from the Manufacturer

Since its foundation in 1992, Bioline has been actively involved in the development and manufacture of ultrapure deoxynucleotides (dNTPs). Our state-of-the-art enzymatic manufacturing processes and facilities, combined with stringent quality assurance and control systems, enable us to manufacture dNTPs with the highest level of quality and performance, crucial for sensitive techniques and critical applications in molecular biology. Bioline is constantly developing and enhancing its production capacity and expertize in the nucleotide area. For example, Hydroxymethyl dCTP is a novel nucleotide analogue that is manufactured exclusively by Bioline and can be used as a substrate for DNA polymerases. Bioline's Hydroxymethyl dCTP can be used to generate PCR products in which cytosines are uniformly replaced by hydroxymethylated cytosines and have exciting applications in forensic DNA analysis, site-directed mutagenesis and in the production of DNA fragments resistant to cleavage by methyl–sensitive endonucleases.

Quality Control

Bioline's ultra-pure dNTPs undergo functional tests with a wide range of assays (Fig. 1) to guarantee outstanding results.

Performance and Sensitivity

Ultra-pure dNTPs have been validated for use in a variety of molecular biology applications including highly sensitive techniques such as real-time PCR (Fig. 2), long range PCR (Fig. 3), RT-PCR (Fig. 4) and low-copy or rare-message assays (Fig. 5).

High Efficiency PCR Reactions

Real-time PCR is perhaps the most sensitive technique for gene expression analysis and is reliant upon the quality of reagents to yield reliable data. Bioline's ultra-pure dNTPs used in combination with a highly efficient hot-start DNA polymerase are ideal for PCR methods over a large variety of cDNA/DNA template preparations and are used in all of Bioline's real-time mixes.

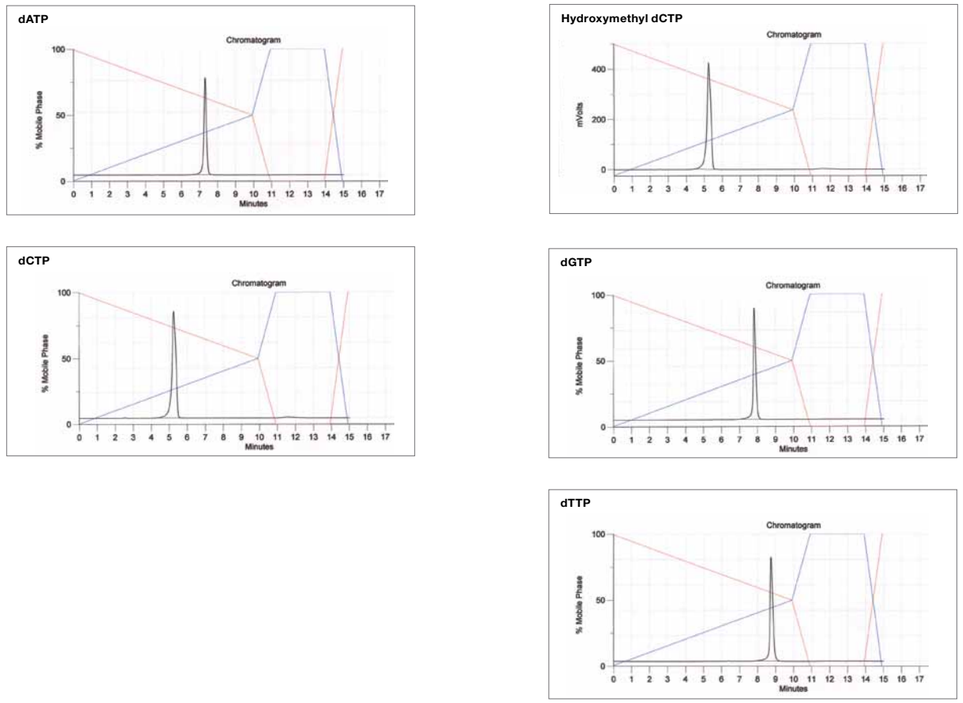


Fig. 1 HPLC Chromatograms of Bioline dNTPs show extremely high level of purity.

Extended Storage Life

Bioline's dNTPs have the distinct advantage of being presented as lithium salts. dNTPs presented in lithium salts are more resistant to repeated freeze/thaw cycles and remain sterile during storage (lithium ions exhibit bacteriostatic activity towards most microorganisms). dNTPs are more soluble as lithium salts than sodium salts. This is particularly important for dGTP, which has a tendency to precipitate during freezing, thereby causing an imbalance in the final dNTP concentration. Lithium salts are also more soluble in ethanol than sodium salts, so their removal by ethanol precipitation is more efficient, as it reduces salt artifacts and increases the efficiency of sequencing and labeling applications.

Bioline's dNTPs are stable for 24 months when stored in a -20°C constant-temperature freezer.

Configurations

Bioline's dNTPs are available as both convenient 100mM sets (in four pack sizes) and as ready-to-use dNTP mixes. The dNTP mixes can be added directly to amplification reactions to save time, reduce the risk of contamination and ensure the reproducibility of results. The dNTP solutions are ready-to-use at pH 7.5 in lithium salts, which offer improved stability of the dNTPs in reactions, and a longer shelf life as compared with sodium salts.

Bulk and Custom Orders

Being a primary manufacturer, Bioline can accommodate requests from micro-liter to multi-liter quantities. We can manufacture special batches with unique formulations, blends and mixes to your requirements. Private labeling and packaging arrangements are also possible. We welcome on-site audits by our bulk, custom and OEM partners.

Visit our dedicated micro site **www.bioline.com/custom** for more information.

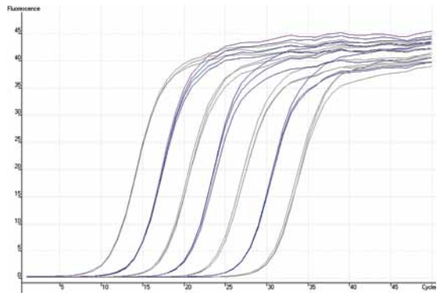


Fig. 2 qPCR over a Broad Dynamic Range.
Bioline's dNTPs are validated for use in real-time PCR experiments. A fragment of the GAPDH gene was amplified and the results show exact replicates over a dynamic range of 1 x 10^7.

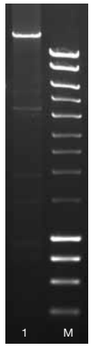


Fig. 3 Exceptional PCR Amplification.
To demonstrate the high level of purity of Bioline's dNTPs, a long-range 20Kb PCR reaction was performed using ultra-pure dNTPs and BIO-X-ACT Long DNA polymerase (1). HyperLadder I (M)

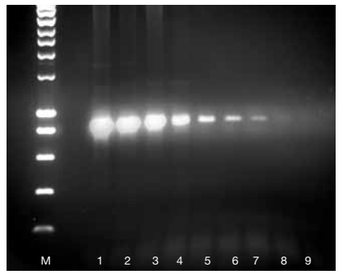


Fig. 4 Reverse Transcription PCR.
Various quantities of Total HeLa cell RNA were reverse-transcribed using Bioline's dNTPs, Reverse Transcriptase and Oligo(dT)$_{18}$ primer in a 20µl reaction, 50ng (1), 25ng (2), 10ng (3), 1ng (4), 500pg (5), 250pg (6), 100pg (7), 50pg (8) and 0pg (9). HyperLadder I (M). Subsequently, 5µl of each reaction was used in conjunction with a β-actin specific primer to amplify an 860bp band.

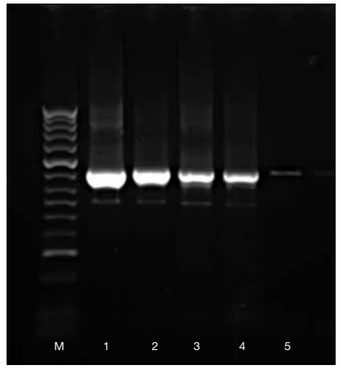


Fig. 5 Low template concentration assay.
Successful amplification of a fragment of a human gene from 50ng (1) to 0.1ng (5) of human genomic DNA template using Bioline's dNTPs. HyperLadder II (M).

dNTP Sets & Mixes

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	FINAL CONC.	PRESENTATION	CAT NO.
dNTP Sets			
4 x 25µmol	100mM total	4 x 250µl	BIO-39025
4 x 100µmol	100mM total	4 x 4 x 250µl	BIO-39026
4 x 100µmol	100mM total	4 x 1ml	BIO-39049
4 x 500µmol	100mM total	4 x 20 x 250µl	BIO-39027
dNTP Mixes			
10µmol	10mM total	1 x 1ml	BIO-39044
100µmol	10mM total	10 x 1ml	BIO-39053
20µmol	40mM total	1 x 500µl	BIO-39043
50µmol	100mM total	1 x 500µl	BIO-39028
200µmol	100mM total	4 x 500µl	BIO-39029
dUTP Mix			
25µmol	50mM total	1 x 500µl	BIO-39041

Features:

- **Ultra-pure: >99% trisphosphate by HPLC**
- **Free from PCR inhibitors**
- **DNase, RNase and Nickase free**
- **Presented in lithium salts**
- **Choice of sets or mix packs**

Applications:

- **Standard and long range PCR assays**
- **cDNA synthesis**
- **Real-time PCR**
- **Microarrays**
- **DNA sequencing**
- **Low-copy assays**
- **Genotyping**

Description: Manufactured by Bioline in a purpose-built facility, a set of ready-to-use molecular grade ultra-pure dNTP solutions consisting of 4 separate 100mM solutions of dATP, dGTP, dCTP, and dTTP, at pH 7.5 and supplied as lithium salts in purified water.

The ultra-pure dNTP Mix contains the dATP, dGTP, dCTP, and dTTP solutions in one tube and is designed to save hands-on time for researchers and minimize the possibility of contamination and pipetting errors.

Storage Conditions: dNTP Set, dNTP Mix & dUTP Mix can be stored for 24 months at -20°C. Avoid multiple freeze/thaw cycles. For long-term storage, aliquoting is recommended.

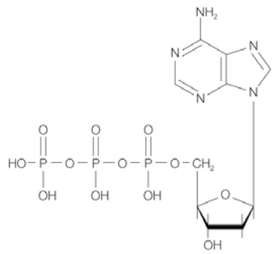
Product Citations:

dNTP Sets
1. Rip, D., *et al. Food Analyt. Meth.* **2**, 190-196 (2009).
2. Thomson, S., *et al. Meth. Mol. Biol.* **512**, 233-248 (2009).
3. Hayden, M. J., *et. al. BMC Genom.* **9,** 80-85 (2008).
4. Mayor, N. P., *et al. J. Immunol. Meth.* **327(1/2)**, 82-87 (2007).
5. Tabone, T., *et al. NAR* **34(6)**, e45 (2006).
6. Dean, Y. D., *et al. J. Biol. Chem.* **275(44)**, 34382-34392 (2000).

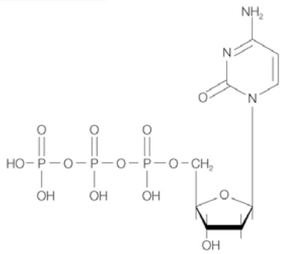
dNTP Mixes
1. Meijer, P-J., *et al. Meth. Mol. Biol.* **525(3)**, 1-17 (2009).
2. Zampolla, T., *et al. Cryobiol.* **59 (2)**, 188-194 (2009).
3. Hampson, L., *et al. FEBS Lett.* **581(21)**, 3955-3960 (2007).
4. Tayeb, M. T., *et al. British J. Can.* **88**, 928-932 (2003).
5. Charlton, K. A., *et al. J. Immunol.* **164**, 6221-6229 (2000).

dUTP Mixes
1. Dyson, M. R., *et al. NAR* **36(9)**, e51 (2008).

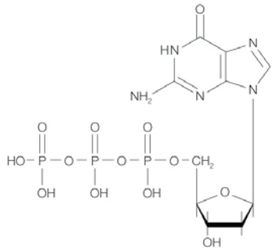
dATP



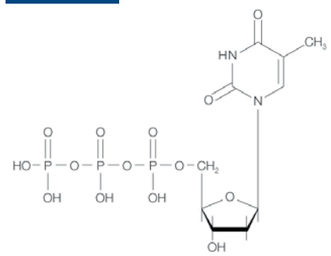
dCTP



dGTP



dTTP



Associated Products	Cat. No.	Page
IMMOLASE DNA Polymerase	BIO-21046	21
ACCUZYME DNA Polymerase	BIO-21051	24
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

Individual **dNTPs**

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	FINAL CONC.	PRESENTATION	CAT NO.
dATP			
25µmol	100mM	1 x 250µl	BIO-39036
dCTP			
25µmol	100mM	1 x 250µl	BIO-39038
dGTP			
25µmol	100mM	1 x 250µl	BIO-39037
dTTP			
25µmol	100mM	1 x 250µl	BIO-39039
dUTP			
25µmol	100mM	1 x 250µl	BIO-39035

Features:

- **Ultra-pure: >99% trisphosphate by HPLC**
- **Free from PCR inhibitors**
- **DNase, RNase and Nickase free**
- **Bulk and OEM sizes available**

Applications:

- **Standard and long range PCR assays**
- **cDNA synthesis**
- **Real-time PCR**
- **Low-copy assays**
- **Microarrays**
- **DNA sequencing**
- **Labeling**

Description: Manufactured by Bioline in a purpose-built facility, ready-to-use molecular grade individual ultra-pure dNTP solutions at pH 7.5 supplied as lithium salts in purified water. For use in a wide range of applications including DNA polymerization reactions, DNA Labeling, and sequencing processes.

The ultra-pure dUTP Mix is a solution containing 10mM of each dATP, dGTP, dCTP and 20mM dUTP at pH 7.5 supplied as lithium salts in purified water. The mix is designed to save hands-on time for researchers and minimize the possibility of contamination.

Storage Conditions: Ultra-pure dNTPs can be stored for 24 months at -20°C. Avoid multiple freeze/thaw cycles. For long-term storage, aliquoting is recommended.

Product Citations:

dNTPs
1. Meijer, P-J., *et al. Meth. Mol. Biol.* **525(3)**, 1-17 (2009).
2. Dellinger, M., *et al. Develop. Biol.* **319(2)**, 309-320 (2008).
3. Hampson, L., *et al. FEBS Lett.* **581(21)**, 3955-3960 (2007).
4. Lloyd, R. E., *et al. Gene.* **172**, 2515-2527 (2006).
5. Tabone, T., *et al. NAR* **34(6)**, e45 (2006).

dUTP
1. Konstantou, J. K., *et al. Eur. J. Human Gene.* **17**, 105-111 (2009).
2. Liontos, M., *et al. Am. J. Pathol.* **175**, 376-391 (2009).
3. Brown, J. T., *et al. BMC Med. Gen.* **7(69)**, (2006).
4. Pass, M. A., *et al. J. Clin. Microbiol.* **38(5)**, 2001-2004 (2000).

Associated Products	Cat. No.	Page
ACCUZYME DNA Polymerase	BIO-21051	24
BIO-X-ACT Short DNA Polymerase	BIO-21064	29
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

Hydroxymethyl **dCTP**

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	FINAL CONC.	PRESENTATION	CAT NO.
25µmol	100mM	1 x 250µl	BIO-39046

Features:

- **>99% pure by HPLC**
- **Readily incorporated by standard DNA polymerases**
- **Hydroxymethylated substrates can be ligated by standard ligases**
- **DNase, RNase and Nickase free**

Applications:

- **Site-directed mutagenesis**
- **Substitution of dCTP in a wide variety of molecular biology assays**
- **Structural and activity studies of the restriction/ modification systems of different organisms**
- **Labeling of DNA *in vitro***
- **Methylation studies**
- **Studies of hydroxymethylated DNA/protein interaction**

Description: Manufactured by Bioline in a purpose-built facility, Bioline has developed a novel method for producing highly purified Hydroxymethyl dCTP. Using a unique enzymatic synthesis method, Bioline have been able to mimic the biological steps in the synthesis of Hydroxymethyl dCTP from T-even phages. Highly purified Hydroxymethyl dCTP can be used in a number of molecular biological applications.

Hydroxymethyl dCTP can be used as a substrate for several DNA polymerases under conditions that permit the amplification of DNA containing hydroxymethylated cytosine in place of cytosine. Hydroxymethyl dCTPs can be used to discriminate between the different DNA molecules synthesized in one or several PCR cycles. By the use of appropriate enzymes, it is possible to separate the un-hydroxymethylated starting material from the hemi-hydroxymethylated intermediate (produced by a single primer extension reaction) and from the fully-hydroxymethylated end product.

This ability to generate PCR products in which cytosine is uniformly replaced by hydroxymethylated cytosine can be applied to: forensic DNA analysis, the development of novel strategies for site-directed mutagenesis and the production of DNA fragments resistant to cleavage by a wide range of restriction endonucleases and can be useful in the generation of cDNA libraries.

Storage Conditions: Hydroxymethyl dCTP can be stored for 24 months at -20°C. Avoid multiple freeze/thaw cycles. For long-term storage, aliquoting is recommended.

Product Citation:

1. Tahiliani, M., *et al. Sci.* **324**, 930-935 (2009).
2. Charlton, K.A., *et al. J. Immunol.* **164**, 6221-6229 (2000).

Associated Products	Cat. No.	Page
IMMOLASE DNA Polymerase	BIO-21046	21
ACCUZYME DNA Polymerase	BIO-21051	24
α-Select Bronze Efficiency	BIO-85025	48
CH3-Blue 10^{β} Chemically Competent Cells	BIO-85040	49

Ultra-pure NTPs

Bioline ultra-pure NTPs (Ribonucleoside-5'-tri-phosphates) are enzymatically synthesized from premium quality raw materials, using highly specific production systems, in our purpose-built facilities. The manufacturing process eliminates impurities, such as ribo-analogue and other contaminants commonly observed in other commercially available NTP products. Bioline NTPs are >98% pure as analyzed by HPLC and are free of DNase, RNase, Protease, Phosphatase and Nickase activity.

	ATP	CTP	GTP	UTP
Product	ATP Sodium 100mM Solution	CTP Sodium 100mM Solution	GTP Sodium 100mM Solution	UTP Sodium 100mM Solution
Nomenclature	Adenosine 5'-triphosphate	Cytidine 5'-triphosphate	Guanosine 5'-triphosphate	Uridine 5'-triphosphate
Formula	$C_{10}H_{16}N_5O_{13}P_3$	$C_9H_{16}N_3O_{14}P_3$	$C_{10}H_{16}N_5O_{14}P_3$	$C_9H_{15}N_2O_{15}P_3$
Concentration	100mM ± 2%	100mM ± 2%	100mM ± 2%	100mM ± 2%
Appearance	Clear Colorless Solution	Clear Colorless Solution	Clear Colorless Solution	Clear Colorless Solution
pH of Solution	7.5	7.5	7.5	7.5
NTP (HPLC Area)	≥98%	≥98%	≥98%	≥98%
NDP (HPLC Area)	<2%	<2%	<2%	<2%
DNase, RNase, Nicking Activity	Negative	Negative	Negative	Negative
Storage	at -20°C	at -20°C	at -20°C	at -20°C
Stability	≤12 months	≤12 months	≤12 months	≤12 months

NTP Set & Mix

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	FINAL CONC.	PRESENTATION	CAT NO.
NTP Set			
4 x 25µmol	100mM	4 x 250µl	BIO-39052
NTP Mix			
100µmol	100mM	1ml	BIO-39050

Features:
- **Validated for *in vitro* transcription**
- **DNase, RNase and Nickase free**
- **98% pure by HPLC**
- **Convenient, pre-optimized mix available**

Applications:
- ***In vitro* transcription reactions**
- **Production of RNA probes and transcripts**

Description: Manufactured by Bioline in a purpose-built facility, the ultra-pure NTP Set consists of 4 separate 100mM solutions (ATP, GTP, CTP, and UTP, (pH 7.5)) as sodium salts. Each solution contains 25µmol (250µl) of the corresponding NTP. For *in vitro* RNA synthesis, mix equal volumes of all separate NTP solutions.

The ultra-pure NTP Mix is a solution containing 25µmol of each ATP, GTP, CTP and UTP (pH 7.5) as sodium salts in a convenient mix at 100mM (total NTP concentration).

Storage Conditions: NTPs and NTP mix can be stored for 12 months at -20°C. Avoid multiple freeze/thaw cycles. For long-term storage, aliquoting is recommended.

Product Citations:

1. Kleman-Layer, K. M., *et al. Assays & Drug Dev. Tech.* **7**,56-67 (2009).
2. Llarena, M., *et al. Biochim. Biophys. Acta* **1760(12)**, 1819-1826 (2006).
3. Peyvandi, F., *et al. Blood* **97(4)**, 960-965 (2001).

Bulk, Custom and OEM Services

When your requirements are beyond the scope of our standard product range, take advantage of our bulk, custom and OEM service. We provide custom made solutions to industrial and bulk partners and welcome new partners with specific product needs. Bioline can accommodate requests from micro-liter to multi-liter quantities, manufacturing special batches with unique formulations, blends and mixes as well as labeling and packaging to your requirements.

