

Reagents for Successful Results



# The **Essentials** Guide

Core reagents for Molecular Biology



# *Essential Reagents for Successful Results*

Trusted by scientists all over the world, the Biotline 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 SensiMix kits, PCR enzymes, RNA analysis reagents, Markers, Cloning reagents, Competent cells and Protein tools, offering the convenience of ordering all reagents from one source.

Biotline'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 for your everyday research.



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**Agarose** | *For sharp DNA electrophoresis*

Bioline's Agarose is DNase/RNase free and of the highest quality, ideal for high resolution separation of a wide range of DNA/RNA fragments.

**Agarose, HiRes Grade**

- Special high resolution grade
- High gel strength for easy-to-handle flexible gels
- Your choice for separating nucleic acid fragments  $\leq 1000\text{bp}$

**Agarose, Molecular Grade**

- Excellent value and clarity
- Strong gels at low concentration
- Ideal for separating nucleic acids fragments  $> 10000\text{bp}$

**Agarose Tablets**

- Exactly pre-weighed tablets
- Convenient and time saving
- Greater gel-to-gel consistency
- Gels as low as 0.5%

PRODUCT	PACK SIZE	CAT NO.
Agarose, HiRes Grade	100g	BIO-41029
Agarose, Molecular Grade	100g	BIO-41026
Agarose, Molecular Grade	500g	BIO-41025
Agarose, Tablets	100g	BIO-41028
Agarose, Tablets	500g	BIO-41027



**BIOLINE AGAROSE SPECIFICATIONS**

Specification	Agarose, Molecular Grade	Agarose, HiRes Grade	Agarose Tablets
Appearance	White crystals or powder	White crystals or powder	White tablet
Gel strength	$\geq 1200\text{g/cm}^2$ (1.0% gel)	$\geq 1200\text{g/cm}^2$ (4% gel)	$\geq 1200\text{g/cm}^2$ (1.0% gel)
Gel clarity/background	Passes test	Passes test	Passes test
Electroendosmosis (EEO)	$\leq 0.12$ (-m)	0.06 - 0.14 (-m)	0.10 - 0.20 (-m)
Melting temperature	88-90°C	$\leq 92^\circ\text{C}$	88-90°C
Gelling temperature	36°C +/-2°C	31-39°C	37-39°C
Moisture (loss on drying)	$\leq 8.5\%$	$\leq 10\%$	$< 7\%$
Solids (ash/residue on ignition)	$\leq 0.6\%$	$\leq 1\%$	$< 10\%$
Sulfate	$\leq 0.14\%$	$< 0.15\%$	$< 0.10\%$
DNase and RNase activity	None detected	None detected	None detected
DNA binding activity	None detected	None detected	None detected
Optimal range of separation	-500 to $> 40,000\text{bp}$ for gels 0.7-3%	$< 1000\text{bp}$ for gels 1-4%	-500 to $> 40,000\text{bp}$ for gels 0.7-3%

## Crystal Electrophoresis Buffers | *Pure, Simple & Convenient*

Our selection of pre-weighed and ready-to-use running and loading buffers were especially developed to help you to standardize your nucleic acid and protein electrophoresis.

### Crystal Electrophoresis Running Buffers

**Crystal TBE** and **TAE** are most common buffers used in agarose and polyacrylamide electrophoresis of DNA and RNA. **MOPS buffer** is used for RNA analysis.

**Crystal TG buffer** is recommended to perform PAGE and, in combination with Bioline SDS reagent, for SDS-PAGE techniques.

The Crystal buffers are made from reagents with the highest purity and reliability, undergo stringent QC analysis and are delivered pre-weighed in convenient ready-to-use sealed pouches and in tablets. MOPS buffer is supplied as a stock solution.

