7. Molecular Biology

Polymerases

Taq DNA-Polymerases

Description

The Taq DNA Polymerase is a thermostable DNA polymerase complex exactly following the original procedure for the isolation of DNA polymerases.

Storage and dilution buffer
20 mM Tris-HCl (pH 8,0), 100 mM KCL, 0,1 mM EDTA, 1 mM DTT, 50 % glycerol, 0,5% Nonidet P40 and 0,5 % Tween 20.

Unit definition
One unit is defined as the amount of enzyme that incorporates 10 nmoles of dNTP's into acid-insoluble fraction in 30 minutes at 74 °C under the standard assay conditions: 25 mM TAPS (tris-(hydrooxymethyl)-methyl-amino-propansulfonic acid, sodium salt) pH 9,3 (at 25 °C), 50 mM KCl, 2 mM 50 mM MgCl2, 1 mM β-mercapto-ethanol, 200 µM each dATP, dGTP, dTTP, 100 µM dCTP (a mix of cold and P32-labelled), 12,5 µg activated salmon sperm DNA, in a final volume of 50 µl.

Supplied buffers (alternatively with complete or imcomplete buffer)

- **10x PCR buffer with $MgCl_2$:** 100 mM Tris-HCl (pH 9.0 at 25 °C), 500 mM KCl, 15 mM $MgCl_2$, 1.0 % Triton X-100
- **10x PCR buffer without $MgCl_2$:** 100 mM Tris-HCl (pH 9.0 at 25 °C), 500 mM KCl, 1.0 % Triton X-100.
- **Magnesium stock solution:** 25 mM $MgCl_2$

Stability
The enzyme is stable for more than 12 months if stored at -20 °C. The enzyme is also stable for some days at temperatures above 20 °C.

Associated activities
Endonuclease and exonuclease activities were not detectable after 4 hours incubation of 1 µg native lambda DNA and 0.22 µg of EgoR I-digested lambda DNA at 72 °C in the presence of 15 - 20 units of Taq-DNA Polymerases.

Properties and application
The Taq DNA Polymerase is a thermostable DNA polymerase from T. aquaticus of high purity with good fidelity and high processivity.

Taq DNA Polymerase with buffer and $MgCl_2$	250 units	MB-30010250
Taq DNA Polymerase with buffer and $MgCl_2$ with Phenol red	250 units	MB-30020250

PANScript DNA-Polymerases

Description

Features and applications

- Consistent results
- Premium Taq polymerase suited to a wide range of applications
- Processes fragments of up to 5Kb
- Leaves A overhang
- Available as ready-to-use 2x reaction mixes (PAN Mix and PAN Mix red)
- Routine PCR applications
- Products suitable for TA cloning

PANScript is widely used by molecular biologists that have come to depend upon the robust performance of this reagent. PANScript is a highly purified thermostable DNA polymerase offering very high yield over a wide range of PCR templates, and is the ideal choice for most assays.

PanScript is a robust preparation and consistently delivers high yields with minimal background. PANScript possesses 5' - 3' exonuclease activity and leaves an A overhang such that the PCR product is suitable for effective integration into TA cloning vectors.

PANScript 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 PANScript can be further improved with the use of 2x PAN Mate Additive (Cat No. PAN737041), which is designed for GC- or AT-rich DNA, dirty templates or sequences with a high level of secondary structure.

PANScript DNA Polymerase is purified from *Thermus aquaticus*.

Polymerases

PANScript DNA-Polymerases

Reagent Specifications

- **10x NH_4 Reaction Buffer:** 160 mM $(NH_4)_2SO_4$, 670mM Tris-HCl (pH 8.8 at 25 °C), 0.1 % stabilizer
- **$MgCl_2$ Stock Solution:** 50 mM $MgCl_2$ (suggested final concentration 1.5 mM - 4 mM).

Storage Buffer

20 mM Tris-HCl, pH 7.5, 100 mM NaCl, 0.1 mM EDTA, 2mM DTT, 50 % Glycerol and stabilizers.

Storage Conditions

PANScript can be stored for 12 months at -20 °C.

Associated Activities

Endonuclease and exonuclease activities were not detectable after 2 and 1 hour incubations, respectively, of 1 µg lambda DNA and 0.22 µg of EcoR I-digested lambda DNA at 72 °C in the presence of 15 - 20 units of PANScript DNA polymerase.