For bulk and custom services please contact **custom@bioline.com**

BIOLINE
A Meridian Life Science® Company

Standards You Can Rely On

DNA Ladders are nucleic acid fragments of specific base pair length, designed for sizing linear double-stranded DNA fragments. Bioline ready-to-use DNA HyperLadders includes one, two or three higher intensity reference bands for easy identification and orientation. HyperLadders are supplied premixed with loading buffer and are stable at room temperature. There is no need to heat or dilute HyperLadders prior to loading them onto a gel.

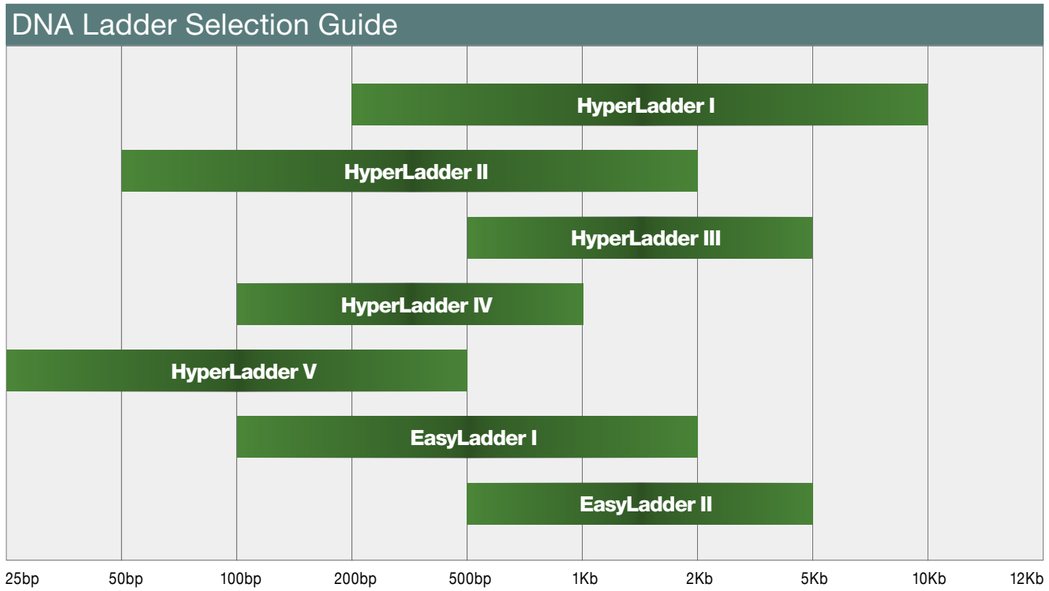
EasyLadders contain all the features of our HyperLadder range, but are designed for short runs (1 to 3cm) in standard or high-throughput agarose gels, providing a fast way to determine size and quality of DNA fragments.

HyperPAGE pre-stained protein ladder enables you to easily identify your protein bands on polyacrylamide electrophoresis.

Molecular Weight Markers

HyperLadders & EasyLadders

Bioline offers a wide range of DNA Ladders premixed with Loading Buffer, enabling accurate sizing of DNA ranging between 25bp and 10,000bp and optional mass determination. The ready-to-use format minimizes the time spent diluting and adding tracking dye to the DNA Ladder. Simply transfer the Ladder from the vial to the gel. An additional 5x Sample Loading Buffer is supplied for your convenience.



Separation of DNA Ladders				
Ladder	Separation Range (bp)	Leading Dye Color	High Intensity Bands (bp)	Page No.
HyperLadder I	200 - 10,000	Blue	1000 & 10,000	85
HyperLadder II	50 - 2000	Blue	300, 1000 & 2000	85
HyperLadder III	500 - 5000	Red	1000 & 3500	86
HyperLadder IV	100 - 1000	Blue	300 & 1000	86
HyperLadder V	25 - 500	Blue	100 & 200	87
EasyLadder I	100 - 2000	Red	Even Bands	87
EasyLadder II	500 - 5000	Red	Even Bands	88

To minimize preparation time, DNA ladders are available with loading buffer in a ready-to-use format. Bioline's wide range of DNA Ladders are available in a ready-to-use format with loading buffer.

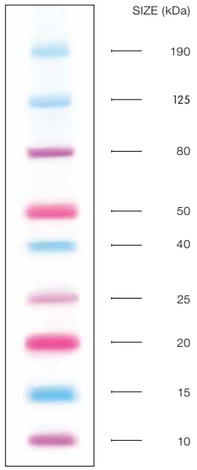
HyperLadders are created for accurate sizing of DNA fragments on agarose gels. EasyLadders are for shorter runs and can be run on standard or high-throughput agarose gels.

Colored DNA Loading Buffers Blue, Red and TriColor

Crystal DNA Loading Buffers, page 89, allow users to monitor DNA migration and therefore by choosing the buffer suitable to their application, increase the versatility of their DNA analysis.

HyperPAGE Prestained Protein Marker

HyperPAGE, page 90, is a broad range protein marker consisting of 9 highly purified discrete proteins with approximate masses ranging from 10 to 190kDa. The proteins are prestained with fluorescent dyes and resolve into 4 blue and 5 pink bands, for easy visualization and orientation. Ideal for monitoring separation of proteins in SDS-PAGE and the transfer of proteins to membranes in Western blotting.



HyperPAGE
Band sizes are approximate

HyperLadder™ I

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
200 Lanes	BIO-33025
500 Lanes	BIO-33026

Components	200 Lanes	500 Lanes
HyperLadder I	2 x 500µl	5 x 500µl
5x Sample Loading Buffer	1 x 1ml	1 x 1ml

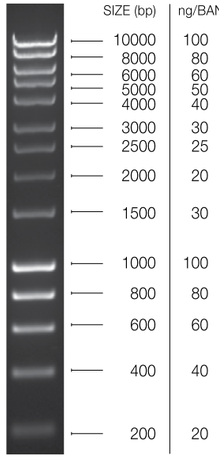
Features:

- **14 bands from 200bp - 10,000bp**
- **Accurate size determination**
- **Optional mass determination**
- **Easy identification and orientation**
- **Ready-to-use format**

Description: HyperLadder™ I is a popular ready-to-use molecular weight marker, especially designed for easy DNA quantification and size determination. This ready-to-use format reduces handling steps and saves time; simply transfer HyperLadder I from the vial to the gel.

HyperLadder I produces a pattern of 14 regularly spaced bands, ranging from 200 to 10,000bp. To allow easy identification and orientation, the 1000 and 10,000bp bands have the highest intensity.

A 5x sample loading buffer is supplied for your convenience.



1% agarose gel
5µl per lane

Storage Conditions:
HyperLadder I can be stored for up to 6 months at room temperature, 12 months at +4°C, or up to 24 months at -20°C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.

Product Citations:

1. Lynch, A. G., *et al. BMC Biotechnol.* **10**, 30 (2010).
2. Puspitaningrum, R., *et al. HAYATI J. Biosci.* **17(3)**, 110-114 (2010).
3. Freilas, S. S., *et al. Sep. Purifi. Technol.* **65**, 95-104 (2009).
4. Hobman, J. L., *et al. J. Bacteriol.* **189**, 8786-8792 (2007).
5. Candolfi, M., *et al. Mol. Therapy* **14**, 371–381 (2006).
6. Hutchison, C. A., *et al. PNAS USA* **102(48)**, 17332-17336 (2005).

HyperLadder™ II

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
200 Lanes	BIO-33039
500 Lanes	BIO-33040

Components	200 Lanes	500 Lanes
HyperLadder II	2 x 500µl	5 x 500µl
5x Sample Loading Buffer	1 x 1ml	1 x 1ml

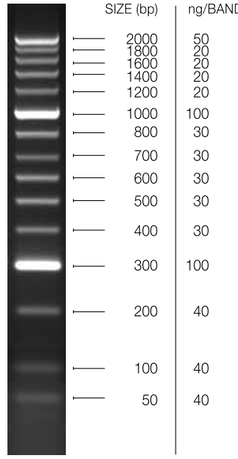
Features:

- **15 bands from 50bp - 2000bp**
- **Accurate size determination**
- **Optional mass determination**
- **Easy identification and orientation**
- **Ready-to-use format**

Description: HyperLadder™ II is a ready-to-use molecular weight marker, especially designed for easy size determination. This ready-to-use format reduces handling steps and saves time; simply transfer HyperLadder II from the vial to the gel.

HyperLadder II produces a pattern of 15 regularly spaced bands, ranging from 50 to 2000bp. To allow easy identification and orientation, the 300, 1000 and 2000bp bands have the highest intensity.

A 5x sample loading buffer is supplied for your convenience.



1.5% agarose gel
5µl per lane

Storage Conditions:
HyperLadder II can be stored for up to 6 months at room temperature, 12 months at +4°C, or up to 24 months at -20°C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.

Product Citations:

1. Baston-Buest, D. M., *et al. Reproduction* **139**, 741-748 (2010).
2. Quilaguy-Ayure D. M., *et al. Universitas Scientiarum*, **15(1)**, 17-26 (2010).
3. Silva, E., *et al. Vet. Microbiol.* **132**, 111-118 (2008).
4. Phillips, N. E., *et al. J. Exp. Marine Biol. Ecol.* **362 (2)**, 90-94 (2008).
5. Weiss, A., *et al. J. Chromatog.* **853**, 190-197 (2007).
6. Contento, A., *et al. Cyto. Genome Res.* **109**, 34-42 (2005).

HyperLadder™ III

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
200 Lanes	BIO-33043
500 Lanes	BIO-33044

Components	200 Lanes	500 Lanes
HyperLadder III	2 x 500µl	5 x 500µl
5x Sample Loading Buffer	1 x 1ml	1 x 1ml

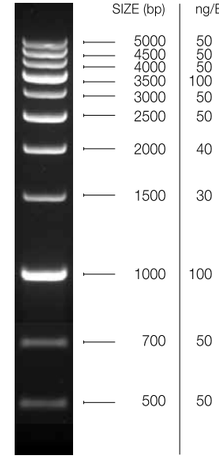
Features:

- **11 bands from 500bp - 5000bp**
- **Accurate size determination**
- **Contains red dye, migrating at 900bp in 1.5% agarose gel**
- **Easy identification and orientation**
- **Ready-to-use format**

Description: HyperLadder™ III is a ready-to-use molecular weight marker, especially designed for easy size determination. This ready-to-use format reduces handling steps and saves time; simply transfer HyperLadder III from the vial to the gel.

HyperLadder III produces a pattern of 11 regularly spaced bands, ranging from 500 to 5000bp. To allow easy identification and orientation, the 1000 and 3500bp bands have the highest intensity. HyperLadder III contains a red dye, migrating at 900bp in 1.5% agarose gel.

A 5x sample-loading buffer is supplied for your convenience.



1.5% agarose gel
5µl per lane

Storage Conditions:
HyperLadder III can be stored for up to 1 month at room temperature, 4 months at +4°C, or up to 12 months at -20°C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.

Product Citations:

1. Beller, H. R., *et al. Biodegradation* **20(1)**, 45-53 (2009).
2. Meyer, J. M., *et al. J. Invertebrate Pathol.* **99(1)**, 96-102 (2008).
3. Siegrist, T. J., *et al. J. Microbiol. Methods* **68(3)**, 554-562 (2007).
4. Letain, T. E., *et al. Appl. and Environ. Microbiol.* **73(10)**,265-3271 (2007).
5. Bhattacharjee, B. & Sengupta, S., *Virol. J.* **354(2)**, 280-285 (2006).
6. Zorzetto, M., *et al. J. Respir. Cell. Mol. Biol.* **27(1)**, 17-23 (2002).

HyperLadder™ IV

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
200 Lanes	BIO-33029
500 Lanes	BIO-33030

Components	200 Lanes	500 Lanes
HyperLadder IV	2 x 500µl	5 x 500µl
5x Sample Loading Buffer	1 x 1ml	1 x 1ml

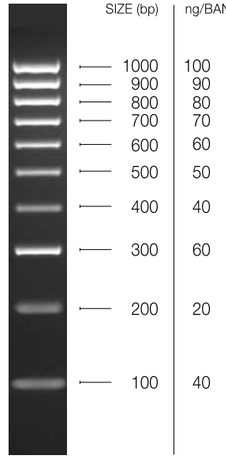
Features:

- **10 bands from 100bp - 1000bp**
- **Accurate size determination**
- **Optional mass determination**
- **Easy identification and orientation**
- **Ready-to-use format**

Description: HyperLadder™ IV is a ready-to-use molecular weight marker, especially designed for easy size determination. This ready-to-use format reduces handling steps and saves time; simply transfer HyperLadder IV from the vial to the gel.

HyperLadder IV produces a pattern of 10 regularly spaced bands, ranging from 100 to 1000bp. To allow easy identification and orientation, the 300pb and 1000bp bands have the highest intensity. Each band is an exact multiple of 100bp.

A 5x sample-loading buffer is supplied for your convenience.



2% agarose gel
5µl per lane

Storage Conditions:
HyperLadder IV can be stored for up to 1 month at room temperature, 4 months at +4°C, or up to 12 months at -20°C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.

Product Citations:

1. Dzahini-Obiatey, H. & Fox, R. *African J. Biotechnol.* **9(5)**, 593-603 (2010).
2. Van den Broeke, A., *et al. BMC Genomics.* **11**, 179 (2010).
3. Tivendale, K. A., *et al. Microbiol.* **155**, 450-460 (2009).
4. Garshasbi, M., *et al. Amer. J. Human Gen.* **82(5)**, 3783-3792 (2008).
5. Buonocore, F., *et al. Mol. Immunol.* **45(11)**, 3168-3177 (2008).
6. Beutin, L., *et al. J. Clin. Microbiol.* **43(4)**, 1552-1563 (2005).

Associated Products	Cat. No.	Page
Agarose, Molecular Grade	BIO-41026	93
Agarose Tablets	BIO-41028	94
Crystal DNA Loading Buffer	BIO-37045	99

HyperLadder™ V

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
200 Lanes	BIO-33031
500 Lanes	BIO-33032

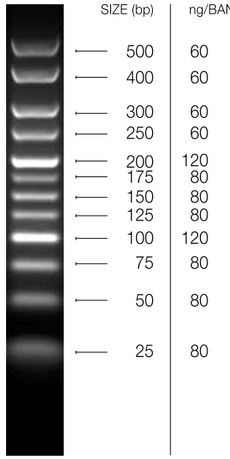
Components	200 Lanes	500 Lanes
HyperLadder V	2 x 500µl	5 x 500µl
5x Sample Loading Buffer	1 x 1ml	1 x 1ml

Features:
- **12 bands from 25bp - 500bp**
- **Accurate size determination**
- **Optional mass determination**
- **Easy identification and orientation**
- **Ready-to-use format**

Description: HyperLadder™ V is a ready-to-use molecular weight marker for size determination of DNA fragments. It is especially designed for short fragments such as apoptotic DNA oligonucleotides. This ready-to-use format reduces handling steps and saves time; simply transfer HyperLadder V from the vial to the gel.

HyperLadder V produces a pattern of 12 regularly spaced bands, ranging from 25 to 500bp. To allow easy identification and orientation, the 100 and 200bp bands have the highest intensity.

A 5x sample-loading buffer is supplied for your convenience.



3.5% agarose gel
5µl per lane

Storage Conditions:
HyperLadder V can be stored for up to 6 months at room temperature, 12 months at +4°C, or up to 24 months at -20°C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.

Product Citations:

1. Flórez, O., *et al. Parasitol. Res.* **107(2)**, 439-442 (2010).
2. Vreulink, J.-M., *et al. J. App. Microbiol.* **109(4)**, 1411–1421 (2010).
3. Robinson, T., *et al. Anal. Chem.* **81(1)**, 302-306 (2009).
4. Thomson, S., *et al. Meth. Mol. Biol.* **512**, 233-248 (2009).
5. Williamson, M. R., *et al. J. Cell Sci.* **121**, 2696-2704 (2008).
6. Karpinsky, P., *et al. Mol. Can. Res.* **6**, 585-601 (2008).

EasyLadder I

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
200 Lanes	BIO-33045
500 Lanes	BIO-33046

Components	200 Lanes	500 Lanes
EasyLadder I	2 x 500µl	5 x 500µl
5x Sample Loading Buffer	1 x 1ml	1 x 1ml

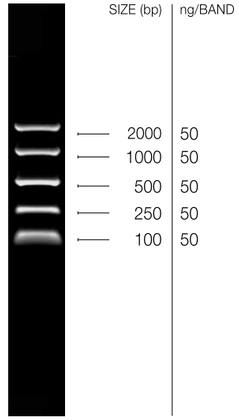
Features:
- **5 bands from 100bp - 2000bp**
- **Relative quantitation**
- **Ready-to-use format**

Applications:
- **Ideal for short runs**
- **Ideal for high-throughput applications**

Description: EasyLadder I is a ready-to-use DNA molecular weight marker, especially designed for DNA analysis in standard and high-throughput agarose gels. The ladder is premixed with red loading buffer.

EasyLadder I contains 5 even-intensity bands ranging from 100 to 2000bp for easy identification of the DNA samples analyzed. EasyLadder I is ideal for short runs (1 to 3cm) on agarose gels.

When the standard loading volume of 5µl per lane (250ng of DNA) is being used, each band corresponds to a precise quantity of 50ng, which enables the user to determine the relative concentration of the DNA sample to be analyzed as well as its molecular weight.



2% agarose gel
5µl per lane

Storage Conditions: EasyLadder I can be stored for up to 1 month at room temperature, 4 months at +4°C, or up to 12 months at -20°C. Avoid multiple freeze/thaw cycles.

Product Citations:

1. Cavill, L., *et al. Food Microbiol.* **doi:10.1016/j.fm.2011.01.003** (2011).
2. Tasker, S., *et al. J. Med. Microbiol.* **59**, 1285-1292 (2010).
3. Bonilla-Findji, O., *et al. Appl. Enviro. Microbiol.* **75(14)**, 4801-4812 (2009).
4. Yu, J., *et al. Infection and Immunity* **77(2)**, 585-597 (2009).
5. Mutch, L. A., *et al. Advanced Materials. Res.* **20/21**, 485-488 (2007).

EasyLadder II

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
200 Lanes	BIO-33047
500 Lanes	BIO-33048

Components	200 Lanes	500 Lanes
EasyLadder II	2 x 500µl	5 x 500µl
5x Sample Loading Buffer	1 x 1ml	1 x 1ml

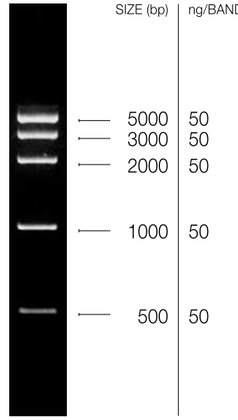
Features:
- **5 bands from 500bp - 5000bp**
- **Relative quantitation**
- **Ready-to-use format**

Applications:
- **Ideal for short runs**
- **Ideal for high-throughput applications**

Description: EasyLadder II is a ready-to-use DNA molecular weight marker, especially designed for DNA analysis in standard and high-throughput agarose gels. The ladder is premixed with red loading buffer.

EasyLadder II contains 5 even-intensity bands ranging from 500 to 5000bp for easy identification of the DNA samples analyzed. EasyLadder II is ideal for short-runs (1 to 3cm) on agarose gels.

When the standard loading volume of 5µl per lane (250ng of DNA) is being used, each band corresponds to a precise quantity of 50ng, which enables the user to determine the relative concentration of the DNA sample to be analyzed as well as its molecular weight.



1.5% agarose gel
5µl per lane

Storage Conditions: EasyLadder II can be stored for up to 1 month at room temperature, 4 months at +4°C, or up to 12 months at -20°C. Avoid multiple freeze/thaw cycles.

Product Citations:

1. Beller, H. R., *et al. Biodegradation* **20(1)**, 45-53 (2009).
2. Meyer, J. M., *et al. J. Invertebrate Pathol.* **99(1)**, 96-102 (2008).
3. Siegrist, T. J., *et al. J. Microbiol. Methods* **68(3)**, 554-562 (2007).
4. Letain, T. E., *et al. Appl. and Environ. Microbiol.* **73(10)**, 3265-3271 (2007).
5. Bhattacharjee, B. & Sengupta, S., *Virol. J.* **354(2)**, 280-285 (2006).
6. Zorzetto, M., *et al. J. Respir. Cell. Mol. Biol.* **27(1)**, 17-23 (2002).