#### Crystal Electrophoresis Running Buffers

- Perfect for DNA/RNA and protein electrophoresis
- Molecular biology grade
- Dissolve and use in minutes
- Guaranteed batch-to-batch reproducibility



PRODUCT	PACK SIZE	CAT NO.
10x Crystal TBE Buffer	10 Pouches	BIO-37104
50x Crystal TAE Buffer	5 Pouches	BIO-37103
1x Crystal TG Buffer	10 Pouches	BIO-37106
10x MOPS Buffer	1 Litre	BIO-38027

### SPECIFICATIONS AND APPLICATIONS OF CRYSTAL DNA/RNA RUNNING BUFFERS

	Crystal 10x TBE	Crystal 50x TAE	Crystal 1x TG	10x MOPS
Name	Tris-Borate-EDTA	Tris-Acetate-EDTA	Tris-Glycine	MOPS-EDTA-Na Acetate
Format	Powder in sealed pouch	Powder in sealed pouch	Powder in sealed pouch	10x Stock solution
Molecular Biology Grade	DNase and RNase free	DNase and RNase free	DNase and RNase free	DNase and RNase free
Composition (Pouch/1000ml)	0.89M Tris-Borate, 0.02M EDTA, pH 8.3 at 25°C	2.0M Tris-Acetate, 0.05M EDTA, pH 8.3 at 25°C	0.1M Tris and 0.192M glycine, pH 8.3 at 25°C	3-Morpholinopropane-sulfonic acid-EDTA-sodium acetate, pH 7.0 at 25°C
Shelf Life	At least 3 years	At least 3 years	At least 3 years	At least 1 year
Applications	<ul style="list-style-type: none"> <li>• DNA electrophoresis</li> <li>• Short fragments &lt;1500 bp</li> </ul>	<ul style="list-style-type: none"> <li>• DNA electrophoresis</li> <li>• Long fragments &gt;1500 bp</li> <li>• Non-denaturing RNA analysis</li> <li>• Southern blotting buffer</li> </ul>	<ul style="list-style-type: none"> <li>• Protein electrophoresis</li> <li>• PAGE</li> <li>• SDS-PAGE combined with Crystal SDS tablets</li> <li>• Western blotting assays</li> </ul>	<ul style="list-style-type: none"> <li>• RNA electrophoresis</li> <li>• Northern blotting buffer</li> </ul>
Recommended Bioline Agarose	<ul style="list-style-type: none"> <li>• HiRes grade (BIO-41029)</li> <li>• Tablets (BIO-41028)</li> </ul>	<ul style="list-style-type: none"> <li>• Molecular grade (BIO-41026)</li> <li>• Tablets (BIO-41028)</li> </ul>	<ul style="list-style-type: none"> <li>• Polyacrylamide gels</li> </ul>	<ul style="list-style-type: none"> <li>• Molecular grade (BIO-41026)</li> <li>• Tablets (BIO-41028)</li> <li>• Polyacrylamide gels</li> </ul>

## Crystal Nucleic Acid Loading Buffers

**Crystal 5x DNA Loading Buffers** are ready-to-use solutions with color dyes to facilitate sample loading and to monitor the migration rate during agarose electrophoresis. The presence of glycerol in the buffer ensures that the sample is deposited at the bottom of the sample well.

Depending on the specific application it is possible to select between:  
 Crystal 5x DNA Loading Buffer Blue (Bromophenol Blue)  
 Crystal 5x DNA Loading Buffer Red (Cresol Red)  
 Crystal 5x DNA Loading Buffer Tri-Color (Xylene Cyanol Blue, Cresol Red and Orange-G).

**Crystal 2x RNA Loading Buffers** are ready-to-use solutions supplied in two formulations: with and without ethidium bromide (EtBr). The buffer solution maintains the denatured state of RNA during agarose electrophoresis.