Unit Definition

One unit is defined as the amount of enzyme that incorporates 10nmoles of dNTPs into acid-insoluble form in 30 minutes at 72 °C.

PCR Reaction Conditions (for a 50 µl volume)

10x NH_4 Buffer	5 µl
50 mM $MgCl_2$ Solution	1.5 - 4.0 µl
100 mM dNTP Mix (see below)	0.5 - 1.0 µl
Template and Primers	as required
PANScript	0.5 - 1.0 µl
Water (ddH_2O)	up to 50 µl

100 mM dNTP Mix is available as a separate product (Cat No: PAN73028)

Denature: 94 - 96° C
Elongate: 70 - 72° C (allowing 15 - 30 seconds/Kb)
This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.

High performance with PANScript
A 175 bp fragment was amplified from pG EM 3z f(+) using PANScript DNA-Polymerase. Lane 1 - 4: 10-fold serial dilution of template. (starting concentration 25 ng/µl) Lane 5: PANLadder V

7

PANScript DNA-Polymerase	500 units	MB-1100500
	1000 units	MB-1101000

PANScript red DNA-Polymerases

Description

Features and applications

- Easy visual recognition
- Direct loading onto agarose gels
- Same high performance as PANScript DNA-Polymerase
- Leaves A overhang
- Available as a ready-to-use 2x reaction mix (PAN Mix Red)
- Routine PCR assays
- Products suitable for TA cloning
- High throughput applications

PANScript red DNA Polymerase is a formulation of our regular PANScript DNA Polymerase, which contains a non-toxic and non-hazardous red dye. The red dye provides easy and quick identification of reactions to which the enzyme has been added, and facilitates the confirmation of complete mixing. When the reaction is complete, a sample of the reaction mix can be loaded directly onto the agarose gel without the need for loading buffer, since the mix is of sufficiently high density to sink to the bottom of the gel. The red dye migrates towards the positive electrode, thereby providing a means to monitor the progress of the electrophoresis. The presence of the dye has no effect on routine enzymatic manipulations, although rare exceptions may occur. In order to produce a reaction of sufficient density to allow for the direct loading of a sample onto a gel, we recommend using a minimum of 1.5 Units per 50 µl reaction.

The specificity and performance of PANScript red can be further improved with the use of 2x PAN Mate Additive (Cat No. PAN737041), which is designed for GC or AT-rich DNA, dirty templates or sequences with a high level of secondary structure.

PANScript DNA Polymerase is purified from *Thermus aquaticus*.

Polymerases

PANScript red DNA-Polymerases

Reagent Specifications

- **10x NH_4 Reaction Buffer:** 160 mM $(NH_4)_2SO_4$, 670mM Tris-HCl (pH 8.8 at 25° C), 0.1 % stabilizer
- **$MgCl_2$ Stock Solution:** 50 mM $MgCl_2$ (suggested final concentration 1.5 mM - 4 mM).

Storage Buffer

20 mM Tris-HCl, pH 7.5, 100 mM NaCl, 0.1 mM EDTA, 2mM DTT, 50 % Glycerol and stabilizers and inert dye.

Storage Conditions

PANScript red can be stored for 12 months at -20°C.

PCR Reaction Conditions (for a 50 µl volume)

10x NH_4 Buffer	5 µl
50 mM $MgCl_2$ Solution	1.5 - 4.0 µl
100 mM dNTP Mix (see below)	0.5 - 1.0 µl
Template and Primers	as required
PANScript red	1.5 - 2.5 µl
Water (ddH_2O)	up to 50 µl

100 mM dNTP Mix is available as a separate product (Cat No: PAN73028)

Denature: 94 - 96° C
Elongate: 70 - 72° C (allowing 15 - 30 seconds/Kb)
This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.

Associated Activities

Endonuclease and exonuclease activities were not detectable after 2 and 1 hour incubations, respectively, of 1 µg lambda DNA and 0.22 µg of EcoR I-digested lambda DNA at 72°C in the presence of 15 - 20 units of PANScript red DNA polymerase.

Unit Definition

One unit is defined as the amount of enzyme that incorporates 10nmoles of dNTPs into acid-insoluble form in 30 minutes at 72°C.