Associated Products	Cat. No.	Page
Agarose, Molecular Grade	BIO-41026	93
Agarose Tablets	BIO-41028	94
Colored DNA Loading Buffer	BIO-37045	99

Agarose & Agarose Tablets

- Excellent value and high purity
- Molecular biology grade
- High gel strength (>1500g/cm²)
- Available as powder or tablets

Colored DNA Loading Buffers

See page 99 for full product details

Storage -20°C | Shipped at room temperature

PACK SIZE	CONC.	CAT NO.
5x Loading Buffer Blue		
2 x 1ml	5x	BIO-37045
5x Loading Buffer Red		
2 x 1ml	5x	BIO-37068
5x Loading Buffer TriColor		
2 x 1ml	5x	BIO-37070

Features:
- **Colored loading for easy recognition**
- **No need to add dye**
- **Guarantee reproducible results**

Applications:
- **To monitor migration rate during agarose electrophoresis**
- **Loading of samples onto DNA agarose gels**

Description: The Bioline range of Colored Crystal DNA Loading Buffers are ready-to-use solutions premixed with bromophenol blue (Blue), cresol red (Red), orange G and xylene cyanol FF (TriColor). The dyes in the Colored Crystal DNA Loading Buffers migrate at different rates depending on the dye and the concentration of the agarose gel (see Dye Migration Table below). This allows users to monitor DNA migration, and therefore increase the versatility of their DNA analysis, by choosing the buffer most suited to their application.

Dye Migration (Approx.)

AGAROSE GEL CONC.	XYLENE CYANOL FF	BROMOPHENOL BLUE	CRESOL RED	ORANGE G
0.70%	8000	600	3000	100
1.00%	4000	400	1500	50
1.50%	2000	250	900	20
2.00%	900	120	300	<10
3.00%	400	50	>100	<10

Storage Conditions: Crystal Colored 5x DNA Loading Buffers can be stored at -20°C for 24 months from the date of purchase.

Product Citations:

1. Neary, J. M., *et al. Vet. Parasitol.* **doi:10.1016/j.vetpar.2010.08.031** (2010).
2. Gomes, G. A., *et al. Sep. & Purifi. Tech.* **65(1)**, 22-30 (2009).
3. Singh, R., *et al. Meth. Mol. Biol.* **483**, 163-192 (2009).
4. Yu, Z., *et al. NAR.* **36(1)**, 9-13 (2008).
5. Böhm, M., *et al. J. Biol. Chem.* **280**, 5795-5802 (2005).
6. Nunan, N., *et al. Appl. Environ. Microbiol.* **71(11)**, 6784-6792 (2005).

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93
Agarose Tablets	BIO-41028	94

SDS Reagent

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
50 Tablets	BIO-37109

Components	50 Tablets
SDS Buffer	50 x 0.5g tablets

Features:
- **Highest purity and quality**
- **Exactly pre-weighed tablets**
- **Dissolve and go for greater convenience**
- **Guaranteed reproducible results**

Applications:
- **Protein denaturing agent**
- **Detergent**
- **SDS-PAGE**
- **Western blotting**

Description: Crystal SDS Reagent is a general purpose laboratory detergent and denaturing agent made from reagents with the highest purity and delivered in convenient, pre-weighed, ready-to-use tablets. Each tablet contains precisely 0.5g of SDS (sodium dodecyl sulfate) reagent.

To perform SDS-PAGE, SDS is added to Tris-glycine buffer at a concentration of 0.1%. This can be obtained by dissolving 2 tablets of Crystal SDS Reagent in 1000ml of Tris-glycine buffer.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

Storage Conditions: The tablets can be stored at room temperature in a humidity free environment for 3 years. Protect from moisture.

Associated Products	Cat. No.	Page
HyperPAGE Prestained Protein Marker	BIO-33065	90
TG Buffer	BIO-37106	98

1x **TG Buffer** for Protein Electrophoresis

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Pouches	BIO-37106

Components	10 Pouches
1x TG Buffer	10 x 1000ml pouches

Features:
- **Formulated from analytical grade reagents**
- **Exactly pre-weighed powder in sealed pouches**
- **Ideal to standardize protein electrophoresis**
- **Dissolve and go for greater convenience**
- **Guaranteed reproducible results**

Applications:
- **Protein polyacrylamide gel electrophoresis (PAGE)**
- **Western blotting assays**

Description: Crystal 1x TG Buffer is a Tris-glycine protein electrophoresis buffer made from reagents with the highest purity and delivered in convenient ready-to-use sealed pouches. Each pouch contains a pre-determined amount of components, providing increased buffer precision. There is no need to spend time in the laboratory weighing and handling the loose components for the electrophoresis buffer. Simply dissolve the contents of the pouch in deionized water to the recommended volume and the buffer is ready for use without any further preparation.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

One pouch of Crystal 1x TG buffer dissolved in deionized water and made up to 1000ml yields a solution containing 0.1M Tris and 0.192M glycine, pH 8.3 at 25°C.

Crystal 1x TG Buffer can be used to perform SDS-PAGE when used in combination with the anionic detergent sodium dodecyl sulfate (SDS) at a concentration of 0.1% This can be obtained by dissolving 2 tablets of the Bioline Crystal SDS Reagent in 1000ml of the Tris-glycine buffer. Crystal SDS reagent is provided in preweighed 0.5g tablets (BIO-37109).

Storage Conditions: Unopened pouches can be stored at room temperature for unlimited time. The 1x stock solution prepared in a sterile bottle with high-quality water and filtered through a 0.20µm filter can be stored for 1 month at 4°C. Passing the 1x solution through the filter prevents or delays the formation of precipitates.

Associated Products	Cat. No.	Page
SDS Reagent	BIO-37109	89
HyperPAGE Prestained Protein Marker	BIO-33065	90

HyperPAGE Prestained Protein Marker

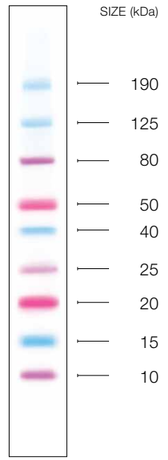
Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
10 Lanes	BIO-33065
50 Lanes	BIO-33066

Features:
- **Broad range marker 10 to 190kDa**
- **9 prestained bands**
- **Easy identification and orientation**
- **Clear and sharp band resolution**

Applications:
- **Ideal for SDS-PAGE**
- **Western Blotting**

Description: HyperPAGE is a broad range protein marker prestained with blue and pink fluorescent dyes. It resolves into 9 bands with molecular weights ranging from 10 to 190kDa. HyperPAGE is suitable for monitoring the efficiency of electrophoretic migration in SDS-PAGE and the transfer of proteins from gel to membrane in Western blotting, without the addition of staining dye. Prestained protein markers are suitable for determining the approximate molecular weights of proteins. For accurate sizing, the use of unstained markers is recommended.



Band sizes are approximate

Storage Conditions: HyperPAGE prestained protein marker is supplied freeze-dried and is stable at -20°C for three years. Once reconstituted with water the product is stable for three months at -20°C. Avoid multiple freeze/thaw cycles.

Associated Products	Cat. No.	Page
BL21 (DE3)	BIO-85032	52
SDS Reagent	BIO-37109	89
TG Buffer	BIO-37106	98

Essential Reagents For Successful Results

Trusted by scientists all over the world, the Bioline Essentials range provides ultra-pure, high-quality reagents for molecular biology. This includes core products that deliver outstanding results at competitive prices and compliment our real-time PCR SensiFAST kits, PCR enzymes, RNA analysis reagents, Markers, Cloning reagents and Competent cells, offering the convenience of ordering all reagents from one source.

Bioline's range of Essentials includes a comprehensive array of core products for everyday work. This includes Agarose, available both as powder and convenient pre-weighed tablets and Crystal buffers ready-to-use for loading and running electrophoresis gels. In addition there is a selection of optimized PCR reaction buffers, additives and enhancers, antibiotic solutions and other general molecular biology reagents.

Essential Reagents

The PCR Company • BIOLINE since 1992 • The PCR Company

Agarose, HiRes Grade

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
100g	BIO-41029

Features:
- **Excellent value and clarity**
- **High gel strength for easy-to-handle flexible gels**
- **DNase/RNase-free**

Applications:
- **DNA/RNA Electrophoresis**
- **Ideal for separating nucleic acid fragments ≤1000bp**

Description: Agarose HiRes Grade offers consistent high resolution of nucleic acid fragments below 1000bp. The agarose is capable of separating DNA/RNA fragments differing by only a few base-pairs.

Agarose HiRes Grade offers high gel strength, which provides easy-to-handle, flexible gels for electrophoresis of small DNA and RNA fragments.

For separation of nucleic acids >1000bp we recommend using Bioline's Agarose, Molecular Grade which offers superior resolution of high molecular weight fragments.

Storage Conditions: Agarose can be stored for 12 months in a cool, dry place.

Product Citations:
1. Tong, P., *et al. Genome Bio.* **11(9)**, R91 (2010).

Associated Products	Cat. No.	Page
HyperLadder I	BIO-33025	85
TBE Buffer	BIO-37104	97
TAE Buffer	BIO-37103	98
Colored DNA Loading Buffer	BIO-37045	99

Agarose, Molecular Grade

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
100g	BIO-41026
500g	BIO-41025

Features:
- **Excellent value and clarity**
- **Strong gels at low concentration**
- **DNase/RNase-free**

Applications:
- **DNA/RNA electrophoresis**
- **Ideal for separating nucleic acids of a wide range of sizes, especially large fragments ≥1000bp**

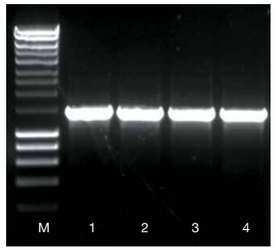
Description: Bioline's Agarose, Molecular Grade is ideally suited for routine analysis of nucleic acids by gel electrophoresis and blotting. Bioline's extremely pure, high molecular biology grade agarose has no detectable DNase or RNase activity and forms strong gels with low background. Due to its low EEO, DNA will have a high electrophoretic mobility.

Storage Conditions: Agarose can be stored for 12 months in a cool, dry place.

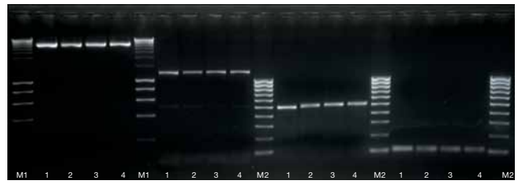
Product Citations:
1. Ansari, S. B., *et al. African J. Biotechnol.* **9(43)**, 7230-7235 (2010).
2. Arpanahi, A., *et al. Gen. Res.* **19**, 1338-1349 (2009).
3. Passante, E., *et al. Inflamm. Res.* **58(9)**, 611-618 (2009).
4. Benest, A. V., *et al. Meth. Mol. Biol.* **467**, 251-270 (2009).
5. Kaszimierczak, K. A., *et al. Antimicrob. Agents Chemo.* **52(11)**, 4001-4009 (2008).
6. Fernandes, J. M. O., *et al. J. Exp. Biol.* **210**, 3461-3472 (2007).

Associated Products	Cat. No.	Page
HyperLadder I	BIO-33025	85
TBE Buffer	BIO-37104	97
TAE Buffer	BIO-37103	98
Colored DNA Loading Buffer	BIO-37045	99

Bioline agarose provides high resolution of DNA and RNA fragments separated by gel electrophoresis.



20mg freeze-dried budding leaves of *Arabidopsis thaliana* were homogenized using liquid nitrogen and with a rotor stator homogenizer. Genomic DNA was isolated using ISOLATE Plant DNA Mini Kit. A 1.4Kb fragment of allene oxide synthase gene was amplified from the isolated DNA using MangoMix. Lanes: HyperLadder I (M), liquid nitrogen ground material (1, 3), rotor stator homogenized material (2, 4).



Various sized DNA fragments were run on 1% TAE agarose gel and extracted using ISOLATE PCR and Gel Kit. The isolated fragments were again run on 1% TAE agarose gel along with the original fragments. Lanes: HyperLadder I (M1), HyperLadder IV (M2), Not extracted (1), ISOLATE PCR and Gel Kit (2), Supplier A (3), Supplier B (4).

Agarose Tablets

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	PRESENTATION	CAT NO.
150g	300 x 0.5g	BIO-41028
300g	600 x 0.5g	BIO-41027

Features:
- **Exactly preweighed tablets**
- **DNase/RNase free**
- **Convenient and time saving**
- **Greater gel-to-gel consistency**
- **Gels as low as 0.5%**

Applications:
- **DNA/RNA electrophoresis**
- **Ideal for separating nucleic acids of a wide range of sizes**

Description: Bioline's Agarose Tablets (DNase/RNase free) are designed to provide a cleaner, safer, no-mess environment and more convenience than powdered agarose. Each tablet contains a pre-determined amount of agarose (0.5g), eliminating the need to weigh out loose agarose powder. Simply add the appropriate number of tablets to your buffer, incubate at room temperature for five minutes, heat the solution and then prepare your gel as normal.

Storage Conditions: Agarose tablets can be stored for 12 months in a cool dry place.

Product Citations:
1. Ansari, A. and Emery, V. C. *J. Virol.* **73(4)**, 3284-3291 (1999).

Associated Products	Cat. No.	Page
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93
TBE Buffer	BIO-37104	97
TAE Buffer	BIO-37103	98
Colored DNA Loading Buffer	BIO-37045	99

Proteinase K Powder & Solution

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
Proteinase K Powder		
100mg	-	BIO-37037
1000mg	-	BIO-37039
Proteinase K Solution		
5ml	20mg/ml	BIO-37084
5 x 5ml	20mg/ml	BIO-37085

Features:
- **Broad-spectrum serine protease**
- **Active under denaturing conditions**
- **Stable at high temperatures**
- **Molecular biology grade**
- **Available as powder and stabilized stock solution**

Applications:
- **Inactivation of RNases/DNases during nucleic acid extraction**
- **Protein modification**
- **General protein digestion**
- **Determination of enzyme localization**

Description: Proteinase K is a highly active serine protease (MW 28,500 Da) isolated from the fungus *Tritirachium album*. The enzyme exhibits broad cleavage specificity on native and denatured proteins and is widely used in the purification of native RNA and DNA from tissues or cell lines. Because the solution is tested for the absence of RNases and DNases, it is especially suitable for isolating PCR and RT-PCR templates.

The activity of Proteinase K is increased in the presence of denaturants such as SDS (1%) and elevated temperature (50-60°C). The recommended working concentration is 50-100 µg/ml for protein removal and enzyme inactivation, and up to 2 mg/ml for tissue treatment.

Storage Conditions: Proteinase K can be stored for 12 months at -20°C.

Product Citations:

1. Teague, B., *et al. PNAS* **107(24)**, 10848-53 (2010).
2. Rolfsmeier, M. L., *et al. J. Bacteriol.* **192(19)**, 4954-4962 (2010).
3. Arpanahi, A., *et al. Genome Res.* **19**, 1338-1349 (2009).
4. Schwenkenbecher, J. M., *et al. J. Medical Entomol.* **46(3)**, 610-614 (2009).
5. Jo, K., *et al. Meth. Mol. Biol.* **544**, 29-42 (2009).
6. Tiwari, J., *et al. Vet. Parasitol.* **138(3-4)**, 301-307 (2006).

Associated Products	Cat. No.	Page
Quick-Stick Ligase	BIO-27027	53
ISOLATE Fecal DNA Kit	BIO-52037	63
ISOLATE Genomic DNA Mini Kit	BIO-52031	64
ISOLATE Plant DNA Mini Kit	BIO-52035	65

X-GAL

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
1g	BIO-37035

Features:
- **Extremely pure**
- **Intense blue precipitate upon hydrolysis**

Applications:
- **Blue/white cloning systems**
- **Immunoblotting**
- **Immunocytochemical assays**
- **Microbiology and cell culture media**

Description: 5-bromo-4-chloro-3-indolyl ß-D-galactopyranoside (X-GAL) is a chromogenic substrate for ß-Galactosidase that forms an intense blue precipitate. It can be used in molecular biology to detect the *gal* gene product, and also in microbiology where it is used to detect micro-organisms which have ß-Galactosidase activity (usually coliforms). It can be combined with the R-substrates to differentiate between two species of organisms on the same plate. X-GAL is soluble in N, N-dimethylformamide.

Storage Conditions: X-GAL can be stored for 12 months at -20°C. Store protected from light.

Product Citations:

1. Valleley, E. M. A. *et al. Gen., Chrom. & Can.* **49(5)**, 480-6 (2010).
2. Wilson, A. C., *et al. J. Bacteriol.* **190(15)**, 5522-5525 (2008).
3. Liapis, E., *et al. NAR* **36(18)**, 5933-5945 (2008).
4. Corbett, D., *et al. J. Biol. Chem.* **282**, 33326-33335 (2007).
5. Toledo-Arana, A., *et al. J. Bacteriol.* **187(15)**, 5318-5329 (2005).
6. Staddon, J. H., *et al. Plasmid* **56(2)**, 102-111 (2006).

Associated Products	Cat. No.	Page
CH3-Blue 10^{8} Chemically Competent Cells	BIO-85039	49
BIO*Blue* 10^{8} Chemically Competent Cells	BIO-85036	50
Quick-Stick Ligase	BIO-27027	53
IPTG	BIO-37036	96

IPTG & IPTG Solution

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
IPTG		
5g	-	BIO-37036
IPTG Solution		
10ml	240mg/ml	BIO-37082
5 x 10ml	240mg/ml	BIO-37083

Features:
- **Induces *E. coli lac* operon activity**
- **>99.6% by HPLC**
- **Available as powder and stabilized stock solution**

Applications:
- **Blue/white color screening**
- **Induction of *lac* operon for protein expression**
- **Genes controlled by the *lac* or *tac* promoter/operator sequences are expressed to high levels in the presence of IPTG**

Description: Isopropyl-ß-D-thiogalactopyranoside (IPTG) is a chemical analogue of galactose, which cannot be hydrolysed by the enzyme ß-Galactosidase. Hence, it induces the *E. coli lac* operon activity by binding and inhibiting the *lac* repressor without being degraded. Genes controlled by the *lac* or *tac* promoter/operator sequences are expressed to high levels in the presence of IPTG.

Storage Conditions: IPTG powder can be stored for 12 months at -20°C. IPTG Solution can be stored for 24 months at -20°C.

Product Citations:

1. Valleley, E. M. A. *et al. Gen., Chrom. & Can.* **49(5)**, 480-6 (2010).
2. Prabhakar, V., *et al. FEBS Lett.* **583(6)**, 983-991 (2009).
3. Chan, C-H., *et al. Conserv. Gen.* **9(4)**, 1067-1070 (2008).
4. Hamblin, K., *et al. Mol. Microbiol.* **68(6)**, 1395–1405 (2008).
5. Maruta, F., *et al. J. Drug Targeting* **15(4)**, 311-319 (2007).
6. Ross, P. J., *et al. Infect. Immun.* **72(3)**, 1568-1579 (2004).

Associated Products	Cat. No.	Page
CH3-Blue 10^{8} Chemically Competent Cells	BIO-85039	49
BIO*Blue* 10^{8} Chemically Competent Cells	BIO-85036	50
Quick-Stick Ligase	BIO-27027	53
IPTG	BIO-37036	96

Co-Precipitant Pink

PACK SIZE	CONC.	CAT NO.
1.5ml	5mg/ml	BIO-37075

Features:
- **Up to 100% nucleic acid recovery**
- **Effective for fragments ≥25bp**
- **Suitable for sequencing**
- **Free from DNA, RNA and protein**
- **Increases pellet mass and visibility**
- **Minimizes pellet loss**

Applications:
- **DNA and RNA recovery**

Description: Bioline's Co-Precipitant Pink (Linear Polyacrylamide), aids salt/alcohol precipitation of DNA and RNA and is suitable for most applications, including the precipitation of DNA for sequencing, DNA after enzymatic manipulations and RNA from different sources.

Bioline Co-Precipitant Pink is free of nucleic acids. Therefore, all resulting precipitates are suitable for standard PCR, RT-PCR and other enzymatic reactions. Bioline Co-Precipitant provides almost complete recovery of DNA/RNA fragments as small as 25bp.

Storage Conditions: Co-Precipitant Pink can be stored for 12 months at -20°C.

Associated Products	Cat. No.	Page
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93
TBE Buffer	BIO-37104	97
TAE Buffer	BIO-37103	98

10x **TBE Buffer**

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Pouches	BIO-37104

Components	10 Pouches
10x TBE Buffer	10 x 1000ml pouches

Features:
- **Reagents of the highest purity and quality**
- **Exactly pre-weighed powder in sealed pouches**
- **Ideal to standardize DNA electrophoresis**
- **Dissolve and go for greater convenience**
- **DNase and RNase free**

Applications:
- **Agarose gel electrophoresis of short DNA fragments (<1500bp)**

Description: Crystal 10x TBE Buffer is a Tris-Borate-EDTA electrophoresis running buffer made from reagents with the highest purity and delivered in convenient ready-to-use sealed pouches. Each pouch contains a pre-determined amount of components, providing increased buffer precision. There is no need to spend time in the laboratory weighing and handling the loose components for the buffers. Simply dissolve the contents of the pouch in deionized water to the recommended volume and the buffer is ready for use without any further preparation.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

One pouch of Crystal 10x TBE buffer dissolved in deionized water and made up to 1000ml yields a 10x stock solution containing 0.89M Tris-Borate, 0.02M EDTA, pH 8.3 at 25°C.