PRODUCT	PACK SIZE	CAT NO.
5x DNA Loading Buffer Blue	2 x 1ml	BIO-37045
5x DNA Loading Buffer Red	2 x 1ml	BIO-37068
5x DNA Loading Buffer TriColor	2 x 1ml	BIO-37070
2x RNA Loading Buffer with EtBr	1ml	BIO-38025
2x RNA Loading Buffer without EtBr	1ml	BIO-38026

## PCR Buffers & Enhancers *The perfect match for your PCR assays*

### PCR Buffers

Bioline PCR buffers are available in 10x concentration and have been assayed in PCR reactions with commercially available DNA polymerases. Our selection of PCR buffers includes:

**10x NH<sub>4</sub> Buffer | 10x NH<sub>4</sub> + MgCl<sub>2</sub> Buffer | 10x KCl Reaction Buffer  
 50mM MgCl<sub>2</sub> Solution | 5x Hi-Fi Buffer**

A specially optimized reaction buffer for *MangoTaq* DNA polymerase is provided in two formats: colored and colorless

**MangoTaq Buffer colored** contains two inert dyes for easy orientation and monitors migration rate during agarose electrophoresis, making it useful for high-throughput applications  
**MangoTaq Buffer colorless** is used for downstream processes involving absorbance or fluorescent detection.

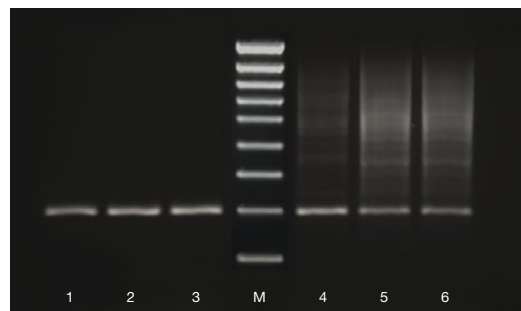
PRODUCT	PACK SIZE	CAT NO.
<b>PCR Buffers</b>		
10x NH <sub>4</sub> Buffer	3 x 1.2ml	BIO-37025
10x NH <sub>4</sub> + MgCl <sub>2</sub> Buffer	3 x 1.2ml	BIO-37064
10x KCl Reaction Buffer	3 x 1.2ml	BIO-37066
50mM MgCl <sub>2</sub> Solution	3 x 1.2ml	BIO-37026
5x Hi-Fi Buffer	2 x 1.5ml	BIO-37110
MangoTaq Buffer, colored	10ml	BIO-37102
MangoTaq Buffer, colorless	10ml	BIO-37101
<b>PCR Enhancers</b>		
2x PolyMate Additive	2 x 1.2ml	BIO-37041
5x Hi-Spec Additive	3 x 1.2ml	BIO-37032

### PCR Enhancers

Bioline offers PolyMate and HiSpec additives to enhance amplification reactions and should be empirically tested for each combination of template and primers.

**PolyMate Additive (2x)** is used in reactions involving thermostable DNA polymerase, designed to dramatically improve reaction specificity. It is ideal for dirty/difficult DNA templates (Fig. 1), GC/AT-rich, repetitive sequences or sequences with a high level of secondary structure.

**Hi-Spec Additive (5x)** is a popular compound designed to eliminate unwanted by-products during DNA amplification and is ideally suited to difficult templates with GC-rich regions or repetitive sequences.



**Fig. 1 High specificity and reduced smearing.**  
 PCR of a 201bp GC-rich fragment (>66%) from Human TGF- $\beta$  gene.  
 Lanes: With PolyMate & 1.5mM, 2.0mM & 2.5mM MgCl<sub>2</sub> respectively (1-3),  
 HyperLadder IV (M), Without PolyMate (4-6)

## PCR Clean-up | *Clean-up at its best*

**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.

### SureClean

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

**SureClean** is easy to use, combining convenience, speed and excellent recovery rates. SureClean 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), and enables the researcher to re-suspend the cleaned-up nucleic acids in any buffer and volume of choice. This allows the purification process to be tailored specifically to suit any downstream applications.