PANScript red DNA-Polymerases	500 units	MB-1100600

PANPhusion DNA Polymerases

Description

PANPhusion is a fast, proofreading DNA polymerase from archaeal origin which generates blunt-ended amplicons. Its high thermostability combined with its 5'-3' DNA polymerase and 3'-5' proofreading exonuclease activities makes PANPhusion an ideal enzyme for all PCR applications. Indeed, PANPhusion possesses an error-rate of 4.4×10^{-7}, providing a 50-fold higher fidelity than Thermus aquaticus DNA polymerase (determined using an adapted rpsL fidelity assay, Mo J.Y. et al., J. Mol. Biol. 1991; Fujii. S. et al., J. Mol. Biol. 1999). In addition, owing to its enhanced processivity, PANPhusion exhibits not only high amplification rates up to 66 bp/s (equivalent to 15s/kb), but also results in higher yields than most commercially available enzymes.

PCR Reaction Conditions (for a 50 µl volume)

5x Hi-Fi Reaction Buffer	10 µl
100 mM dNTP Mix (see below)	0.5 µl
Template	as required
Primers 20 µM each	1 µl
Enzyme	1 µl
DMSO (if required)	(1.5 µl)
Water (ddH_2O)	up to 50 µl

100 mM dNTP Mix is available as a separate product (Cat No: PAN73028)

Denature: 98° C
Elongate: 72° C (allowing 15-30 seconds/Kb)
This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.

Reagents Specifications

- **5x HI-Fi Buffer** (contains 10 mM Mg^{2+})
- **$MgCl_2$ Stock Solution:** 50 mM $MgCl_2$

Storage Buffer

10mM Tris-HCl, pH 8.0, 100mM KCl, 0.1mM EDTA, 1mM DTT, glycerol and stabilizers

Storage Conditions

The PANPhusion is shipped on Dry/Blue Ice. All kit components should be stored at -20°C upon receipt. Excessive freeze/thawing is not recommended.

Unit Definition

One unit is defined as the amount of enzyme that incorporates 10nmoles of dNTPs into acid-insoluble form in 30 minutes at 72°C.

PANPhusion DNA Polymerase	250 units	PAN721098
	500 units	PAN721099

Polymerases

PAN Hot Start DNA-Polymerases

Description

Features and applications

- Outstanding and robust performance
- For PCR assays requiring hot-start
- Excellent yield in quantitative assays
- Convenient set up at room temperature
- Leaves „A“ overhang
- Available in ready-to-go versions PAN Hot Mix and PAN Hot Mix red
- Highly suited to real-time assays
- Products suitable for TA cloning

PAN Hot Start is a heat-activated thermostable DNA polymerase isolated from a novel organism. PAN Hot Start provides improved specificity as compared to standard polymerases and can eliminate the presence of non-specifics, such as primer-dimers and mis-primed products. PAN Hot Start is inactive at room temperature and therefore, prior to PCR cycling, requires activation by heat treatment for 10 minutes. Subsequently, the reaction can be handled according to the user's existing protocols for thermostable DNA polymerases.

Specificity and performance of PAN Hot Start can be further improved with the use of 2x PAN Mate Additive, which is designed for GC- or AT-rich DNA, „dirty“ templates or sequences with a high level of secondary structure.

PCR Reaction Conditions (for a 50 µl volume)

10x PAN Hot Start Buffer	5 µl
50 mM $MgCl_2$	1.5 - 4.0 µl
100 mM dNTP Mix (see below)	0.5 - 1.0 µl
Template and Primers	as required
PAN Hot Start	0.2 - 1.0 µl
Water (ddH_2O)	up to 50 µl

100 mM dNTP Mix is available as a separate product (Cat No: PAN73028)
Activate: pre-heating step at 95° C for 10 minutes
Denature: 94 - 96° C
Extension: 72° C (allowing 15 - 30 seconds/Kb)
This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.