Crystal 10x TBE Buffer is part of our Essentials range of products, which includes agaroses, buffers, PCR water and enhancers, antibiotic solutions, cloning reagents and protein digestion reagents.

Storage Conditions: Unopened pouches can be stored at room temperature for 3 years. The 10x stock solution prepared in a sterile bottle with high-quality water and filtered through a 0.20µm filter can be stored for 1 month at 4°C. Passing the 10x solution through the filter prevents or delays the formation of precipitates. 1x solutions should be prepared fresh before use.

Associated Products	Cat. No.	Page
ISOLATE Plasmid Mini Kit	BIO-52025	61
HyperLadder I	BIO-33025	85
Agarose, HiRes	BIO-41029	93
TAE Buffer	BIO-37103	98

50x **TAE Buffer**

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
5 Pouches	BIO-37103

Components	5 Pouches
50x TAE Buffer	5 x 1000ml pouches

Features:
- **Reagents of the highest purity and quality**
- **Exactly pre-weighed powder in sealed pouches**
- **Ideal to standardize DNA electrophoresis**
- **Dissolve and use in minutes**
- **RNase and DNase free**

Applications:
- **Agarose gel electrophoresis of long nucleic acid fragments (>1500bp)**
- **Native and denaturing RNA analysis**
- **For Southern blotting**

Description: Crystal 50x TAE buffer is a Tris-Acetate-EDTA electrophoresis running buffer made from reagents with the highest purity and delivered in convenient ready-to-use sealed pouches. Each pouch contains a pre-determined amount of components, providing increased buffer precision. There is no need to spend time in the laboratory weighing and handling the loose components for the buffers. Simply dissolve the contents of each the pouch in deionized water to the recommended volume and the buffer is ready for use without any further preparation.

Crystal 50x TAE Buffer is recommended for large fragments (above 1500bp) and complex mixtures of large genomic DNA. TAE has a lower buffering capacity than TBE, however linear dsDNA tends to migrate faster in TAE than in TBE. Crystal 50x TAE Buffer is also used in non-denaturing RNA agarose gel electrophoresis. Southern blots are generally derived from gels prepared and run in TAE buffers. TAE buffers are considered better for gel purification since acetate is less inhibitory then borate for downstream applications.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

One pouch of Crystal 50x TAE buffer dissolved in deionized water and made up to 1000ml yields a 10x stock solution containing 2.0M Tris-Acetate, 0.05M EDTA, pH 8.3 at 25°C.

Storage Conditions: Unopened pouches can be stored at room temperature for 3 years. The 50x stock solution prepared in a sterile bottle with high-quality water and filtered through a 0.20µm filter can be stored for 1 year at room temperature. Passing the 50x solution through the filter prevents or delays the formation of precipitates. 1x solutions should be prepared fresh before use.

Associated Products	Cat. No.	Page
ISOLATE Plasmid Mini Kit	BIO-52025	61
HyperLadder I	BIO-33025	85
Agarose, HiRes	BIO-41029	93
TBE Buffer	BIO-37104	97

1x **TG Buffer**

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Pouches	BIO-37106

Components	10 Pouches
1x TG Buffer	10 x 1000ml pouches

Features:
- **Formulated from analytical grade reagents**
- **Exactly pre-weighed powder in sealed pouches**
- **Ideal to standardize protein electrophoresis**
- **Dissolve and go for greater convenience**
- **Guaranteed reproducible results**

Applications:
- **Protein polyacrylamide gel electrophoresis (PAGE)**
- **Western blotting assays**

Description: Crystal 1x TG Buffer is a Tris-glycine protein electrophoresis buffer made from reagents with the highest purity and delivered in convenient ready-to-use sealed pouches. Each pouch contains a pre-determined amount of components, providing increased buffer precision. There is no need to spend time in the laboratory weighing and handling the loose components for the electrophoresis buffer. Simply dissolve the contents of the pouch in deionized water to the recommended volume and the buffer is ready for use without any further preparation.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

One pouch of Crystal 1x TG buffer dissolved in deionized water and made up to 1000ml yields a solution containing 0.1M Tris and 0.192M glycine, pH 8.3 at 25°C.

Crystal 1x TG Buffer can be used to perform SDS-PAGE when used in combination with the anionic detergent sodium dodecyl sulfate (SDS) at a concentration of 0.1% This can be obtained by dissolving 2 tablets of the Bioline Crystal SDS Reagent in 1000ml of the Tris-glycine buffer. Crystal SDS reagent is provided in preweighed 0.5g tablets (BIO-37109).

Storage Conditions: Unopened pouches can be stored at room temperature for unlimited time. The 1x stock solution prepared in a sterile bottle with high-quality water and filtered through a 0.20µm filter can be stored for 1 month at 4°C. Passing the 1x solution through the filter prevents or delays the formation of precipitates.

Associated Products	Cat. No.	Page
SDS Reagent	BIO-37109	89
HyperPAGE Prestained Protein Marker	BIO-33065	90

SDS Reagent

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
50 Tablets	BIO-37109

Components	50 Tablets
SDS Buffer	50 x 0.5g tablets

Features:
- **Highest purity and quality**
- **Exactly pre-weighed tablets**
- **Dissolve and go for greater convenience**
- **Guaranteed reproducible results**

Applications:
- **Protein denaturing agent**
- **Detergent**
- **SDS-PAGE**
- **Western blotting**

Description: Crystal SDS Reagent is a general purpose laboratory detergent and denaturing agent made from reagents with the highest purity and delivered in convenient, pre-weighed, ready-to-use tablets. Each tablet contains precisely 0.5g of SDS (sodium dodecyl sulfate) reagent.

To perform SDS-PAGE, SDS is added to Tris-glycine buffer at a concentration of 0.1%. This can be obtained by dissolving 2 tablets of Crystal SDS Reagent in 1000ml of Tris-glycine buffer.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

Storage Conditions: The tablets can be stored at room temperature in a humidity free environment for 3 years. Protect from moisture.

Associated Products	Cat. No.	Page
HyperPAGE Prestained Protein Marker	BIO-33065	90
TG Buffer	BIO-37106	98

Colored DNA Loading Buffers

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CONC.	CAT NO.
5x Loading Buffer Blue		
2 x 1ml	5x	BIO-37045
5x Loading Buffer Red		
2 x 1ml	5x	BIO-37068
5x Loading Buffer TriColor		
2 x 1ml	5x	BIO-37070

Features:
- **Colored loading for easy recognition**
- **No need to add dye**
- **Glycerol ensures sample is deposited at the bottom of the well**
- **Guaranteed reproducible results**

Applications:
- **Monitor migration rate during agarose electrophoresis**
- **Load samples on DNA agarose gels**

Description: The Bioline range of Crystal Colored DNA Loading Buffers are ready-to-use solutions premixed with bromophenol blue (Blue), cresol red (Red), orange G and xylene cyanol FF (TriColor). The dyes in the buffers migrate towards the anode at different rates depending on the dye and the concentration of the agarose gel (see Dye Mobility Table). This allows users to monitor DNA migration, and therefore increase the versatility of their DNA analysis, by choosing the colored loading buffer most suited to their application. The presence of glycerol in the buffer ensures that the sample is deposited at the bottom of the sample well.

When the buffer is mixed with the sample, the presence of the dye provides easy visualization of the wells in the agarose gel to which the sample has been added. Additionally, the dye migrates towards the anode at predictable rates during electrophoresis, thus providing an approximate reference band (fig 1).

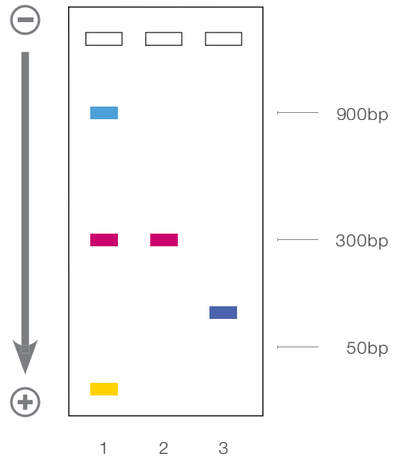
Dye Mobility Table
The table above gives the approximate migration rates of dyes in different agarose concentrations in TAE buffer. The values indicate the size of DNA fragments with which the dye will co-migrate at that particular gel concentration.

Storage Conditions: Crystal Colored 5x DNA Loading Buffers can be stored at -20°C for 24 months from the date of purchase.

Product Citations:

1. Neary, J. M., *et al. Vet. Parasitol.* **doi:10.1016/j.vetpar.2010.08.031** (2010).
2. Gomes, G. A., *et al. Sep. & Purifi. Tech.* **65(1)**, 22-30 (2009).
3. Singh, R., *et al. Meth. Mol. Biol.* **483**, 163-192 (2009).
4. Yu, Z., *et al. NAR.* **36(1)**, 9-13 (2008).
5. Böhm, M., *et al. J. Biol. Chem.* **280**, 5795-5802 (2005).
6. Nunan, N., *et al. Appl. Environ. Microbiol.* **71(11)**, 6784-6792 (2005).

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93
Agarose Tablets	BIO-41028	94



Graphic representation of DNA Loading Buffers on 2% agarose gel. Band sizes are approximate.
Lane 1. 5x DNA Loading Buffer TriColor
Lane 2. 5x DNA Loading Buffer Red
Lane 3. 5x DNA Loading Buffer Blue

Dye Migration (Approx.)

AGAROSE GEL CONC.	XYLENE CYANOL FF	BROMOPHENOL BLUE	CRESOL RED	ORANGE G
0.70%	8000	600	3000	100
1.00%	4000	400	1500	50
1.50%	2000	250	900	20
2.00%	900	120	300	<10
3.00%	400	50	>100	<10

10x TE Buffer

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 Pouches	BIO-37105

Components	10 Pouches
10x TE Buffer	10 x 1000ml pouches

Features:
- **Reagents of the highest purity and quality**
- **Exactly pre-weighed powder in sealed pouches**
- **Dissolve and go for greater convenience**
- **Guaranteed reproducible results**

Applications:
- **Procedures involving DNA and RNA**

Description: Crystal 10x TE Buffer is a Tris-EDTA general purpose laboratory buffer made from reagents with the highest purity and delivered in convenient ready-to-use sealed pouches. Each pouch contains a pre-determined amount of components, providing increased buffer precision. There is no need to spend time in the laboratory weighing and handling the loose components for the buffer. Simply dissolve the contents of the pouch in deionized water to the recommended volume and the buffer is ready for use at the pre-set pH, without any further manipulation.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

One pouch of Crystal 10x TE Buffer dissolved in deionized water and made up to 1000ml yields a 10x stock solution containing 0.1M Tris-HCl and 0.01M EDTA, pH 7.4 at 25°C.

Storage Conditions: Unopened pouches can be stored at room temperature for 3 years. The 10x stock solution prepared in a sterile bottle with high-quality water and filtered through a 0.20µm filter can be stored for 1 year at room temperature. Passing the 10x solution through the filter will ensure sterility and prolong shelf life. 1x solutions should be prepared fresh before use.

Associated Products	Cat. No.	Page
EasyLadder II	BIO-33047	88
TBE Buffer	BIO-37104	97
TAE Buffer	BIO-37103	98

PBS Buffer

Store at Room Temperature | Shipped at Ambient Temperature

PACK SIZE	CONC.	CAT NO.
100 Tablets	0.5 Liter	BIO-37107
100 Tablets	1 Liter	BIO-37108

Components	0.5 Liter	1 Liter
PBS Buffer	100 x 0.5 liter tablets	100 x 1 liter tablets

Features:
- **Formulated from analytical grade reagents**
- **Isotonic and non-toxic to cells**
- **Exactly pre-weighed buffer tablets**
- **Ready to use in minutes**
- **Guaranteed reproducible results**

Applications:
- **General purpose laboratory buffer**

Description: Crystal PBS Buffer is a phosphate buffered saline solution made from reagents with the highest purity and delivered in convenient ready-to-use tablets. Each tablet contains a precise, pre-determined amount of components to make 500ml (BIO-37107) or 1000ml (BIO-37108) buffer. There is no need to spend time in the laboratory weighing and handling the loose components for the buffer. Simply dissolve each tablet in 500ml or 1000ml deionized water and the buffer is ready to use without any further manipulation.

Bioline Crystal buffers undergo extensive and stringent QC assays and the guaranteed batch-to-batch reproducibility provides consistent results.

One tablet of Crystal PBS Buffer dissolved in 500ml or 1000ml deionized water yields a solution containing 10mM phosphate, 2.7mM potassium chloride and 140mM sodium chloride with pH 7.4 at 25°C.

Storage Conditions: The tablets can be stored at room temperature for 3 years. The buffer solution prepared in a sterile bottle with high-quality water and filtered through a 0.20µm filter can be stored for 1 month at 4°C. Passing the solution through the filter will ensure sterility and prolong shelf life.

Associated Products	Cat. No.	Page
ISOLATE Genomic DNA Mini Kit	BIO-52031	64
ISOLATE RNA Mini Kit	BIO-52026	66

10x NH_4 Buffer

Stored at -20°C | Shipped on Blue or Dry Ice

PACK SIZE	CAT NO.
3 x 1.2ml	BIO-37025

Composition: 160mM $(NH_4)_2SO_4$, 670mM Tris-HCl (pH8.8 at 25°C) and stabilizers.

Storage Conditions: 10x NH_4 Buffer can be stored for 12 months at -20°C.

Product Citations:

1. Short, A. D., *et al. Vet. Record* **167**, 455-7 (2010).
2. Gubili, C., *et al. Marine Biol.* **156(10)**, 2199-2207 (2009).
3. Petry, C. J., *et al. Hum. Gene.* **126(3)**, 375-384 (2009).
4. Caldwell, G. M., *et al. Brit. J. Can.* **98(8)**, 1437–1442 (2008).
5. Munafo, M. R., *et al. Am. J. Med. Gen.* **135(B)**, 10–14 (2005).
6. Caldwell, G. M., *et al. Can. Res.* **64**, 883-888 (2004).

MyTaq Reaction Buffers

NEW

Stored at -20°C | Shipped on Blue or Dry Ice

PACK SIZE	CONC.	CAT NO.
5x MyTaq Reaction Buffer Colorless		
4 x 1ml	5x	BIO-37111
5x MyTaq Reaction Buffer Red		
4 x 1ml	5x	BIO-37112

Applications:
- **For use in reactions containing MyTaq DNA Polymerase**
- **Use at 1 x concentration in reaction mix**

Description: Bioline's 5x MyTaq™ Reaction Buffer is an advanced formulation buffer that saves time and delivers superior results, containing dNTPs, $MgCl_2$ and enhancers at optimal concentrations which eliminates the need for optimization.

Composition: 5mM dNTPs, 15mM $MgCl_2$, stabilizers and enhancers.

Storage Conditions: MyTaq Reaction Buffers can be stored for 6 months at -20°C.

50mM $MgCl_2$ Solution

Stored at -20°C | Shipped on Blue or Dry Ice

PACK SIZE	CAT NO.
3 x 1.2ml	BIO-37026

Composition: 50mM $MgCl_2$ in nuclease free water.

Storage Conditions: 50mM $MgCl_2$ Solution should be stored at -20°C.

Product Citations:

1. Anastasi, E. M., *et al. Appl. Environ. Microbiol.* **doi:10.1128/AEM.00141-10** (2010).
2. Boldorini, R., *et al. J. Med. Virol.* **82(12)**, 2127-32 (2010).
3. Svachova, M. & Tichy, M. *Neoplasma* **55(1)**, 36-41 (2008).
4. Mulder, I. E., *et al. Fish Sellfish Immunol.* **23(4)**, 747-759 (2007).
5. O'Shea, D. J., *et al. Anal Chim. Acta* **537(1-2)**, 111-117 (2005).
6. Meir, R., *et al. Avian Dis.* **45(1)**, 223-228 (2001).

Hi-Spec Additive

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
3 x 1.2ml	BIO-37032

Features:
- **Eliminates background smears and spurious bands**
- **Improves PCR specificity**
- **Compatible with all commercially available DNA polymerases**
- **Ideal for difficult templates**

Applications:
- **Improving the specificity of any DNA polymerase in PCR reactions**

Description: Hi-Spec Additive is a popular compound designed to eliminate unwanted by-products, such as background smears and spurious bands, during DNA amplification. Hi-Spec Additive is ideally suited to difficult templates with GC-rich regions or repetitive sequences. The additive is supplied at a concentration of 5x.

Storage Conditions: Hi-Spec Additive can be stored for 12 months at -20°C.

Product Citations:

1. Whiteley, M. H., *et al. PLoS ONE* **6(2)**, e16684 (2011).
2. Zhang, Z., *et al. J. Mol. Diag.* **12(2)**, 152-61 (2010).
3. Elders, R. C., *et al. Vet. Immunol. Immunopathol.* **130(1-2)**, 11-16 (2009).
4. Ralser, M., *et al. Biochem Biophys Res Commun.* **347(3)**, 747-51 (2006).
5. Faiger,H., *et al. NAR* **34(1)**, 104-119 (2006).
6. Gow, J.L., *et al. Genetica* **124(1)**, 77-83 (2005).

Associated Products	Cat. No.	Page
BIO-X-ACT Short DNA Polymerase	BIO-21064	29
MyTaq DNA Polymerase	BIO-21105	25
MyTaq HS DNA Polymerase	BIO-21111	19

PolyMate Additive

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
2 x 1.2ml	BIO-37041

Features:
- **Dramatically improves PCR specificity and yield**
- **Compatible with all commercially available thermostable DNA polymerases**
- **Ideal for difficult templates**
- **Reduces smearing and background**

Applications:
- **DNA polymerase reactions where specificity is critical**
- **Enhancing the performance and specificity of any thermostable DNA polymerase**

Description: PolyMate is a proprietary additive for use in reactions involving any thermostable DNA polymerase, designed to dramatically improve reaction specificity. PolyMate provides an optimized composition of reagents, and is ideally suited to dirty/difficult templates with GC or AT rich DNA (fig. 1), repetitive sequences or sequences with a high level of secondary structure.

PolyMate is provided at a concentration of 2x and acts as a melting agent by allowing the DNA polymerase and oligonucleotides greater access to the template DNA (fig. 2). PolyMate does not contain magnesium, dNTPs, or buffer components. In some cases it may be necessary to optimize the magnesium concentration.

Storage Conditions: PolyMate Additive can be stored for 12 months at –20°C.

Note: PolyMate should not be used in combination with any other additives for polymerase reactions.

Product Citations:

1. McMahon, D. P., *et al BMC Genomics.* **10**, 603 (2009).
2. Baker, J. G., *et al. Mol Pharmacol.* **74(5)**, 1246-1260 (2008).
3. Edwards C. A., *et al. PLoS Biol* **6(6)**, e135 (2008).
4. Edwards, M. J., *et al. Mol. Eco. Notes* **7(6)**, 1302-1304 (2007).
5. Oates, N., *et al. Am. J. Hum. Gene.* **79(1)**, 155-162 (2006).
6. Willis-Owen, S. A. G., *et al. Biol. Psychiatry* **58(6)**, 451-456 (2005).

Associated Products	Cat. No.	Page
ACCUZYME DNA Polymerase	BIO-21051	24
MyTaq DNA Polymerase	BIO-21105	25
MyTaq HS DNA Polymerase	BIO-21111	19

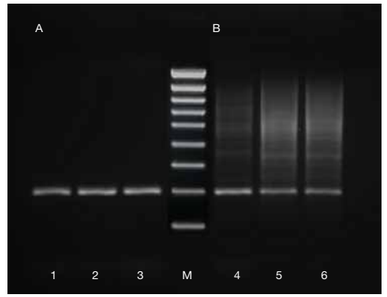


Fig. 1 High specificity and reduced smearing using PolyMate Additive.
PCR of a 201bp GC-rich fragment (>66%) from Human TGF-β gene.
A) 1.5mM, 2.0mM & 2.5mM $MgCl_2$ with Polymate, Lanes 1-3 respectively
B) without Polymate, Lanes 4-6 respectively. HyperLadder IV (M)

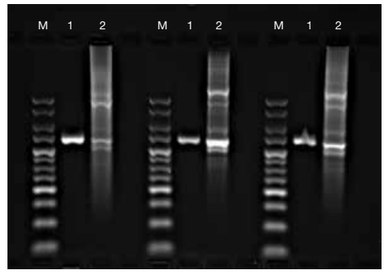


Fig. 2 PolyMate leads to an increased specificity of amplified PCR product.
A 234bp GC-rich (>66%) fragment from human ApoE gene was amplified with 1.25 Units of *Taq* DNA Polymerase. Reactions were performed in duplicate in the presence (lane 1) and absence (lane 2) of PolyMate. HyperLadder V (M).