**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.

### Co-Precipitants

**Bioline Co-Precipitants, Glycogen (isolated from Oyster) and Linear Polyacrylamide (Pink), aid salt/alcohol precipitation of DNA and RNA.**

- Effective for fragments  $\geq 25$ bp
- Suitable for sequencing
- Free from DNA, RNA and protein
- Minimizes pellet loss

Co-Precipitants provide almost complete recovery of DNA/RNA fragments as small as 25bp, and are suitable for most applications, including the precipitation of DNA for sequencing, DNA after enzymatic manipulations and RNA from different sources. As Co-Precipitants are free of nucleic acids, all resulting precipitates are also suitable for standard PCR, RT-PCR and other enzymatic reactions.

PRODUCT	PACK SIZE	CAT NO.
<b>SureClean &amp; SureClean Plus</b>		
SureClean	5ml	BIO-37042
SureClean	25ml	BIO-37046
SureClean Plus	5ml	BIO-37047
SureClean Plus	25ml	BIO-37048
<b>Co-Precipitants</b>		
Co-Precipitant Pink	1.5ml	BIO-37075
Co-Precipitant Glycogen	1ml	BIO-37077

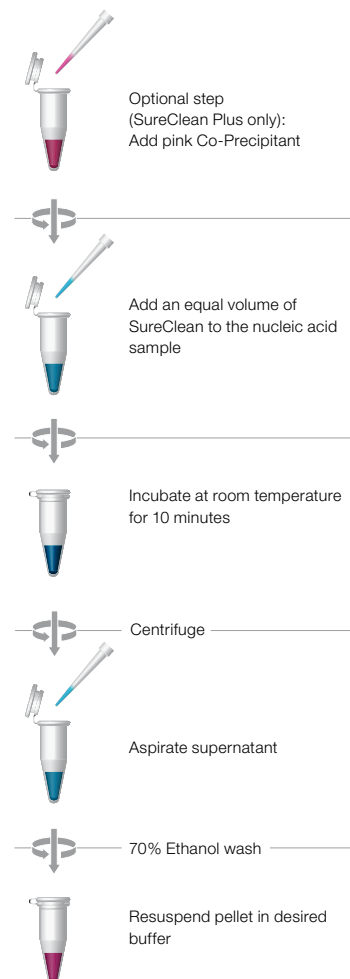


Fig. 1 Schematic of SureClean/SureClean Plus protocol

## Cloning Reagents *Make the BEST of it*

Bioline features a range of proven reagents for your everyday cloning needs. These high quality products include SOC medium, X-GAL/IPTG solutions, antibiotic solutions and ligases. They are the ideal complement our Bioline Competent Cells range.

### Ligases

Bioline offers T4 DNA ligase and Quick-Stick ligase for cloning of DNA from PCR products, plasmids, cosmids and genomic, phage and viral DNA.

#### Quick-Stick ligase

Features:

- Dramatically decreases time for DNA cloning
- Fast 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 various sources
- Linker ligation
- Re-ligation of linearized plasmids
- Ligation of double-stranded oligonucleotides into vectors (plasmid and phage)

#### T4 DNA ligase

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

PRODUCT	PACK SIZE	CAT NO.
Quick-Stick Ligase	50 Reactions	BIO-27027
Quick-Stick Ligase	100 Reactions	BIO-27028
T4 DNA Ligase	500 Units	BIO-27026

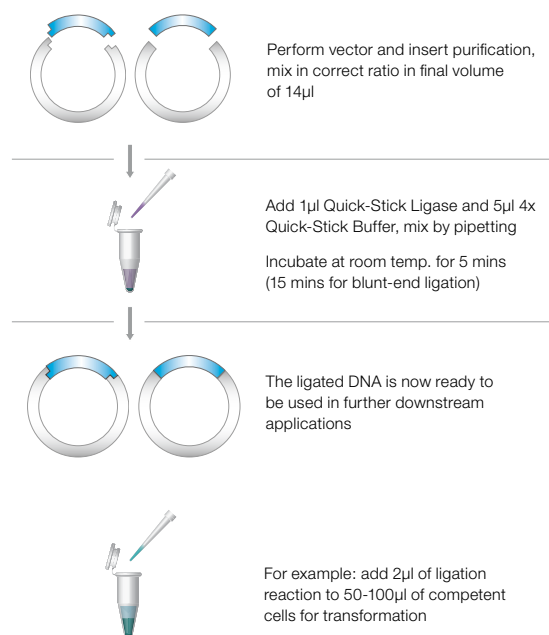


Fig. 1 Schematic of Quick-Stick Ligation procedure

### SOC Medium

Bioline SOC Medium is a nutrient-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.