PAN Hot Start DNA Polymerase	250 units	MB-1860250
	500 units	MB-1860500
	5000 units	MB-1865000

Reagent Specifications

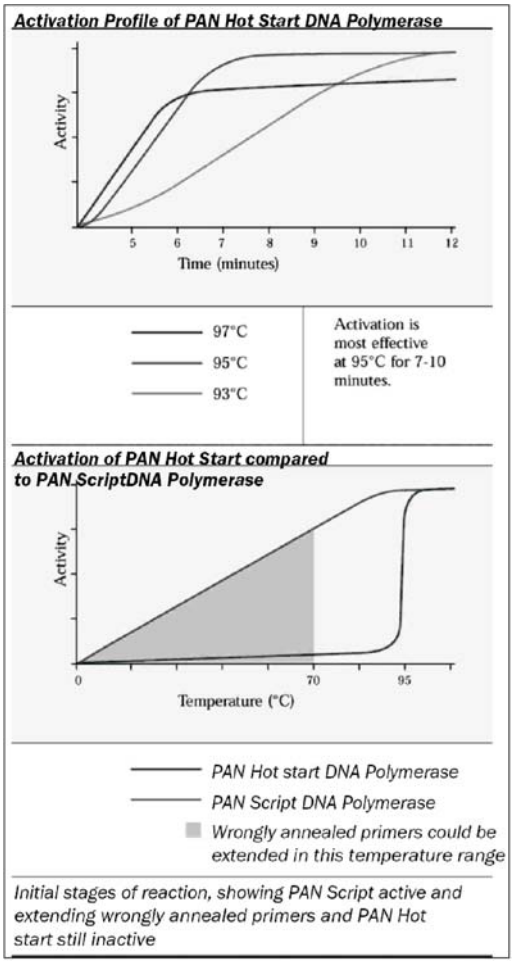
- **10x PAN Hot Start Buffer:**
- **$MgCl_2$ Stock Solution:** 50 mM $MgCl_2$

Storage Conditions
PAN Hot Start DNA Polymerase can be stored for 12 months at -20 °C.

Storage and Dilution Buffer
20 mM Tris-HCl, pH 7.5, 100mM NaCl, 0.1mM EDTA, 2mM DTT, 50 % Glycerol, and stabilizers.

Associated Activities
Endonuclease and exonuclease activities were not detectable after 4 hours of incubation of 1 mg of pBR322 plasmid DNA and 0.5 mg Hind III-digested lambda phage DNA at 72 °C in the presence of 20 u of PAN Hot Start.

Unit Definition
One unit is defined as the amount of enzyme that incorporates 10nmoles of dNTPs into acid-insoluble form in 30 minutes at 72 °C.



Polymerases

PowerScript DNA-Polymerases short range

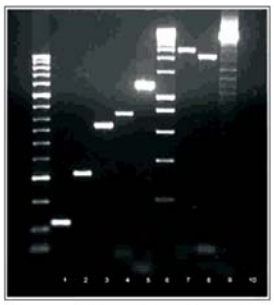
Description

Features and applications

- Ideal for problematic templates that fail with standard Taq DNA Polymerases
- Ideal for fragments up to 5Kb in length
- Higher fidelity than Taq
- For high fidelity PCR
- Suitable for both TA and blunt-end cloning

Powerscript short DNA Polymerase is a high-performance proprietary complex of enzymes specifically designed for difficult/problematic PCR applications requiring high processivity with fidelity that would normally fail with standard Taq Polymerases.

PowerScript short DNA Polymerase is recommended for short genomic DNA fragments of up to 3 Kb, or up to 5 Kb on Lambda DNA.



High specificity with problematic templates using PowerScript short.
A range of fragments from human genes were amplified, varying in length and GC content.
Lane 1: *PANLadder II*
Lane 2: *119 bp and 43% GC product amplified from the human glucocerebrosidase gene*
Lane 3: *321 bp and 37% GC product amplified from Angiotensin receptor II gene*
Lane 4: *626 bp and 56% GC product amplified from the Rhodopsin gene*
Lane 5: *762 bp and 33% GC product amplified from the ß-Globin gene*
Lane 6: *1200 bp and 54% GC product amplified from the alpha-1-antitrypsin gene*
Lane 7: *PANLadder I*
Lane 8: *2256 bp and 52% GC product amplified from the p53 gene*
Lane 9: *2000 bp and 32% GC product amplified from the Angiotensin receptor II gene*
Lane 10: *6000 bp and 51% GC product amplified from the alpha-1-antitrypsin gene*

Reagent Specifications

5x Hi-Spec Additive is a specificity enhancer.
If necessary, re-dissolve Hi-Spec by heating to 70 °C and vortexing.