PCR Water 18.2MΩ

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 x 10ml	BIO-37080

Features:
- **Ultra-pure 18.2MΩ**
- **DNase/RNase-free**

Applications:
- **For use in molecular biology applications**

Description: Bioline ultra-pure 18.2MΩ PCR Water is extremely pure molecular biology grade water, which is suitable for all PCR and electrophoresis applications. Final purification of ultra-pure water is carried out with a pharmaceutical-grade, absolute 0.22µm membrane filter that is recommended for most analytical applications. Further purification is achieved by filtration of water through a membrane filter with a molecular weight cut-off of 10 Kilo Dalton. Each lot is PCR-tested with universal primers and certified to be free of DNA contamination. For all applications involving RNA, we recommend using DEPC-treated Water, which is chemically treated to eliminate any RNase contamination.

Storage Conditions: PCR Water 18.2MΩ can be stored for 12 months at -20°C.

DEPC-treated Water

Storage -20°C | Shipped at Ambient Temperature

PACK SIZE	CAT NO.
10 x 10ml	BIO-38030
1 Liter	BIO-38031

Features:
- **Ideal for RNA work**
- **DNase/RNase free**
- **Ultra-pure 18.2MΩ**

Applications:
- **For use in RNA applications**

Description: Bioline DEPC-treated Water is deionised, high-quality molecular grade water, which is ready-to-use and requires no preparation, mixing or autoclaving. DEPC-treated Water is prepared by treating ultra-pure 18.2MΩ PCR Water with diethylpyrocarbonate (DEPC), and is then autoclaved to inactivate the DEPC. DEPC-treated Water is ideal for use in all RNA work.

Storage Conditions: DEPC-treated Water can be stored for 12 months at -20°C.

Product Citations:

1. Boldorini, R., *et al. J. Med. Virol.* **82(12)**, 2127-32 (2010).
2. Burrows, C., *et al. NAR* **38(16)**, 5542-5553 (2010).
1. Cervelló, I., *et al. Human Reprod.* **22(1)**, 45-51 (2007).
2. Carrigg, C., *et al. Appl. Microbiol. Biotechnol.* **77(4)**, 955-964 (2007).
3. Nicla Romano, N., *et al. Cell Tissue Res.* **329(3)**, 479-489 (2007).
4. Sigh, J., *et al. Fish Shellfish Immunol.* **17(1)**, 75-86 (2004).

Antibiotic Solutions

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CONC.	CAT NO.
Ampicillin		
10ml	100mg/ml	BIO-87025
Carbenicillin		
10ml	100mg/ml	BIO-87026
Chloramphenicol		
10ml	50mg/ml	BIO-87027
Kanamycin		
10ml	100mg/ml	BIO-87028
Neomycin		
10ml	50mg/ml	BIO-87029
Tetracycline		
10ml	12.5mg/ml	BIO-87030

Features:
- **Cost effective**
- **Ready-to-use solutions**
- **Stable at -20°C**
- **Avoids handling of toxic or harmful substances**
- **No sterile filtration required**

Applications:
- **Cell culture**
- **Plasmid selection**
- **Gene regulation**

Storage Conditions: Antibiotic Solutions can be stored at -20°C, in a constant temperature freezer for 12 months. Antibiotic Solutions will remain stable if stored as specified.

Antibiotic Properties

Antibiotics	Working Concentration	Stock Solution
Ampicillin	50-200µg/ml	100mg/ml in water
Carbenicillin	20-200µg/ml	100mg/ml in 50% ethanol
Chloramphenicol	25-170µg/ml	50mg/ml in 100% ethanol
Kanamycin	10-50µg/ml	100mg/ml in water
Neomycin	50µg/ml	50mg/ml in water
Tetracycline	12.5-50µg/ml	12.5mg/ml in 90% ethanol

Note: For Research Use Only.

Product Citations:

1. Dassanayake, R. P., *et al. Vet. Microbiol.* **133(4)**, 366-371 (2009).
2. Silva, M. S., *et al. Parasitol. Res.* **105(5)**, 1223-1229 (2009).

Associated Products	Cat. No.	Page
α-Select Bronze Efficiency	BIO-85025	48
CH3-Blue Competent Cells 10^8	BIO-85039	49

Human Genomic DNA

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
500µl	BIO-35025

Features:
- **Highly purified**
- **Average length of fragment >50Kb**

Applications:
- **Southern blotting**
- **Genomic library construction**
- **Control template**

Description: Human Genomic DNA is highly purified and isolated from human placenta. The average length of the DNA is greater than 50Kb and is suitable for Southern blotting, genomic library construction and as a control template. The Human Genomic DNA is supplied at a concentration of 200ng/µl.

Storage Conditions: Human Genomic DNA should be stored at -20°C for up to 12 months. Repeated freeze/thaw cycles should be avoided.

Product Citations:

1. Sambrook, J., *et al., Molecular Cloning: A laboratory Manual* (1989).

Rat Genomic DNA

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
500µl	BIO-35026

Features:
- **Highly purified**
- **Average length of fragment >50Kb**

Applications:
- **Southern blotting**
- **Genomic library construction**
- **Control template**

Description: Rat Genomic DNA is highly purified and isolated from *Rattus norvegicus* brain tissue. The average length of the DNA is greater than 50Kb and is suitable for Southern blotting, genomic library construction and as a control template. The Rat Genomic DNA is supplied at a concentration of 200ng/µl.

Storage Conditions: Rat Genomic DNA should be stored at –20°C for up to 12 months. Repeated freeze/thaw cycles should be avoided.

Product Citations:

1. Krajicek, B. J., *et al. Am. J. Physiol. Lung Cell Mol. Physiol.* **298**, 252-60 (2010).
2. Rivers, C., *et al. Endocrinol.* **150**, 4958–67 (2009).
3. Hermann, B. P., *et al. Mol. Cell. Endocrin.* **260-262**, 49-58 (2007).
4. Baldwin, S. J., *et al. Drug Metab. Disposition* **34(6)**, 1063-1069 (2006).

Mouse Genomic DNA

Storage -20°C | Shipped on Dry or Blue Ice

PACK SIZE	CAT NO.
500µl	BIO-35027

Features:
- **Highly purified**
- **Average length of fragment >50Kb**

Applications:
- **Southern blotting**
- **Genomic library construction**
- **Control template**

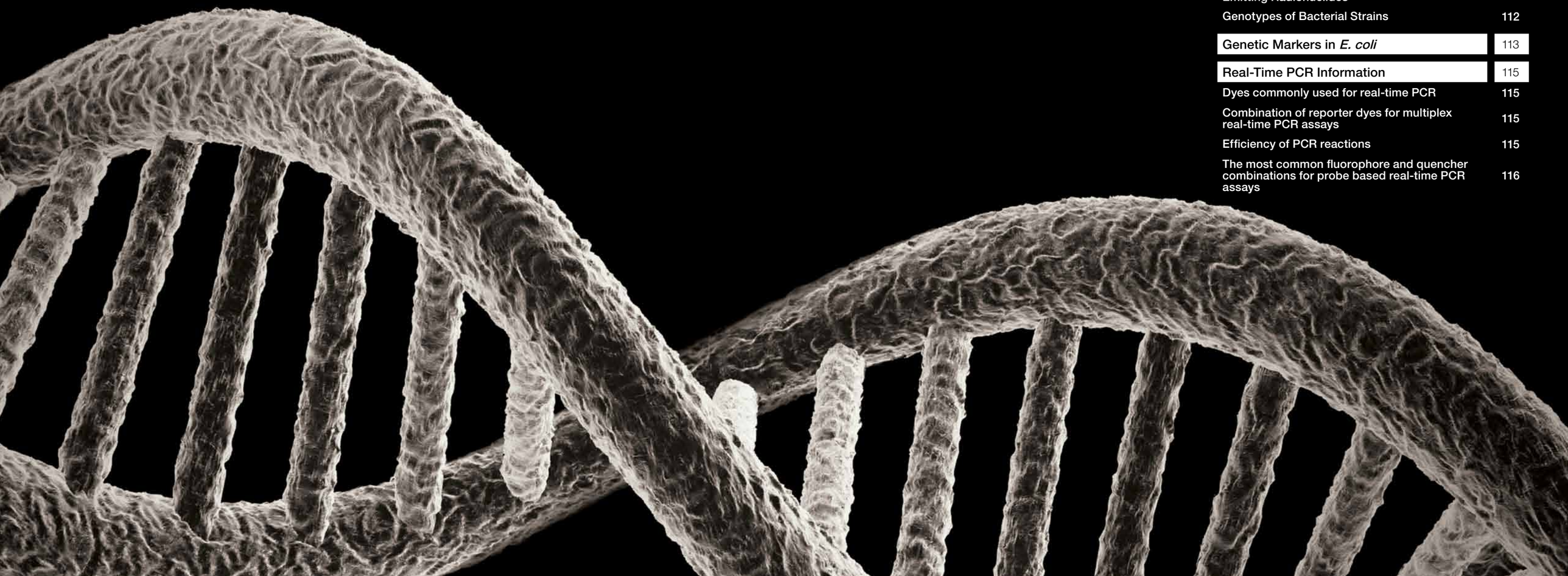
Description: Mouse Genomic DNA is highly purified and isolated from mixed gender BALB/c mice livers. The average length of the DNA is greater than 50Kb and is suitable for Southern blotting, genomic library construction and as a control template. The Mouse Genomic DNA is supplied at a concentration of 200ng/µl.

Storage Conditions: Mouse Genomic DNA should be stored at -20°C for up to 12 months. Avoid multiple freeze/thaw cycles.

Associated Products	Cat. No.	Page
MyTaq DNA Polymerase	BIO-21105	25
dNTP Mix	BIO-39028	77
HyperLadder I	BIO-33025	85
Agarose, Molecular Grade	BIO-41026	93

Technical References

Bioline's Technical Reference section features a range of tables and calculators to help in your experimental design. These include basic information on nucleic and amino acids, size calculators, unit converters, genotypic markers and real-time PCR setup. For further help Bioline also has an online interactive range of Biomath Tools, to guide you through your experimental steps and troubleshooting (www.bioline.com/tools).



Technical References

The Genetic Code

A Ala	R Arg	N Asn	D Asp	C Cys	Q Gln	E Glu	G Gly	H His	I Ile	L Leu	K Lys	M Met	F Phe	P Pro	S Ser	T Thr	W Trp	Y Tyr	V Val
5' GCA	CGA	AAC	GAC	UGC	CAA	GAA	GGA	CAC	AUA	CUA	AAA	AUG	UUC	CCA	UCA	ACA	UGG	UAC	GUA 3'
C	C	U	U	U	G	G	C	U	C	C	G		U	C	C	C		U	C
G	G						G		U	G	G			G	G	G			G
U	U						U			U				U	U	U			U
	or									or					or				
	AGA									UUA					AGC				
	G									G					U				

1st Position	2nd Position: U		2nd Position: C		2nd Position: A		2nd Position: G		3rd Position
U	UUU	Phe	UCU	Ser	UAU	Tyr	UGU	Cys	U
	UUC	Phe	UCC	Ser	UAC	Tyr	UGC	Cys	C
	UUA	Leu	UCA	Ser	**UAA**	Stop	**UGA**	Stop	A
	UUG	Leu	UCG	Ser	**UAG**	Stop	UGG	Trp	G
C	CUU	Leu	CCU	Pro	CAU	His	CGU	Arg	U
	CUC	Leu	CCC	Pro	CAC	His	CGC	Arg	C
	CUA	Leu	CCA	Pro	CAA	Gln	CGA	Arg	A
	CUG	Leu	CCG	Pro	CAG	Gln	CGG	Arg	G
A	AUU	Ile	ACU	Thr	AAU	Asn	AGU	Ser	U
	AUC	Ile	ACC	Thr	AAC	Asn	AGC	Ser	C
	AUA	Ile	ACA	Thr	AAA	Lys	AGA	Arg	A
	AUG	***Met***	ACG	Thr	AAG	Lys	AGG	Arg	G
G	GUU	Val	GCU	Ala	GAU	Asp	GGU	Gly	U
	GUC	Val	GCC	Ala	GAC	Asp	GGC	Gly	C
	GUA	Val	GCA	Ala	GAA	Glu	GGA	Gly	A
	GUG	Val	GCG	Ala	GAG	Glu	GGG	Gly	G

The codons are read in the 5' - 3' direction.
Termination codons are in bold.
AUG start codons is bold italic.

Amino Acids

Amino Acids : Three Letter Abbreviations and One Letter Symbols

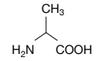
Amino Acid	Three-Letter Abbreviation	One-Letter Symbol
Alanine	Ala	A
Arginine	Arg	R
Asparagine	Asn	N
Aspartic acid	Asp	D
Asparagine or aspartic acid	Asx	B
Cysteine	Cys	C
Glutamine	Gln	Q
Glutamic Acid	Glu	E
Glutamine or glutamic acid	Glx	Z
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I
Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V

The average molecular weight of an amino acid is 110Da.
Dalton (Da) is an alternate name for the atomic mass unit and Kilodalton (KDa) is 1,000 daltons. Thus a protein with a mass of 64KDa has a molecular weight of 64,000 grams per mole.

Amino Acid Structures

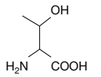
Amino Acid Structures are accompanied by three- and one-letter codes, residue molecular weight (actual molecular weight minus water) and side-chain pKa where appropriate.

Glycine (Gly, G)
MW: 57.05

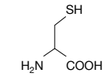


Alanine (Ala, A)
MW: 71.09

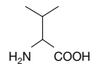
Serine (Ser, S)
MW: 87.08, pK_a ~ 16



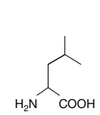
Threonine (Thr, T)
MW: 101.11, pK_a ~ 16



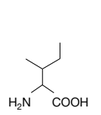
Cysteine (Cys, C)
MW: 103.15, pK_a = 8.35



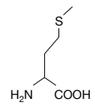
Valine (Val, V)
MW: 99.14



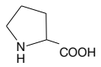
Leucine (Leu, L)
MW: 113.16



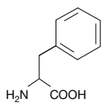
Isoleucine (Ile, I)
MW: 113.16



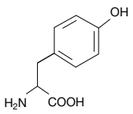
Methionine (Met, M)
MW: 131.19



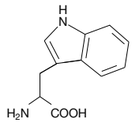
Proline (Pro, P)
MW: 97.12



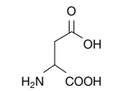
Phenylalanine (Phe, F)
MW: 147.18



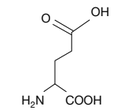
Tyrosine (Tyr, Y)
MW: 163.18



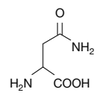
Tryptophan (Trp, W)
MW: 186.21



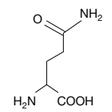
Aspartic Acid (Asp, D)
MW: 115.09, pK_a = 3.9



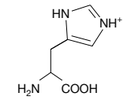
Glutamic Acid (Glu, E)
MW: 129.12, pK_a = 4.07



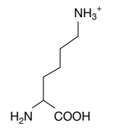
Asparagine (Asn, N)
MW: 114.11



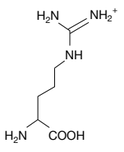
Glutamine (Gln, Q)
MW: 128.14



Histidine (His, H)
MW: 137.14, pK_a = 6.04

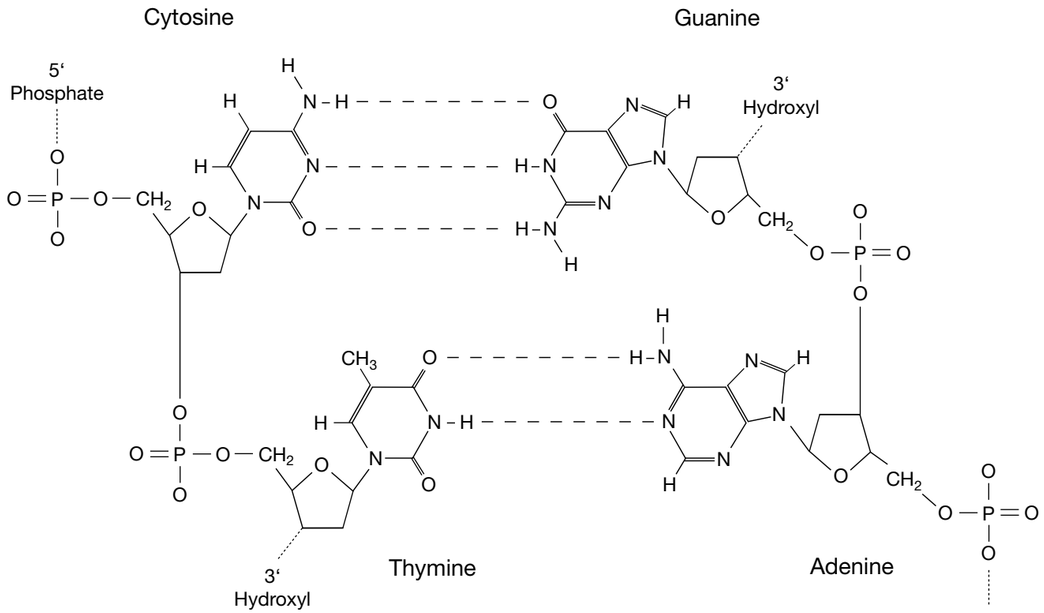


Lysine (Lys, K)
MW: 128.17, pK_a = 10.79



Arginine (Arg, R)
MW: 156.19, pK_a = 12.48

DNA Base Pairs



IUPAC Nucleotide Ambiguity Codes
Y = T or C (pyrimidine)
R = G or A (purine)
M = A or C (amino)
K = G or T (keto)
S = G or C (strong interaction: 3 H bonds)
W = A or T (weak interaction: 2 H bonds)
B = G or T or C (not-A)
V = G or C or A (not-T, not-U)
D = G or A or T (not-C)
H = A or C or T (not-G)
N = G or A or T or C (unknown nucleotide)

Purine & Pyrimidine Three Letter Abbreviations	
Ade = adenine	Thy = thymine
Gua = guanine	Cyt = cytosine
Xan = xanthine	Ura = uracil
Hyp = hypoxanthine	Oro = orotate
Pur = unknown purine	Pyr = unknown pyrimidine
Base = unknown base	

An RNase-free environment

The most critical factor for any work involving RNA is a clean environment. RNA is subject to digestion by a class of enzymes called ribonucleases that can be found everywhere, they are very hardy and difficult to inactivate. When planning to do any work with RNA we would recommend considering the following points:

All equipment used should either be sterile disposable plasticware which is DNase and RNase-free or pretreated before use, either using one of the many commercially available RNase removal products or soaking in 3% H_2O_2 and rinsing with ethanol before air drying. This step is often overlooked and it is often assumed that simply autoclaving tips and tubes is sufficient to remove RNase.

Although many sources of deionised water are RNase-free, we generally recommend using DEPC-treated water for all applications involving RNA. If normal water is to be used, it should be tested by incubating with an RNA sample and run on a gel to check for signs of degradation.

Gloves are essential for any RNA work as the skin is a massive source of RNase contamination.

Sterile technique is a must when handling any reagents for RNA work; some labs may find it useful to set up an isolated RNA area with separate pipettes and equipment only used for RNA work.

A common source of contamination will come directly from your sample. The use of an RNase inhibitor in your reaction can help to overcome this problem. This protein binds to RNases, inhibiting their activity and therefore protecting your valuable RNA.

Lengths/Molecular Weights of Common Nucleic Acids		
Nucleic Acid	**Number of Nucleotides**	**Molecular Weight * (Da)**
Lambda DNA	48502 (dsDNA)	3.2×10^7
pBR322 DNA	4361 (dsDNA)	2.8×10^6
28S rRNA (Eurkaryote)	4800	1.6×10^6
23S rRNA (*E. coli*)	2900	1.0×10^6
18S rRNA (Eurkaryote)	1900	6.5×10^5
16S rRNA (*E. coli*)	1500	5.1×10^5
5S rRNA (*E. coli*)	120	4.1×10^4
tRNA (*E. coli*)	75	2.5×10^4

*Molecular weights based on actual sequence

Standards:
1) Average MW of a dsDNA base pair = 660
2) Average MW of a ssDNA base = 330
3) Average MW of an RNA base = 340

References:
1. Daniels, D.L *et al.* (1983) *Appendix II: Complete annotated Lambda sequence.* In: *Lambda II*, ed., R.W. Hendrix *et al.*, Cold SpringHarborLaboratory, Cold Spring Harbor, NY, 519
2. Sutcliffe, J.G. (1978) *PNAS USA* **75**, 3737.
3. Sutcliffe, J.G. (1979) *Cold Spring Harbor Symp. Quant. Biol.* **43**, 77.