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

PRODUCT	PACK SIZE	CAT NO.
SOC Medium	10 x 10ml	BIO-86033



## X-GAL

Contamination in reagents used for PCR assays can contribute In vector-based gene cloning the competent cells are grown in the presence of X-GAL. If the ligation is successful the bacterial colony will be white, if not, the colony will be blue.

- Extremely pure
- Intense blue precipitate upon hydrolysis
- Blue/white screening for successful ligations
- Immunocytochemical assays
- Microbiology and cell culture media

## IPTG Powder & Solution

Genes controlled by the *lac* or *tac* promotor/operator sequences are expressed to high levels when cells are grown in the presence of IPTG.

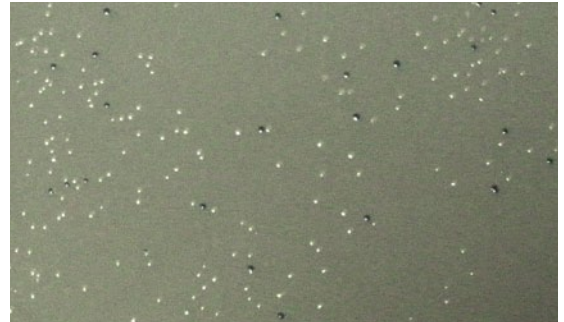
- >99.6% pure by HPLC
- Induces *E. coli lac* operon activity
- Available as powder and stabilized stock solution
- Blue/white color screening
- Induction of *lac* operon for protein expression

## X-GAL/IPTG Solution

The combination of X-GAL and IPTG in one solution, is the perfect choice in cloning experiments

- Convenient ready-to-use solution
- Compatible with commonly used *lacZ* expression systems
- Non-hazardous, non-toxic
- Facilitates handling and saves time
- Ideal for blue/white color screening

PRODUCT	PACK SIZE	CAT NO.
X-GAL	1g	BIO-37035
IPTG Powder	5g	BIO-37036
IPTG Solution	10ml	BIO-37082
IPTG Solution	5 x 10ml	BIO-37083
X-GAL/IPTG Solution	10ml	BIO-37086



**Fig. 1 Blue/white selection**

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

## PCR Water *Achieve reproducible results in PCR*

Contamination in reagents used for PCR assays can contribute to irreproducible results, experimental inconsistency and even experimental failure. Bioline offers two different grades of high quality water: Ultra-pure 18.2M $\Omega$  Water and DEPC-Treated water.

- Ready-to-use, no preparation, mixing or autoclaving
- Ultra-pure 18.2M $\Omega$  Water for DNA work
- DEPC-treated Water ideal for RNA work
- DNase/RNase-free
- Routinely tested in PCR assays

PRODUCT	PACK SIZE	CAT NO.
Water 18.2M $\Omega$ PCR Grade	10 x 10ml	BIO-37080
DEPC-treated Water	10 x 10ml	BIO-38030
DEPC-treated Water	1 Litre	BIO-38031

It is of great importance to secure that the water used in the experiment, either to prepare reagents, or to re-suspend precipitated DNA or RNA is of molecular biology grade. Bioline ultra-pure **18.2M $\Omega$  Water** is suitable for all PCR, RT-PCR, real-time PCR and electrophoresis applications. For all applications involving RNA, we recommend using **DEPC-treated Water**, which is chemically treated to destroy any RNase contamination.

## Antibiotic Solutions *Pure and simple plasmid selection*

Bioline offers arrange of six antibiotic solutions for use in cloning experiments: Ampicillin Carbenicillin, Chloramphenicol, Kanamycin, Neomycin and Tetracycline.

- Cost-effective solutions
- Use directly from the freezer
- Avoid handling of toxic or harmful substances
- No sterile filtration required
- For cell culture, plasmid selection and gene regulation

PRODUCT	PACK SIZE	CAT NO.
Ampicillin	10ml	BIO-87025
Carbenicillin	10ml	BIO-87026
Chloramphenicol	10ml	BIO-87027
Kanamycin	10ml	BIO-87028
Neomycin	10ml	BIO-87029
Tetracycline	10ml	BIO-87030

## Protein Digestion Reagents *For pure nucleic acid preparations*

Generate reproducible data with molecular biology grade Proteinase K available in powder and stabilized stock solution.

### Proteinase K Powder & Solution

Proteinase K is used in molecular biology to digest protein and remove contamination from preparations of nucleic acids. Addition of Proteinase K to nucleic acid preparations rapidly inactivates nucleases (RNases/DNases) that might otherwise degrade DNA or RNA during purification.

- Molecular biology grade
- Available as powder and stabilized solution
- Broad-spectrum serine protease
- Active under denaturing conditions
- Stable at high temperatures and wide pH range

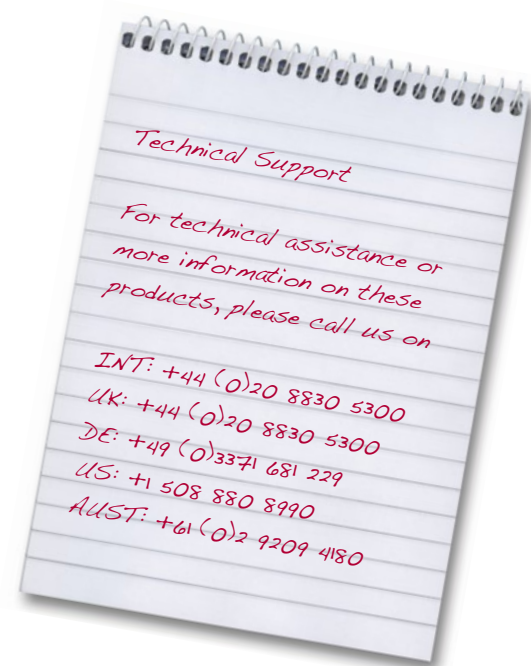
PRODUCT	PACK SIZE	CAT NO.
Proteinase K Powder	100mg	BIO-37037
Proteinase K Powder	1000mg	BIO-37039
Proteinase K Solution	5ml	BIO-37084
Proteinase K Solution	5 x 5ml	BIO-37085





ORDERING INFORMATION		
PRODUCT	PACK SIZE	CAT NO.
<b>Agaroses</b>		
Agarose, HiRes Grade	100g	BIO-41029
Agarose, Molecular Grade	100g	BIO-41026
Agarose, Molecular Grade	500g	BIO-41025
Agarose Tablets	100g	BIO-41028
Agarose Tablets	500g	BIO-41027
<b>Crystal Electrophoresis Running Buffers</b>		
10x TBE Buffer	10 Pouches	BIO-37104
50x TAE Buffer	5 Pouches	BIO-37103
1x TG Buffer	10 Pouches	BIO-37106
10x MOPS Buffer	1 Litre	BIO-00000
<b>Crystal Nucleic Acid Loading Buffers</b>		
5x DNA Loading Buffer Blue	2 x 1ml	BIO-37045
5x DNA Loading Buffer Red	2 x 1ml	BIO-37068
5x DNA Loading Buffer TriColor	2 x 1ml	BIO-37070
2x RNA Loading Buffer with EtBr	1ml	BIO-38025
2x RNA Loading Buffer without EtBr	1ml	BIO-38026
<b>PCR Buffers &amp; Enhancers</b>		
10x NH <sub>4</sub> Buffer	3 x 1.2ml	BIO-37025
10x NH <sub>4</sub> Buffer + MgCl <sub>2</sub>	3 x 1.2ml	BIO-37064
10x KCl Reaction Buffer	3 x 1.2ml	BIO-37066
50mM MgCl <sub>2</sub> Solution	3 x 1.2ml	BIO-37026
5x Hi-Fi Buffer	2 x 1.5ml	BIO-37110
MangoTaq Buffer, colored	10ml	BIO-37102
MangoTaq Buffer, colorless	10ml	BIO-37101
2x PolyMate Additive	2 x 1.2ml	BIO-37041
5x Hi-Spec Additive	3 x 1.2ml	BIO-37032
<b>SureClean</b>		
SureClean	5ml	BIO-37042
SureClean	25ml	BIO-37046
SureClean Plus	5ml	BIO-37047
SureClean Plus	25ml	BIO-37048
Co-Precipitant Pink	1.5ml	BIO-37075
Co-Precipitant Glycogen	1ml	BIO-37077