Ribosomal RNA Sizes from various Species						
SPECIES	**16S rRNA**	**18S rRNA**	**23S rRNA**	**25S rRNA**	**26S rRNA**	**28S rRNA**
Human	-	1.9	-	-	-	5.0
Mouse	-	1.9	-	-	-	4.7
Drosophila	1.5	2.0	-	-	-	4.1
Tobacco Leaf	-	1.9	2.9	3.7	-	-
Yeast	-	2.0	-	-	3.8	-
E. coli	1.5	-	2.9	-	-	-
Xenopus	-	1.8	-	-	-	4.0

**Drosphila* 28S rRNA is processed into 2 fragments that migrate in a similar fashion to the 18S rRNA

Technical References

Metric Prefixes

Prefix	Symbol	Factor
kilo	K	10^{3}
centi	c	10^{-2}
milli	m	10^{-3}
micro	µ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}
atto	a	10^{-18}
zepto	z	10^{-21}

Spectrophotometric Conversions

1 A_{260} unit of double-stranded DNA = 50µg/ml
1 A_{260} unit of single-stranded DNA = 33µg/ml
1 A_{260} unit of single-stranded RNA = 40µg/ml

DNA Molar Conversions

1µg of 1000bp DNA = 1.52pmol (3.03pmol of ends)
1µg of pBR322 DNA = 0.36pmol DNA
1pmol of 1000bp DNA = 0.66µg
1pmol of pBR322 DNA = 2.8µg

Protein/DNA Conversions

1Kb of DNA = 333 amino acids of coding capacity = 37KDa protein
270bp DNA = 10KDa of protein
810bp DNA = 30KDa protein
1.35Kb DNA = 50KDa protein
2.7Kb DNA = 100KDa protein
Average MW of an amino acid = 110 Da
1 Dalton (Da) = 1 gram per mole

Oligonucleotide Conversions

Molecular weight of oligo	ε_{260} of oligo
C x 289	C x 7.05
A x 313	A x 15.2
T x 304	T x 8.4
G x 329	G x 12.01

(ε_{260} = extinction co efficient at 260nm)
C = $OD_{260}/\varepsilon_{260}$ (mM)

Dye Migration: Polyacrylamide Denaturing Gels

Gel %	Bromophenol Blue	Xylene Cyanol
5.0	35bp	140bp
6.0	26bp	106bp
8.0	19bp	75bp
10.0	12bp	55bp
20.0	8bp	28bp

Dyes will migrate to the same point as double-stranded DNA of the indicated size in a denaturing polyacrylamide gel. Adapted from Sambrook, J.,Fritsch, E.F. and Maniatis, T. (1989) In: Molecular Cloning: A laboratory Manual,Cold Spring Harbour Laboratory, Cold Spring Harbor, NY.

Dye Migration: Polyacrylamide Nondenaturing Gels

Gel %	Bromophenol Blue	Xylene Cyanol
3.5	100bp	460bp
5.0	65bp	260bp
8.0	45bp	160bp
12.0	20bp	70bp
15.0	15bp	60bp
20.0	12bp	45bp

Dyes will migrate to the same point as double-stranded DNA of the indicated size in a nondenaturing polyacrylamide gel. Adapted from Sambrook, J.,Fritsch, E.F. and Maniatis, T. (1989) In: Molecular Cloning: A laboratory Manual,Cold Spring Harbour Laboratory, Cold Spring Harbor, NY.

Dye Migration in 0.5-1.4% Agarose (sizes are approximate)

Xylene cyanol FF	4000bp
Cresol Red	300bp
Bromophenol Blue	100bp
Orange G	50bp

Adapted from Sambrook, J.,Fritsch, E.F. and Maniatis, T. (1989) In: Molecular Cloning: A laboratory Manual,Cold Spring Harbour Laboratory, Cold Spring Harbor, NY.

Gel Percentages: Resolution of Linear DNA on Agarose Gels

Recommended % Agarose	Optimum Resolution for Linear DNA (Size of fragments in nucleotides; bp)
0.5	1000-30000
0.7	800-12000
1	500-10000
1.2	400-7000
1.5	200-3000
2	50-2000

Melt temperature for oligonucleotides

T_m (in °C) = 2(A+T) + 4(C+G)

Where (A+T) is the sum of A and T residues in the oligonucleotide and (G+C) is the sum of C and G residues in the oligonucleotide.

pH vs Temperature for Tris Buffer

pH of Tris Buffer (0.05M)		
5°C	25°C	37°C
7.76	7.20	6.91
7.89	7.30	7.02
7.97	7.40	7.12
8.07	7.50	7.22
8.18	7.60	7.30
8.26	7.70	7.40
8.37	7.80	7.52
8.48	7.90	7.62
8.58	8.00	7.71
8.68	8.10	7.80
8.78	8.20	7.91
8.88	8.30	8.01
8.98	8.40	8.10
9.09	8.50	8.22
9.18	8.60	8.31
9.28	8.70	8.42

Physical Properties of ß-Emitting Radionuclides

Radionuclide	Half-Life	Specific Activity: Common Values for Compounds (mCi/mmol)	Daughter Nuclide (stable)
tritium [^{3}H]	12.43 years	10^{2} - 10^{5}	helium-3
carbon-14 [^{14}C]	5,730 years	1 - 10^{2}	nitrogen-14
sulfur-35 [^{35}S]	87.4 days	1 - 10^{6}	chlorine-35
phosphorus-33 [^{33}P]	25.5 days	10 - 10^{4}	sulfur-33
phosphorus-32 [^{32}P]	14.3 days	10 - 10^{6}	sulfur-32

Physical Properties of γ-Ray and X-Ray Emitting Radionuclides

Radionuclide	Half-Life	Specific Activity: Common Values for Compounds (mCi/mmol)	Daughter Nuclide (stable)
iodine-131 [^{131}I]	8.06 days	10^{2} - 10^{6}	xenon-131
iodine-125 [^{125}I]	60 days	10^{2} - 10^{4}	tellurium-125

Genotypes of Bacterial Strains

Strain	Genotype
BL21	F- *ompT hsd*SB(r_B^-,m_B^-) *gal dcm*
BL21 (DE3)	F- *ompT hsd*SB(r_B^-,m_B^-) *gal dcm* (DE3)
BL21 (DE3) pLysS	F- *ompT hsd*SB(r_B^-,m_B^-) *gal dcm* (DE3) pLysS (CamR)
BL21 (DE3) pLysE	F- *ompT hsd*SB(r_B^-,m_B^-) *gal dcm* (DE3) pLysE (CamR)
α-Select Competent Cells	F- *deo*R *end*A1 *rec*A1 *rel*A1 *gyr*A96 *hsd*R17($r_k^-m_k^+$) *sup*E44 *thi*-1 phoA Δ(*lac*ZYA-*arg*FV169) ϕ80Δ*lac*ZΔM15 F- γ -
ElectroSHOX	F- *mcr*A Δ(*mrr*-*hsd*RMS-*mcr*BC) ϕ80*lac*Z ΔM15 Δ*lac*X74 *rec*A1 *end*A1 *ara* Δ139 Δ(*ara*, *leu*)7697 *gal*U *gal*K λ- *rps*L (StrR) *nup*G
BIO*Blue*	*rec*A1 *end*A1 *gyr*A96 *thi*-1 *hsd*R17($r_k^-m_k^+$) *sup*E44 *rel*A1 *lac* [F' *pro*AB *lac*ZΔM15 Tn10(TetR)]
CH3-Blue	F- *mcr*A Δ(*mrr*-*hsd*RMS-*mcr*BC) ϕ80*lac*Z ΔM15 Δ*lac*X74 *rec*A1 *end*A1 *ara* Δ139 Δ(*ara*, *leu*)7697 *gal*U *gal*K λ- *rps*L (StrR) *nup*G

Genetic Markers in *E. coli*

Symbol	Description	Effect of Mutation
***ara*-14**	Mutation in arabinose metabolism	Blocks aribinose catabolism
***ara*D**	L-ribulose phosphate 4-epimerase mutation; part of an inducible operon araBAD repressed by L-arabinose	Blocks aribinose catabolism
***arg*A**	N-Acetylglutamate synthase mutation; inhibited by the presence of arginine	Arginine required from growth in minimal media
***cyc*A**	Involved in D-alanine, glycine, D-serine and D-cycloserine transport, and an L-alanine carrier	Mutants cannot use D-alanine as a carbon source
dam	DNA adenine methylase mutation	Blocks methylation of adenine residues in the sequence shown 5'...GmATC...3'
***dap*D**	Succinyl-diaminopimelate aminotransferase mutation	Mutant reflects impaired synthesis of succinyl CoA and needs to be supplemented with succinate or lysine + methionine
dcm	DNA cytosine methylase mutation	Blocks methylation of cytosine in the sequence shown 5'...CmCAGG...3' or 5'...CmCTGG...3'
***deo*C**	Deoxyribose-phosphate aldolase mutation	
***deo*R**	Regulatory gene mutation allowing constitutive expression of genes for deoxyribose synthesis	Allows efficient propagation of large plasmids
***dut*1**	Mutation of deoxyuridine triphosphatase, which catalyses the conversion of dUTP to dUMP and PPi	Mutants are impaired in conversion of dUTP to dUMP, leading to higher dUTP pools that can lead to misincorporation of uracil instead of thymidine. Stable incorporation of dUTP needs mutation in ung gene
***end*A1**	DNA-specific endonuclease I mutation	Improves quality of plasmid DNA isolations
F	(Also known as the Fertility factor, F factor, sex factor, or F-plasmid) F is a bacterial DNA sequence that allows a bacterium to produce a sex pilus necessary for conjugation.	F' (F-prime) bacteria possess an F plasmid that also includes some DNA taken from the bacterial genome. It gives the bacteria single-strand ability, making it an excellent host for M13 and related filamentous phage
fhuA	Mutation in iron uptake receptor	Confers resistance to Bacteriophage T1
***gal*E**	Part of the galETK operon that encodes galactose-4-epimerase	Mutant cannot metabolize galactose and is more resistant to bacteriophage P1 infection
galK	Galactokinase mutation	Blocks metabolism of galactose
***gal*T**	Galactose-1-phosphate uridylyltransferase mutation	Blocks catabolism of galactose
GinV (SupE)	Suppressor mutations	Suppressor of glutamine-inserting Amber (UAG) tRNA mutation
***gyr*A96**	DNA gyrase mutation	Confers resistance to nalidixic acid
***hfl*A150**	Protease mutation which leads to stabilisation of cII gene products	Leads to high frequency of lysogeny by λ phages (1)
***hfl*B**	Gene encodes a possible protease component	Mutations lead to high frequency of bacteriophage Lambda lysogenisation
***hsd*R (r_K^-,m_K^+)**	Host DNA restriction and methylation system mutation. Restriction minus, modification positive for the *E. coli* K strain methylation system.	Allows cloning without cleavage of transformed DNA by endogenous restriction endonucleases. DNA prepared from this strain can be used to transform rK+ *E. coli* strains.
***hsd*S20 (r_B^-,m_B^-)**	Mutation of specificity determinant for host DNA restriction and methylation system. Restriction minus, modification minus for the *E. coli* B strain methylation system.	Allows cloning without cleavage of transformed DNA by endogenous restriction endonucleases. DNA prepared from this strain is unmethylated by the *hsd*S20 methylases.
***lac*I^q**	Overproduction of the lac repressor protein	Leads to high levels of the lac repressor protein, inhibiting transcription from the *lac* promotor.
***lac*Y**	Galactoside permease mutation	Blocks lactose utilisation
***lac*ZΔM15**	Partial deletion of ß-D-galactosidase gene	Allows complementation of ß-galactosidase activity by α-complementation sequence in plasmid vectors. Allows blue/white selection for recombinant colonies when plated on X-GAL/IPTG.
***leu*B**	ß-isopropylmalate dehydrogenase mutation	Requires leucine for growth on minimal media.
Δ(*lon*)	Deletion of lon protease	Reduces proteolysis of expressed proteins
***Lys*S or *Lys*E**	pLysS and pLysE plasmids are integrated into the host genome	Strains carrying this plasmids will be tet- and chloramphenicol-resistant and constitutively express T7 lysozyme, a natural inhibitor of T7 RNA polymerase, thus lowering background transcription of sequences under the control of the T7 RNA polymerase promotor (2)
***mcr*A**	Mutation in methylcytosine restriction system	Blocks restriction of DNA methylated at the sequence 5'...GmCGC...3'
***mcr*B**	Mutation in methylcytosine restriction system	Blocks restriction of DNA methylated at the sequence 5'...AGmCT...3'
***met*B**	Cystathionine γ-synthase mutation	Requires methionine for growth on minimal media
***met*C**	Cystathionine beta-lyase mutation; involved in methionine biosynthesis	Methionine required from growth in minimal media

Symbol	Description	Effect of Mutation
mrr	Methylated adenine recognition and restriction. DNA targets include both N6-methyladenine and 5-methylcytosine	No precise consensus sequence has been worked out, however dam^-, dcm^- or EcoKI-modified DNA is not restricted
mtl	Mutation in mannitol metabolism	Blocks catabolism of mannitol
***mut*S**	Methyl-directed mismatch repair mutation	Prevents repair of the newly synthesised, unmethylated strand
nupG	The nupG system determines high-affinity nucleoside transport across the cell membrane	$nupG^+$ results in nucleoside transport and these imported nucleosides serve as antecedents of DNA and RNA.
ompT	Mutation of protease VII, an outer membrane protein	Reduces proteolysis of expressed proteins
P2	P2 bacteriophage lysogen present in host	λ phages containing the red and gam genes of λ are growth inhibited by P2 lysogens (3)
***pro*A**	γ-glutamyl phoshate reductase mutation	proA/argD mutant will not block proline synthesis, but will be repressed by arginine. Mutants excrete proline on minimal media and are resistant to proline on minimal media and are resistant to proline analogues. proA/argD/argR triple mutant grows slowly on minimal media + arginine
***pro*AB**	Mutations in proline metabolism	Requires proline for growth in minimal media
***rec*A1, *rec*A13**	Mutation in recombination	Minimizes recombination of introduced DNA with host DNA, increasing stability of inserts. Inserts are more stable in *rec*A1 than *rec*A13 hosts
***rec*B, *rec*C, *rec*D**	Exonuclease V mutations. The *Rec* BCD trimer (exonuclease V) progressively degrades ssDNA and dsDNA in an ATP-dependent manner to form oligonucleotides; implicated in homologous recombination	Reduces general recombination and affects repair of radiation damage. Allows easier propogation of sequences with inverted repeats
***rec*F**	Recombination and repair mutation	Mutant cannot repair daughter strand gaps (post-replicational repair)
***rel*A**	ppGpp synthetase I mutation	Allows RNA synthesis in the absence of protein synthesis
rha	Utilisation of L-rhamnose, a methylpentose	Blocks rhamnose catabolism
***rps*L**	Mutation in subunit S12 of 30S ribosome	Confers resistance to streptomycin
***sbc*B**	Exonuclease I mutation	Allows general recombination in *rec*BC mutant strains
***str*A**	Mutant alters ribosome protein S12	Confers resistance to streptomycin
***sup*B, *sup*C, *sup*G, *sup*L, *sup*M, *sup*N, *sup*O**	Suppressor mutations	Suppresses ochre (UAA) and amber (UAG) mutations
***sup*D, *sup*E, *sup*F**	Suppressor mutations	Suppresses amber (UAG) mutations
T1R	Mutation in outer membrane protein	Confers resistance to Bacteriophage T1
***thi*-1**	Mutation in thiamine metabolism	Thiamine required for growth in minimal media
thr	Threonine biosynthesis mutation	Mutants are obligate threonine auxotrophs
***thy*A**	Thymidylate synthase; dTTP biosynthesis	Mutants are obligate thymidine auxotrophs
Tn5	Transposon	Encodes resistance to kanamycin
Tn10	Transposon	Encodes resistance to tetracycline
***ton*A**	Mutation in outer membrane protein	Confers resistance to bacteriophage T1
***tra*D36**	Transfer factor mutation	Prevents transfer of F' episome
***trp*C**	Phosphoribosyl anthranilate isomerase mutation	Part of tryptophan biosynthesis pathway
***trp*R**	trpR aporepressor	Regulates the biosynthesis of tryptophan and its transport
tsx	T6 and colicin K phage receptor; outer membrane protein involved in specific diffusion of nucleosides; transports the antibiotic albicidin	Resistant to bacteriophage T6 and colicin K
***ung*1**	Uracil-DNA N-glycosylase	Allows uracil to exist in plasmid DNA
***xyl*-5**	Mutation in xylose metabolism	Blocks metabolism of xylose
Δ(lacZYA-argF)U169 Φ80dlacΔ(lacZ) M15	Blue/White Screening	Selection of positive transformants through α-complementation of the β-galactosidase gene

References
1. Hoyt, A. *et al.* (1982) *Cell* 31, 565
2. Studier, F.W. (1991) *J. Mol. Biol.* 219, 37-44
3. Kaiser, K. and Murray, N. (1985) In: *DNA Cloning*, Vol. 1, Glover, D., ed., IRL Press Ltd., Oxford, UK.
4. Neidnardt, F. ed. (1996) *Escherichia coli and Salmonella Cellular and Molecular Biology* 2nd ed, ASM Press, Washington , D.C.

Real-Time PCR Information

Dyes commonly used for real-time PCR

Dye	Excitation maximum (nm)	Emission maximum (nm)*
Fluorescein	490	513
Oregon Green®	492	517
FAM	494	518
SYBR® Green I	494	521
TET	521	538
JOE	520	548
VIC®	538	562
Yakima Yellow®	526	562
HEX	535	563
Cy3	552	570
Bodipy® TMR	544	574
NED	546	575
TAMRA	580	582
Cy3.5	588	604
ROX	587	607
Texas Red®	596	615
LightCycler Red 640 (LC640)	625	640
Bodipy 630/650	625	640
Alexa Fluor® 647	650	666
Cy5	643	667
Alexa Fluor 660	663	690
Cy5.5	683	707

* Emission spectra may vary depending on the buffer conditions.

Efficiency of PCR reactions

Scope of Standard Curve	Amplification Rate*	Efficiency*
-4.00	1.78	78%
-3.95	1.79	79%
-3.90	1.80	80%
-3.85	1.82	82%
-3.80	1.83	83%
-3.75	1.85	85%
-3.70	1.86	86%
-3.65	1.88	88%
-3.60	1.90	90%
-3.55	1.91	91%
-3.50	1.93	93%
-3.45	1.95	95%
-3.40	1.97	97%
-3.35	1.99	99%
-3.30	2.01	101%
-3.25	2.03	103%
-3.20	2.05	105%
-3.15	2.08	108%
-3.10	2.10	110%
-3.05	2.13	113%
-3.00	2.15	115%

* Exponential Amplification = $10^{(-1/\text{scope})}$, Efficiency = $[10^{(-1/\text{scope})}]-1$

Combination of reporter dyes for multiplex real-time PCR assays

Cycler	Reference dye	Dye 1	Dye 2	Dye 3	Dye 4
ABI 7700	ROX	FAM	HEX, JOE, VIC	-	-
ABI 7300, 7000 and 7900, StepOne plus	ROX	FAM	HEX, JOE, VIC	Bodipy TMR, NED	-
ABI 7500	ROX	FAM	HEX, JOE, VIC	Bodipy TMR, NED	Alexa Fluor 647, Cy5
Bio-Rad iCycler® iQ and iQ5	Not required	FAM	HEX, JOE, TET, VIC	Texas Red, ROX	Cy5
Bio-Rad Opticon 2	Not required	FAM	HEX, JOE, VIC	-	-
Bio-Rad Chromo4	Not required	FAM	HEX, JOE, VIC	Texas Red, ROX	Cy5
Corbett Rotor-Gene 3000	Not required	FAM	HEX, VIC	ROX	-
Corbett Rotor-Gene 6000	Not required	FAM	HEX, VIC	ROX	Quasar® 705
Eppendorf Mastercycler ep realplex	Not required	FAM	HEX, JOE, VIC	-	-
Roche LightCycler® 2.0	Not required	FAM	HEX, JOE, VIC	Texas Red, ROX	Alexa Fluor 660, Bodipy 630/650, Pulsar®650
Roche LightCycler® 480	Not required	FAM	HEX, JOE, VIC	Texas Red, ROX	Cy5
Stratagene Mx3000®, Mx3005P®	Not required	FAM	HEX, JOE, VIC	Texas Red, ROX	Cy5

Preferably, select Dye 1 for the least abundant target, Dye 2 for the second least abundant target, and Dyes 3–4 for the most abundant targets.

The most common fluorophore and quencher combinations for probe based real-time PCR assays

Dye	Excitation maximum (nm)	Emission maximum (nm)	Compatible Quencher	Quencher range (nm)
FAM	494	518	BHQ-1, TAMRA	480-580, 550-576
JOE	520	548	BHQ-1, TAMRA	480-580, 550-576
TET	521	538	BHQ-1, TAMRA	480-580, 550-576
Cal Fluor Gold 5401	522	541	BHQ-1	480-580
HEX2	535	555	BHQ-1, TAMRA	480-580, 550-576
Cal Fluor Orange 5602	540	581	BHQ-1	480-580
TAMRA	560	582	BHQ-2	550-650
Cy3	562	570	BHQ-2	550-650
Quasar 5703	548	566	BHQ-2	550-650
Cal Fluor Red 5904	565	588	BHQ-2	550-650
ROX	587	607	BHQ-2	550-650
Texas Red	596	615	BHQ-2	550-650
Cy5	643	667	BHQ-3	620-730
Quasar 6705	647	667	BHQ-3	620-730
Cy5.5	683	707	BHQ-3	620-730

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Bioline offers a wide selection of products and services, together with highly informative product information and services to suit the specific needs of your laboratory. Additional up-to-date information can be found on our website along with seasonal sale promotions, local and international events as well as our new Social Networks: Facebook, Twitter and Blog.