ORDERING INFORMATION		
PRODUCT	PACK SIZE	CAT NO.
<b>Cloning Reagents</b>		
T4 DNA Ligase	500 Units	BIO-27026
Quick-Stick Ligase	50 Reactions	BIO-27027
Quick-Stick Ligase	100 Reactions	BIO-27028
SOC Medium	10 x 10ml	BIO-86033
X-GAL	1g	BIO-37035
IPTG	5g	BIO-37036
IPTG Solution	10ml	BIO-37082
IPTG Solution	5 x 10ml	BIO-37083
X-GAL/IPTG Solution	10ml	BIO-37086
<b>PCR Water</b>		
Water 18.2MΩ PCR Grade	10 x 10ml	BIO-37080
DEPC-treated Water	10 x 10ml	BIO-38030
DEPC-treated Water	1 Litre	BIO-38031
<b>Antibiotic Solutions</b>		
Ampicillin	10ml	BIO-87025
Carbenicillin	10ml	BIO-87026
Chloramphenicol	10ml	BIO-87027
Kanamycin	10ml	BIO-87028
Neomycin	10ml	BIO-87029
Tetracycline	10ml	BIO-87030
<b>Protein Digestion Reagents</b>		
Proteinase K Powder	100mg	BIO-37037
Proteinase K Powder	1000mg	BIO-37039
Proteinase K Solution	5ml	BIO-37084
Proteinase K Solution	5 x 5ml	BIO-37085



For **Bulk and Custom Services** please contact [custom@bioline.com](mailto:custom@bioline.com)



[www.bioline.com](http://www.bioline.com)

**United Kingdom**

**Bioline Ltd**

16 The Edge Business Centre  
Humber Road  
London NW2 6EW  
**Tel:** +44 (0)20 8830 5300  
**Fax:** +44 (0)20 8452 2822  
**email:** [info.uk@bioline.com](mailto:info.uk@bioline.com)

**Germany**

**Bioline GmbH**

Im Biotechnologiepark, TGZ 2  
D-14943 Luckenwalde  
**Tel:** +49 (0)3371 68 12 29  
**Fax:** +49 (0)3371 68 12 44  
**email:** [info.de@bioline.com](mailto:info.de@bioline.com)

**Australia**

**Bioline (Aust) Pty Ltd**

PO Box 122  
Alexandria NSW 1435  
**Tel:** +61 (0)2 9209 4180  
**Fax:** +61 (0)2 9209 4763  
**email:** [info.aust@bioline.com](mailto:info.aust@bioline.com)

**USA**

**Bioline USA Inc.**

305 Constitution Drive  
Taunton MA 02780  
**Tel:** +1 508 880 8990  
**Fax:** +1 508 880 8993  
**Order Toll Free:** +1 888 257 5155  
**email:** [info.us@bioline.com](mailto:info.us@bioline.com)