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CAT. NO.	PRODUCT NAME	PACK SIZE	PAGE NO.
BIO-21040	BIOTAQ DNA Polymerase	500 Units	27
BIO-21046	IMMOLASE DNA Polymerase	250 Units	21
BIO-21047	IMMOLASE DNA Polymerase	500 Units	21
BIO-21048	IMMOLASE DNA Polymerase	5000 Units	21
BIO-21049	BIO-X-ACT Long DNA Polymerase	250 Units	30
BIO-21050	BIO-X-ACT Long DNA Polymerase	500 Units	30
BIO-21051	ACCUZYME DNA Polymerase	250 Units	24
BIO-21052	ACCUZYME DNA Polymerase	500 Units	24
BIO-21060	BIOTAQ DNA Polymerase	2500 Units	29
BIO-21064	BIO-X-ACT Short DNA Polymerase	250 Units	27
BIO-21065	BIO-X-ACT Short DNA Polymerase	500 Units	29
BIO-21071	BIOTAQ PCR Kit	500 Units	28
BIO-21078	Mango*Taq* DNA Polymerase	5000 Units	26
BIO-21082	Mango*Taq* DNA Polymerase	2000 Units	26
BIO-21083	Mango*Taq* DNA Polymerase	1000 Units	26
BIO-21098	VELOCITY DNA Polymerase	250 Units	22
BIO-21099	VELOCITY DNA Polymerase	500 Units	22
BIO-21103	PCR Tailing Mix	50 Reactions	23
BIO-21104	VELOCITY PCR Kit	250 Units	23
BIO-21105	MyTaq DNA Polymerase	500 Units	25
BIO-21106	MyTaq DNA Polymerase	2500 Units	25
BIO-21107	MyTaq DNA Polymerase	5000 Units	25
BIO-21108	MyTaq Red DNA Polymerase	500 Units	25
BIO-21109	MyTaq Red DNA Polymerase	2500 Units	25
BIO-21110	MyTaq Red DNA Polymerase	5000 Units	25
BIO-21111	MyTaq HS DNA Polymerase	250 Units	19
BIO-21112	MyTaq HS DNA Polymerase	1000 Units	19
BIO-21113	MyTaq HS DNA Polymerase	2500 Units	19
BIO-21114	MyTaq HS Red DNA Polymerase	250 Units	19
BIO-21115	MyTaq HS Red DNA Polymerase	1000 Units	19
BIO-21116	MyTaq HS Red DNA Polymerase	2500 Units	19
BIO-25000+			
BIO-25025	BIO-X-ACT Short Mix, 2x	100 Reactions	29
BIO-25026	BIO-X-ACT Short Mix, 2x	500 Reactions	29
BIO-25027	ACCUZYME Mix, 2x	100 Reactions	24
BIO-25028	ACCUZYME Mix, 2x	500 Reactions	24
BIO-25033	MangoMix	250 Reactions	26
BIO-25034	MangoMix	1000 Reactions	26
BIO-25041	MyTaq Mix	200 Reactions	25
BIO-25042	MyTaq Mix	1000 Reactions	25
BIO-25043	MyTaq Red Mix	200 Reactions	25
BIO-25044	MyTaq Red Mix	1000 Reactions	25
BIO-25045	MyTaq HS Mix	200 Reactions	20
BIO-25046	MyTaq HS Mix	1000 Reactions	20
BIO-25047	MyTaq HS Red Mix	200 Reactions	20
BIO-25048	MyTaq HS Red Mix	1000 Reactions	20
BIO-27026	T4 DNA Ligase	500 Units	54
BIO-27027	Quick-Stick Ligase	50 Reactions	53
BIO-27028	Quick-Stick Ligase	100 Reactions	53
BIO-30000+			
BIO-33025	HyperLadder I	200 Lanes	85
BIO-33026	HyperLadder I	500 Lanes	85
BIO-33029	HyperLadder IV	200 Lanes	86
BIO-33030	HyperLadder IV	500 Lanes	86
BIO-33031	HyperLadder V	200 Lanes	87
BIO-33032	HyperLadder V	500 Lanes	87
BIO-33039	HyperLadder II	200 Lanes	85
BIO-33040	HyperLadder II	500 Lanes	85
BIO-33043	HyperLadder III	200 Lanes	86
BIO-33044	HyperLadder III	500 Lanes	86
BIO-33045	EasyLadder I	200 Lanes	87
BIO-33046	EasyLadder I	500 Lanes	87
BIO-33047	EasyLadder II	200 Lanes	88
BIO-33048	EasyLadder II	500 Lanes	88
BIO-33065	HyperPAGE Protein Marker	10 Lanes	90
BIO-33066	HyperPAGE Protein Marker	50 Lanes	90
BIO-35025	Human Genomic DNA	500µl @ 200ng/µl	104
BIO-35026	Rat Genomic DNA	500µl @ 200ng/µl	104
BIO-35027	Mouse Genomic DNA	500µl @ 200ng/µl	104
BIO-37000+			
BIO-37025	NH_4 Buffer, 10x	3 x 1.2ml	101
BIO-37026	$MgCl_2$ Solution, 50mM	3 x 1.2ml	101
BIO-37032	Hi-Spec Additive, 5x	3 x 1.2ml	101
BIO-37035	X-GAL	1g	95
BIO-37036	IPTG	5g	55
BIO-37037	Proteinase K	100mg	95
BIO-37039	Proteinase K	1000mg	95
BIO-37041	PolyMate Additive, 2x	2 x 1.2ml	102

CAT. NO.	PRODUCT NAME	PACK SIZE	PAGE NO.
BIO-37042	SureClean	1 x 5ml	68
BIO-37045	DNA Loading Buffer Blue, 5x	2 x 1ml	99
BIO-37046	SureClean	1 x 25ml	68
BIO-37047	SureClean Plus	1 x 5ml	68
BIO-37048	SureClean Plus	1 x 25ml	68
BIO-37068	DNA Loading Buffer Red, 5x	2 x 1ml	99
BIO-37070	DNA Loading Buffer TriColor, 5x	2 x 1ml	99
BIO-37075	Co-Precipitant, Pink	1.5ml (5mg/ml)	96
BIO-37080	Water 18.2MΩ PCR Grade	10 x 10ml	103
BIO-37082	IPTG Solution	10ml @ 1M, 240mg/ml	55
BIO-37083	IPTG Solution	5 x 10ml @ 1M, 240mg/ml	55
BIO-37084	Proteinase K Solution	5ml @ 20mg/ml	95
BIO-37085	Proteinase K Solution	5 x 5ml @ 20mg/ml	95
BIO-37103	Crystal 50x TAE Buffer	5 x 1000ml Pouches	97
BIO-37104	Crystal 10x TBE Buffer	10 x 1000ml Pouches	97
BIO-37105	Crystal 10x TE Buffer	10 x 1000ml Pouches	100
BIO-37106	Crystal 1x TG Buffer	10 x 1000ml Pouches	98
BIO-37107	Crystal PBS Buffer	100 Tablets (0.5 Liter)	100
BIO-37108	Crystal PBS Buffer	100 Tablets (1 Liter)	100
BIO-37109	Crystal SDS Reagent	50 x 0.5g Tablets	98
BIO-37111	MyTaq Reaction Buffer Colorless	4 x 1ml	101
BIO-37112	MyTaq Reaction Buffer Red	4 x 1ml	101
BIO-38000+			
BIO-38028	Random Hexamer Primer	25µg	38
BIO-38029	Oligo $(dT)_{18}$	27µg	38
BIO-38030	DEPC-Treated Water	10 x 10ml	103
BIO-38031	DEPC-Treated Water	1 Litre	103
BIO-38032	TRIsure	100ml	69
BIO-38033	TRIsure	200ml	69
BIO-38037	Bacterial Enhancement Reagent	20ml	70
BIO-38038	TRIsure Plus Bacterial RNA Isolation Kit	100 Preps	70
BIO-38039	TRIsure Plus Bacterial RNA Isolation Kit	200 Preps	70
BIO-39025	dNTP Set, 100mM	4 x 25µmol (4 x 250µl)	77
BIO-39026	dNTP Set, 100mM	4 x 100µmol (4 x 4 x 250µl)	77
BIO-39027	dNTP Set, 100mM	4 x 500µmol (20 x 4 x 250µl)	77
BIO-39028	dNTP Mix, 100mM Final Conc.	50µmol dNTP (1 x 500µl)	77
BIO-39029	dNTP Mix, 100mM Final Conc.	200µmol dNTP (4 x 500µl)	77
BIO-39035	dUTP, 100mM	25µmol (1x 250µl)	78

CAT. NO.	PRODUCT NAME	PACK SIZE	PAGE NO.
BIO-39036	dATP, 100mM	25µmol (1 x 250µl)	78
BIO-39037	dGTP, 100mM	25µmol (1 x 250µl)	78
BIO-39038	dCTP, 100mM	25µmol (1 x 250µl)	78
BIO-39039	dTTP, 100mM	25µmol (1x 250µl)	78
BIO-39041	dUTP Mix, 50mM Final Conc.	25µmol dUTP (500µl)	78
BIO-39043	dNTP Mix, 40mM Final Conc.	20µmol dNTP (1 x 500µl)	77
BIO-39044	dNTP Mix, 10mM Final Conc.	10µmol (1ml vol.)	77
BIO-39046	Hydroxymethyl dCTP, 100mM	25µmol (1 x 250µl)	78
BIO-39049	dNTP Set, 100mM	4 x 100µmol (4 x 1ml)	77
BIO-39050	NTP Mix, 100mM Final Conc.	100µmol (1ml vol.)	80
BIO-39052	NTP Set, 100mM	4 x 25µmol	80
BIO-39053	dNTP Mix, 10mM Final Conc.	100µmol (10 x 1ml vol.)	77
BIO-40000+			
BIO-41025	Agarose, Molecular Grade	500g	93
BIO-41026	Agarose, Molecular Grade	100g	93
BIO-41027	Agarose Tablets	300g	93
BIO-41028	Agarose Tablets	150g	93
BIO-41029	Agarose, HiRes Grade	100g	93
BIO-52025	ISOLATE Plasmid Mini Kit	10 Preps	61
BIO-52026	ISOLATE Plasmid Mini Kit	50 Preps	61
BIO-52027	ISOLATE Plasmid Mini Kit	250 Preps	61
BIO-52028	ISOLATE PCR and Gel Kit	10 Preps	62
BIO-52029	ISOLATE PCR and Gel Kit	50 Preps	62
BIO-52030	ISOLATE PCR and Gel Kit	250 Preps	62
BIO-52031	ISOLATE Genomic DNA Mini Kit	10 Preps	64
BIO-52032	ISOLATE Genomic DNA Mini Kit	50 Preps	64
BIO-52033	ISOLATE Genomic DNA Mini Kit	250 Preps	64
BIO-52034	ISOLATE Plant DNA Mini Kit	10 Preps	65
BIO-52035	ISOLATE Plant DNA Mini Kit	50 Preps	65
BIO-52036	ISOLATE Plant DNA Mini Kit	250 Preps	65
BIO-52037	ISOLATE Fecal DNA Kit	25 Preps	63
BIO-52038	ISOLATE Fecal DNA Kit	100 Preps	63
BIO-52039	ISOLATE Plant RNA Mini Kit	10 Preps	67
BIO-52040	ISOLATE Plant RNA Mini Kit	50 Preps	67
BIO-52041	ISOLATE Plant RNA Mini Kit	250 Preps	67
BIO-52042	ISOLATE RNA Mini Kit	10 Preps	66
BIO-52043	ISOLATE RNA Mini Kit	50 Preps	66
BIO-52044	ISOLATE RNA Mini Kit	250 Preps	66

CAT. NO.	PRODUCT NAME	PACK SIZE	PAGE NO.
BIO-60000+			
BIO-65027	RiboSafe RNase Inhibitor	2500 Units	39
BIO-65028	RiboSafe RNase Inhibitor	10,000 Units	39
BIO-65042	Tetro cDNA Synthesis Kit	30 Reactions	37
BIO-65043	Tetro cDNA Synthesis Kit	100 Reactions	37
BIO-65047	MyTaq One-Step RT-PCR Kit	10 Reactions	36
BIO-65048	MyTaq One-Step RT-PCR Kit	25 Reactions	36
BIO-65049	MyTaq One-Step RT-PCR Kit	100 Reactions	36
BIO-65050	Tetro Reverse Transcriptase	10,000 Units	35
BIO-65051	Tetro Reverse Transcriptase	4 x 10,000 Units	35
BIO-72001	SensiFAST SYBR No-ROX One-Step Kit	100 Reactions	10
BIO-72005	SensiFAST SYBR No-ROX One-Step Kit	500 Reactions	10
BIO-73001	SensiFAST SYBR Hi-ROX One-Step Kit	100 Reactions	10
BIO-73005	SensiFAST SYBR Hi-ROX One-Step Kit	500 Reactions	10
BIO-74001	SensiFAST SYBR Lo-ROX One-Step Kit	100 Reactions	10
BIO-74005	SensiFAST SYBR Lo-ROX One-Step Kit	500 Reactions	10
BIO-75001	SensiFAST SYBR & Fluorescein One-Step Kit	100 Reactions	11
BIO-75005	SensiFAST SYBR & Fluorescein One-Step Kit	500 Reactions	11
BIO-76001	SensiFAST Probe No-ROX One-Step Kit	100 Reactions	12
BIO-76005	SensiFAST Probe No-ROX One-Step Kit	500 Reactions	12
BIO-77001	SensiFAST Probe Hi-ROX One-Step Kit	100 Reactions	12
BIO-77005	SensiFAST Probe Hi-ROX One-Step Kit	500 Reactions	12
BIO-78001	SensiFAST Probe Lo-ROX One-Step Kit	100 Reactions	12
BIO-78005	SensiFAST Probe Lo-ROX One-Step Kit	500 Reactions	12
BIO-80000+			
BIO-82002	SensiFAST Probe Hi-ROX Kit	200 Reactions	07
BIO-82005	SensiFAST Probe Hi-ROX Kit	500 Reactions	07
BIO-82020	SensiFAST Probe Hi-ROX Kit	2000 Reactions	07
BIO-84002	SensiFAST Probe Lo-ROX Kit	200 Reactions	07
BIO-84005	SensiFAST Probe Lo-ROX Kit	500 Reactions	07
BIO-84020	SensiFAST Probe Lo-ROX Kit	2000 Reactions	07
BIO-85025	α-Select Competent Cells, Bronze Efficiency	2ml (10 x 200µl)	48
BIO-85026	α-Select Competent Cells, Silver Efficiency	2ml (10 x 200µl)	48
BIO-85027	α-Select Competent Cells, Gold Efficiency	1ml (20 x 50µl)	48
BIO-85028	α-Select Competent Cells, Electrocompetent	1ml (10 x 100µl)	48
BIO-85029	α-Select Competent Cells, Silver Efficiency T1-Resistant Cells	2ml (10 x 200µl)	48
BIO-85030	α-Select Competent Cells, Gold Efficiency T1-Resistant Cells	1ml (20 x 50µl)	48

CAT. NO.	PRODUCT NAME	PACK SIZE	PAGE NO.
BIO-85031	BL21	1ml (10 x 100µl)	52
BIO-85032	BL21 (DE3)	1ml (10 x 100µl)	52
BIO-85033	BL21 (DE3) pLysS	1ml (10 x 100µl)	52
BIO-85034	BL21 (DE3) pLysE	1ml (10 x 100µl)	52
BIO-85035	BL21 ComboPack	1.5ml (15 x 100µl)	52
BIO-85036	BIO*Blue*, 10^8	1ml (10 x 100µl)	50
BIO-85037	BIO*Blue*, 10^9	1ml (20 x 50µl)	50
BIO-85038	ElectroSHOX	1ml (10 x 100µl)	50
BIO-85039	CH3-BLUE 10^8	1ml (10 x 100µl)	49
BIO-85040	CH3-BLUE 10^9	1ml (20 x 50µl)	49
BIO-85044	dam-/dcm- Competent Cells Bacteriophage T1-Resistant	1ml (10 x 100µl)	49
BIO-86002	SensiFAST Probe No-ROX Kit	200 Reactions	05
BIO-86005	SensiFAST Probe No-ROX Kit	500 Reactions	05
BIO-86020	SensiFAST Probe No-ROX Kit	2000 Reactions	06
BIO-86033	SOC Medium	10 x 10ml	55
BIO-87025	Ampicillin Solution	10ml @ 100mg/ml, in Water	56
BIO-87026	Carbenicillin Solution	10ml @ 100mg/ml, in 50% Ethanol	56
BIO-87027	Chloramphenicol Solution	10ml @ 50mg/ml, in Ethanol	56
BIO-87028	Kanamycin Solution	10ml @ 100mg/ml, in Water	56
BIO-87029	Neomycin Solution	10ml @ 50mg/ml, in Water	56
BIO-87030	Tetracycline Solution	10ml @ 12.5mg/ml, in Ethanol	56
BIO-90000+			
BIO-92002	SensiFAST SYBR Hi-ROX Kit	200 Reactions	05
BIO-92005	SensiFAST SYBR Hi-ROX Kit	500 Reactions	05
BIO-92020	SensiFAST SYBR Hi-ROX Kit	2000 Reactions	05
BIO-94002	SensiFAST SYBR Lo-ROX Kit	200 Reactions	05
BIO-94005	SensiFAST SYBR Lo-ROX Kit	500 Reactions	05
BIO-94020	SensiFAST SYBR Lo-ROX Kit	2000 Reactions	05
BIO-96002	SensiFAST SYBR & Fluorescein Kit	200 Reactions	07
BIO-96005	SensiFAST SYBR & Fluorescein Kit	500 Reactions	05
BIO-96020	SensiFAST SYBR & Fluorescein Kit	2000 Reactions	07
BIO-98002	SensiFAST SYBR No-ROX Kit	200 Reactions	05
BIO-98005	SensiFAST SYBR No-ROX Kit	500 Reactions	05
BIO-98020	SensiFAST SYBR No-ROX Kit	2000 Reactions	05
QT8000+			
QT805-02	SensiMix HRM Kit	250 Reactions	08
QT805-05	SensiMix HRM Kit	500 Reactions	08
QT805-20	SensiMix HRM Kit	2000 Reactions	08

PRODUCT NAME	PACK SIZE	CAT. NO.	PAGE NO.
α-Select Competent Cells, Bronze Efficiency	2ml (10 x 200µl)	BIO-85025	48
α-Select Competent Cells, Silver Efficiency	2ml (10 x 200µl)	BIO-85026	48
α-Select Competent Cells, Gold Efficiency	1ml (20 x 50µl)	BIO-85027	48
α-Select Competent Cells, Electrocompetent	1ml (10 x 100µl)	BIO-85028	48
α-Select Competent Cells, Silver Efficiency T1-Resistant Cells	2ml (10 x 200µl)	BIO-85029	48
α-Select Competent Cells, Gold Efficiency T1-Resistant Cells	1ml (20 x 50µl)	BIO-85030	48
A			
ACCUZYME DNA Polymerase	250 Units	BIO-21051	24
ACCUZYME DNA Polymerase	500 Units	BIO-21052	24
ACCUZYME Mix, 2x	100 Reactions	BIO-25027	24
ACCUZYME Mix, 2x	500 Reactions	BIO-25028	24
Agarose Tablets	150g	BIO-41028	93
Agarose Tablets	300g	BIO-41027	93
Agarose, HiRes Grade	100g	BIO-41029	93
Agarose, Molecular Grade	100g	BIO-41026	93
Agarose, Molecular Grade	500g	BIO-41025	93
Ampicillin Solution	10ml @ 100mg/ml, in Water	BIO-87025	56
B			
Bacterial Enhancement Reagent	20ml	BIO-38037	70
BIO-X-ACT Long DNA Polymerase	250 Units	BIO-21049	30
BIO-X-ACT Long DNA Polymerase	500 Units	BIO-21050	30
BIO-X-ACT Short DNA Polymerase	250 Units	BIO-21064	29
BIO-X-ACT Short DNA Polymerase	500 Units	BIO-21065	29
BIO-X-ACT Short Mix, 2x	100 Reactions	BIO-25025	29
BIO-X-ACT Short Mix, 2x	500 Reactions	BIO-25026	29
BIO*Blue*, 10^8	1ml (10 x 100µl)	BIO-85036	50
BIO*Blue*, 10^9	1ml (20 x 50µl)	BIO-85037	50
BIOTAQ DNA Polymerase	500 Units	BIO-21040	27
BIOTAQ DNA Polymerase	2500 Units	BIO-21060	27
BIOTAQ PCR Kit	500 Units	BIO-21071	28
BL21	1ml (10 x 100µl)	BIO-85031	52
BL21 (DE3)	1ml (10 x 100µl)	BIO-85032	52
BL21 (DE3) pLysE	1ml (10 x 100µl)	BIO-85034	52
BL21 (DE3) pLysS	1ml (10 x 100µl)	BIO-85033	52
BL21 ComboPack	1.5ml (15 x 100µl)	BIO-85035	52

PRODUCT NAME	PACK SIZE	CAT. NO.	PAGE NO.
C			
Carbenicillin Solution	10ml @ 100mg/ml, in 50% Ethanol	BIO-87026	56
CH3-BLUE 10^8	1ml (10 x 100µl)	BIO-85039	49
CH3-BLUE 10^9	1ml (20 x 50µl)	BIO-85040	49
Chloramphenicol Solution	10ml @ 50mg/ml, in Ethanol	BIO-87027	56
Co-Precipitant, Pink	1.5ml (5mg/ml)	BIO-37075	96
Crystal 10x TBE Buffer	10 Pouches	BIO-37104	97
Crystal 10x TE Buffer	10 Pouches	BIO-37105	100
Crystal 1x TG Buffer	10 Pouches	BIO-37106	98
Crystal 50x TAE Buffer	5 Pouches	BIO-37103	97
Crystal PBS Buffer	100 Tablets (0.5 Liter)	BIO-37107	100
Crystal PBS Buffer	100 Tablets (1 Liter)	BIO-37108	100
Crystal SDS Reagent	50 Tablets	BIO-37109	98
D			
dam-/dcm- Competent Cells Bacteriophage T1-Resistant	1ml (10 x 100µl)	BIO-85044	49
dATP, 100mM	25µmol (1 x 250µl)	BIO-39036	78
dCTP, 100mM	25µmol (1 x 250µl)	BIO-39038	78
DEPC-treated Water	10 x 10ml	BIO-38030	103
DEPC-treated Water	1 Litre	BIO-38031	103
dGTP, 100mM	25µmol (1 x 250µl)	BIO-39037	78
DNA Loading Buffer Blue, 5x	2 x 1ml	BIO-37045	99
DNA Loading Buffer Red, 5x	2 x 1ml	BIO-37068	99
DNA Loading Buffer TriColor, 5x	2 x 1ml	BIO-37070	99
dNTP Mix, 10mM Final Conc.	10µmol (1ml vol.)	BIO-39044	77
dNTP Mix, 10mM Final Conc.	100µmol (10 x 1ml vol.)	BIO-39053	77
dNTP Mix, 40mM Final Conc.	20µmol dNTP (1 x 500µl)	BIO-39043	77
dNTP Mix, 100mM Final Conc.	50µmol dNTP (1 x 500µl)	BIO-39028	77
dNTP Mix, 100mM Final Conc.	200µmol dNTP (4 x 500µl)	BIO-39029	77
dNTP Set, 100mM	4 x 25µmol (4 x 250µl)	BIO-39025	77
dNTP Set, 100mM	4 x 100µmol (4 x 1ml)	BIO-39049	77
dNTP Set, 100mM	4 x 100µmol (4 x 4 x 250µl)	BIO-39026	77
dNTP Set, 100mM	4 x 500µmol (20 x 4 x 250µl)	BIO-39027	77
dTTP, 100mM	25µmol (1x 250µl)	BIO-39039	78
dUTP Mix, 50mM Final Conc.	25µmol dUTP (500µl)	BIO-39041	78
dUTP, 100mM	25µmol (1x 250µl)	BIO-39035	78

PRODUCT NAME	PACK SIZE	CAT. NO.	PAGE NO.
E			
EasyLadder I	200 Lanes	BIO-33045	87
EasyLadder I	500 Lanes	BIO-33046	87
EasyLadder II	200 Lanes	BIO-33047	88
EasyLadder II	500 Lanes	BIO-33048	88
ElectroSHOX	1ml (10 x 100µl)	BIO-85038	50
H			
Hi-Spec Additive, 5x	3 x 1.2ml	BIO-37032	101
Human Genomic DNA	500µl @ 200ng/µl	BIO-35025	104
Hydroxymethyl dCTP, 100mM	25µmol (1 x 250µl)	BIO-39046	78
HyperLadder I	200 Lanes	BIO-33025	85
HyperLadder I	500 Lanes	BIO-33026	85
HyperLadder II	500 Lanes	BIO-33040	85
HyperLadder II	200 Lanes	BIO-33039	85
HyperLadder III	500 Lanes	BIO-33044	86
HyperLadder III	200 Lanes	BIO-33043	86
HyperLadder IV	200 Lanes	BIO-33029	86
HyperLadder IV	500 Lanes	BIO-33030	86
HyperLadder V	200 Lanes	BIO-33031	87
HyperLadder V	500 Lanes	BIO-33032	87
HyperPAGE Protein Marker	10 Lanes	BIO-33065	90
HyperPAGE Protein Marker	50 Lanes	BIO-33066	90
I			
IMMOLASE DNA Polymerase	250 Units	BIO-21046	21
IMMOLASE DNA Polymerase	500 Units	BIO-21047	21
IMMOLASE DNA Polymerase	5000 Units	BIO-21048	21
IPTG	5g	BIO-37036	55
IPTG Solution	10ml @ 1M, 240mg/ml	BIO-37082	55
IPTG Solution	5 x 10ml @ 1M, 240mg/ml	BIO-37083	55
ISOLATE Fecal DNA Kit	25 Preps	BIO-52037	63
ISOLATE Fecal DNA Kit	100 Preps	BIO-52038	63
ISOLATE Genomic DNA Mini Kit	10 Preps	BIO-52031	64
ISOLATE Genomic DNA Mini Kit	50 Preps	BIO-52032	64
ISOLATE Genomic DNA Mini Kit	250 Preps	BIO-52033	64
ISOLATE PCR and Gel Kit	10 Preps	BIO-52028	62
ISOLATE PCR and Gel Kit	50 Preps	BIO-52029	62
ISOLATE PCR and Gel Kit	250 Preps	BIO-52030	62
ISOLATE Plant DNA Mini Kit	10 Preps	BIO-52034	65
ISOLATE Plant DNA Mini Kit	50 Preps	BIO-52035	65
ISOLATE Plant DNA Mini Kit	250 Preps	BIO-52036	65
ISOLATE Plant RNA Mini Kit	10 Preps	BIO-52039	67
ISOLATE Plant RNA Mini Kit	50 Preps	BIO-52040	67
ISOLATE Plant RNA Mini Kit	250 Preps	BIO-52041	67

PRODUCT NAME	PACK SIZE	CAT. NO.	PAGE NO.
ISOLATE Plasmid Mini Kit	10 Preps	BIO-52025	61
ISOLATE Plasmid Mini Kit	50 Preps	BIO-52026	61
ISOLATE Plasmid Mini Kit	250 Preps	BIO-52027	61
ISOLATE RNA Mini Kit	10 Preps	BIO-52042	66
ISOLATE RNA Mini Kit	50 Preps	BIO-52043	66
ISOLATE RNA Mini Kit	250 Preps	BIO-52044	66
K			
Kanamycin Solution	10ml @ 100mg/ml, in Water	BIO-87028	56
M			
MangoMix	250 Reactions	BIO-25033	26
MangoMix	1000 Reactions	BIO-25034	26
Mango*Taq* DNA Polymerase	1000 Units	BIO-21083	26
Mango*Taq* DNA Polymerase	2000 Units	BIO-21082	26
Mango*Taq* DNA Polymerase	5000 Units	BIO-21078	26
$MgCl_2$ Solution, 50mM	3 x 1.2ml	BIO-37026	101
Mouse Genomic DNA	500µl @ 200ng/µl	BIO-35027	104
MyTaq DNA Polymerase	500 Units	BIO-21105	25
MyTaq DNA Polymerase	2500 Units	BIO-21106	25
MyTaq DNA Polymerase	5000 Units	BIO-21107	25
MyTaq HS DNA Polymerase	250 Units	BIO-21111	19
MyTaq HS DNA Polymerase	1000 Units	BIO-21112	19
MyTaq HS DNA Polymerase	2500 Units	BIO-21113	19
MyTaq HS Mix	200 Reactions	BIO-25045	20
MyTaq HS Mix	1000 Reactions	BIO-25046	20
MyTaq HS Red DNA Polymerase	250 Units	BIO-21114	19
MyTaq HS Red DNA Polymerase	1000 Units	BIO-21115	19
MyTaq HS Red DNA Polymerase	2500 Units	BIO-21116	19
MyTaq HS Red Mix	200 Reactions	BIO-25047	20
MyTaq HS Red Mix	1000 Reactions	BIO-25048	20
MyTaq Mix	200 Reactions	BIO-25041	25
MyTaq Mix	1000 Reactions	BIO-25042	25
MyTaq One-Step RT-PCR Kit	10 Reactions	BIO-65047	36
MyTaq One-Step RT-PCR Kit	25 Reactions	BIO-65048	36
MyTaq One-Step RT-PCR Kit	100 Reactions	BIO-65049	36
MyTaq Reaction Buffer Colorless	4 x 1ml	BIO-37111	101
MyTaq Reaction Buffer Red	4 x 1ml	BIO-37112	101
MyTaq Red DNA Polymerase	500 Units	BIO-21108	25
MyTaq Red DNA Polymerase	2500 Units	BIO-21109	25
MyTaq Red DNA Polymerase	5000 Units	BIO-21110	25
MyTaq Red Mix	200 Reactions	BIO-25043	25
MyTaq Red Mix	1000 Reactions	BIO-25044	25

PRODUCT NAME	PACK SIZE	CAT. NO.	PAGE NO.
N			
Neomycin Solution	10ml @ 50mg/ml, in Water	BIO-87029	56
NH_4 Buffer, 10x	3 x 1.2ml	BIO-37025	101
NTP Mix, 100mM Final Conc.	100µmol (1ml vol.)	BIO-39050	80
NTP Set, 100mM	4 x 25µmol	BIO-39052	80
O			
Oligo $(dT)_{18}$	27µg	BIO-38029	38
P			
PCR Tailing Mix	50 Reactions	BIO-21103	23
PolyMate Additive, 2x	2 x 1.2ml	BIO-37041	102
Proteinase K	100mg	BIO-37037	95
Proteinase K	1000mg	BIO-37039	95
Proteinase K Solution	5ml @ 20mg/ml	BIO-37084	95
Proteinase K Solution	5 x 5ml @ 20mg/ml	BIO-37085	95
Q			
Quick-Stick Ligase	50 Reactions	BIO-27027	53
Quick-Stick Ligase	100 Reactions	BIO-27028	53
R			
Random Hexamer Primer	25µg	BIO-38028	38
Rat Genomic DNA	500µl @ 200ng/µl	BIO-35026	104
RiboSafe RNase Inhibitor	2500 Units	BIO-65027	39
RiboSafe RNase Inhibitor	10,000 Units	BIO-65028	39
S			
SensiFAST Probe Hi-ROX Kit	200 Reactions	BIO-82002	07
SensiFAST Probe Hi-ROX Kit	500 Reactions	BIO-82005	07
SensiFAST Probe Hi-ROX Kit	2000 Reactions	BIO-82020	07
SensiFAST Probe Hi-ROX One-Step Kit	100 Reactions	BIO-77001	12
SensiFAST Probe Hi-ROX One-Step Kit	500 Reactions	BIO-77005	12
SensiFAST Probe Lo-ROX Kit	200 Reactions	BIO-84002	07
SensiFAST Probe Lo-ROX Kit	500 Reactions	BIO-84005	07
SensiFAST Probe Lo-ROX Kit	2000 Reactions	BIO-84020	07
SensiFAST Probe Lo-ROX One-Step Kit	100 Reactions	BIO-78001	12
SensiFAST Probe Lo-ROX One-Step Kit	500 Reactions	BIO-78005	12
SensiFAST Probe No-ROX Kit	200 Reactions	BIO-86002	07
SensiFAST Probe No-ROX Kit	500 Reactions	BIO-86005	07
SensiFAST Probe No-ROX Kit	2000 Reactions	BIO-86020	07
SensiFAST Probe No-ROX One-Step Kit	100 Reactions	BIO-76001	12
SensiFAST Probe No-ROX One-Step Kit	500 Reactions	BIO-76005	12
SensiFAST SYBR & Fluorescein Kit	200 Reactions	BIO-96002	06
SensiFAST SYBR & Fluorescein Kit	500 Reactions	BIO-96005	06
SensiFAST SYBR & Fluorescein Kit	2000 Reactions	BIO-96020	06
SensiFAST SYBR & Fluorescein One-Step Kit	100 Reactions	BIO-75001	11
SensiFAST SYBR & Fluorescein One-Step Kit	500 Reactions	BIO-75005	11

PRODUCT NAME	PACK SIZE	CAT. NO.	PAGE NO.
SensiFAST SYBR Hi-ROX Kit	200 Reactions	BIO-92002	05
SensiFAST SYBR Hi-ROX Kit	500 Reactions	BIO-92005	05
SensiFAST SYBR Hi-ROX Kit	2000 Reactions	BIO-92020	05
SensiFAST SYBR Hi-ROX One-Step Kit	100 Reactions	BIO-73001	10
SensiFAST SYBR Hi-ROX One-Step Kit	500 Reactions	BIO-73005	10
SensiFAST SYBR Lo-ROX Kit	200 Reactions	BIO-94002	05
SensiFAST SYBR Lo-ROX Kit	500 Reactions	BIO-94005	05
SensiFAST SYBR Lo-ROX Kit	2000 Reactions	BIO-94020	05
SensiFAST SYBR Lo-ROX One-Step Kit	100 Reactions	BIO-74001	10
SensiFAST SYBR Lo-ROX One-Step Kit	500 Reactions	BIO-74005	10
SensiFAST SYBR No-ROX Kit	200 Reactions	BIO-98002	05
SensiFAST SYBR No-ROX Kit	500 Reactions	BIO-98005	05
SensiFAST SYBR No-ROX Kit	2000 Reactions	BIO-98020	05
SensiFAST SYBR No-ROX One-Step Kit	100 Reactions	BIO-72001	10
SensiFAST SYBR No-ROX One-Step Kit	500 Reactions	BIO-72005	10
SensiMix HRM Kit	250 Reactions	QT805-02	08
SensiMix HRM Kit	500 Reactions	QT805-05	08
SensiMix HRM Kit	2000 Reactions	QT805-20	08
SOC Medium	10 x 10ml	BIO-86033	55
SureClean	1 x 5ml	BIO-37042	68
SureClean	1 x 25ml	BIO-37046	68
SureClean Plus	1 x 5ml	BIO-37047	68
SureClean Plus	1 x 25ml	BIO-37048	68
T			
T4 DNA Ligase	500 Units	BIO-27026	54
Tetracycline Solution	10ml @ 12.5mg/ml, in Ethanol	BIO-87030	56
Tetro cDNA Synthesis Kit	30 Reactions	BIO-65042	37
Tetro cDNA Synthesis Kit	100 Reactions	BIO-65043	37
Tetro Reverse Transcriptase	10,000 Units	BIO-65050	35
Tetro Reverse Transcriptase	4 x 10,000 Units	BIO-65051	35
TRIsure	100ml	BIO-38032	69
TRIsure	200ml	BIO-38033	69
TRIsure Plus Bacterial RNA Isolation Kit	100 Preps	BIO-38038	70
TRIsure Plus Bacterial RNA Isolation Kit	200 Preps	BIO-38039	70
V			
VELOCITY DNA Polymerase	250 Units	BIO-21098	22
VELOCITY DNA Polymerase	500 Units	BIO-21099	22
VELOCITY PCR Kit	250 Units	BIO-21104	23
W			
Water 18.2MΩ PCR Grade	10 x 10ml	BIO-37080	103
X			
X-GAL	1g	BIO-37035	95

Terms and Conditions of Sale

1. Terminology

a. The "Company" shall mean either Bioline Ltd or Bioline GmbH in line with the entity with whom any order is placed.
b. The "Goods" are products supplied by the "Company".
c. The "Buyer" means the person or organisation to whom the Company has contracted to supply Goods.
d. Headings are given for ease of reference only and shall not affect the products described.
e. References to individuals shall be treated as applying to corporations and vice versa.

2. Contract Conditions

These conditions shall apply to every sale made or agreed to be made by the Company. They shall govern each contract defined as an agreement to sell, either by acknowledgment of the Buyer's order, or by the dispatch of the Goods requested. These Conditions cannot be varied or waived except with an expressly written approval of the Company. Any conditions submitted by the Buyer, in whatever form, are expressly waived and excluded except where written agreement is given by the Company in exceptional cases.

3. Contract Cancellation

The Buyer may not cancel the contract without written agreement of the Company. If this is given, the Buyer shall indemnify the Company against all losses, damage, claims or action arising as a result of such cancellation.

4. Changes to Contract

After accepting an order, the Company may make modifications to the Goods without informing the Buyer, it being understood that such modifications are improvements, not adversely affecting the performance of the Goods.

5. Prices

The price of the Goods does not include the following items:
Packaging, delivery, insurance and taxes, duties and other impositions, all of which shall be borne by the Buyer.
The Company shall not modify prices before delivery to the Buyer, except to reflect additional costs resulting from any alteration or addition to the Buyer's requirements.

6. Payment Terms

a. Payment shall be made in full in the currency invoiced, within 30 days from the date of the invoice.
b. In the event of late payment the Company reserves the right to:
Suspend all further deliveries until payment has been made, or cancel the contract with respect to Goods still to be delivered.
In either case this shall not prevent recourse to other rights or remedies available to the Company.
c. The Company may charge interest at 2 per cent per 28 days on any sum overdue, calculated on a day-to-day basis until final payment. The Buyer shall not be entitled to withhold payment on the grounds of having other claims against the Company.

7. Returns

Owing to the temperature requirements of our products, the quality of returned goods cannot be guaranteed. consequently, we regret that we cannot accept returned goods in the event of a purchasing error.

8. Delivery

a. Unless otherwise agreed in writing, all Goods shall be dispatched by methods judged the most appropriate to ensure the safe delivery of the Goods. Whilst expedient delivery is considered most important, any times quoted for delivery shall be treated as estimates only and the Company shall not be liable for any loss or damage arising from delays in delivery.
b. Delivery is on an ex-factory basis. After delivery, the Goods shall be solely the Buyer's risk in respect of loss or damage arising from any cause, unless the Buyer notifies the Company in writing: of any damage, discrepancy or shortage in the Goods delivered, within 8 days of delivery or of total loss or non-receipt of the Goods, within 10 days of the Company's invoice.
In such cases, the Company's sole obligation shall be limited to the replacement of the Goods in question and the Company shall not be under any other liability whatsoever.
c. Where delivery of any product requires an Export Licence or other authorisation before shipment, the Company shall not be responsible for delivery delays resulting from a delay in the granting, or refusal of, such authorization.

9. Property

Title to the Goods shall remain vested in the Company and shall not pass to the Buyer until the purchase price has been paid in full and received by the Company. However from delivery the Buyer shall keep the Goods fully insured until the time of payment. If the Goods are lost or destroyed before payment, the Buyer shall hold the proceeds of insurance to the order of the Company pending payment. The Buyer agrees not to dispose of or re-sell the Goods before full payment is made for them.

10. Limited Product Warranty

The Company warrants that its products will conform to the standards stated in its product specification sheets in effect at the time of shipment. The Company will replace free of charge any product that does not conform to the specifications.
This warranty limits the Company's liability only to the replacement of the product. This warranty is exclusive and the Company makes no other warranty, expressed or implied, including without limitation any implied warranty of marketability or fitness for a particular purpose.
The stated express warranties and the remedy provided for breach thereof, are in lieu of all other liability or obligations of the Company for any damages whatsoever, arising out of or in connection with the delivery, or the inability to use any of its products.
In no event shall the Company be legally liable in the basis of contract, negligence, strict liability in tort, or warranty of any kind for any indirect, special, incidental, consequential or exemplary damages (including but not limited to lost profits).
Without limiting the effect of the preceding sentence, the Company's maximum liability, if any, shall not exceed the purchase price paid by the Buyer for the product.

11. Patent Disclaimer

Unless explicitly stated, no license or immunity under any patent is either granted or implied by the sale of any of our products.
The Company does not warrant that the resale or use of its products delivered will not infringe the claims of any patents, trademarks or copyright covering use of the product itself, or its use in combination with any other products, or its use in the operation of any process. Furthermore, the purchaser assumes all risks of patent, trademark or copyright infringement associated with any such use, combination or operation.

12. Claims and Liability

a. To the extent permitted by law, all conditions, warranties or obligations expressed or implied by statute, common law or otherwise are excluded and replaced by the provisions of these conditions.
b. No claim under the Warranty (see Condition 9) will be met if, in the opinion of the Company:
The defect is not due solely to defective materials or manufacture.
The Goods have been misused, treated with carelessness, contaminated, involved in an accident or dealt with in a manner at variance with the Company's directions.
c. The warranty of condition 9 is specifically limited to the Buyer and does not apply to any other person.
d. The Buyer acknowledges that the Goods will be used for laboratory and research purposes and undertakes not to make them available for human consumption,

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