Storage Buffer
20 mM Tris-HCl, pH 7.5, 100mM NaCl, 0.1mM EDTA, 2mM DTT, 50 % Glycerol, and stabilizers.

Storage Conditions
PowerScript short DNA Polymerase can be stored for 12 months at -20 °C.

Associated Activities
Endonuclease and exonuclease activities were not detectable after 4 hours of incubation of 1 mg of pBR322 plasmid DNA and 0.5 mg Hind III-digested Lambda DNA at 72 °C in the presence of 20 units of PowerScript short.

Unit Definition
One unit is defined as the amount that incorporates 10nmoles of dNTPs into acid-precipitable form in 30 minutes at 72 °C.

Components	250 Units	500 Units
PowerScript short DNA Polymerase	62.5 µl	125 µl
10x OptiBuffer	1.2ml	2 x 1.2ml
50 mM $MgCl_2$ Solution	1.2ml	1.2ml
5x Hi-Spec Additive	1.2ml	1.2ml

PowerScript DNA-Polymerases short range	250 units	PAN721064
	500 units	PAN721065

PowerScript DNA-Polymerases long range

Description

Features and applications

- Ideal for problematic templates that fail with standard Taq DNA Polymerases
- Ideal for fragments 2 - 20 Kb in length
- Higher fidelity than Taq
- Available as a ready-to-use 2x reaction mix
- For high fidelity PCR
- Suitable for both TA and blunt-end cloning

Polymerases

PowerScript DNA-Polymerases short range

PowerScript long DNA polymerase is a high-performance proprietary complex of enzymes specifically designed for difficult/problematic PCR applications requiring high processivity with fidelity that would normally fail with standard Taq Polymerases.

PowerScript long DNA Polymerase is recommended for long Genomic DNA fragments of between 2 - 20 Kb, or up to 30 Kb Lambda DNA fragments. With Lambda DNA as template, the best performance is achieved in the 2 - 20 Kb range. PowerScript long is our original widely used PowerScript formulation.

Reagent Specifications
5x Hi-Spec Additive is a specificity enhancer. If necessary, re-dissolve Hi-Spec by heating to 70 °C and vortexing.

Storage Buffer
20 mM Tris-HCl, pH 7.5, 100mM NaCl, 0.1mM EDTA, 2mM DTT, 50 % Glycerol, and stabilizers.

Storage Conditions
PowerScript short DNA Polymerase can be stored for 12 months at -20 °C.

Associated Activities
Endonuclease and exonuclease activities were not detectable after 4 hours of incubation of 1 mg of pBR322 plasmid DNA and 0.5 mg Hind III-digested Lambda DNA at 72 °C in the presence of 20 units of PowerScript short.

Unit Definition
One unit is defined as the amount that incorporates 10nmoles of dNTPs into acid-precipitable form in 30 minutes at 72 °C.

Long range PCR with PowerScript long.
PowerScript long is a polymerase ideally suited to the amplification of long DNA fragments. A 20 Kb fragment of Lambda DNA was amplified using PowerScript long DNA Polymerase.
Lane 1: *PANLadder I (top band = 10 Kb)*
Lane 2: *Amplification of 20 Kb Lambda DNA fragment*

Components	250 Units	500 Units
PowerScript long DNA Polymerase	62.5 µl	125 µl
10x OptiBuffer	1.2ml	2 x 1.2ml
50 mM $MgCl_2$ Solution	1.2ml	1.2ml
5x Hi-Spec Additive	1.2ml	1.2ml

PowerScript DNA-Polymerase long range	250 units	MB-1120250
	500 units	MB-1120500

TrueScript™ DNA-Polymerases

Description

Features and applications

- High fidelity coupled with high yield
- Amplifies fragments up to 5 Kb
- Ultra-high fidelity for subsequent cloning
- Blunt-end cloning
- DHPLC compatible (detergent free)

TrueScript™ is a thermostable enzyme possessing 5' - 3' DNA polymerase and 3' - 5' proofreading exonuclease activities, offering high fidelity. TrueScript produces blunt-ended amplicons of up to 5 Kb in length. TrueScript is supplied with 10x Reaction Buffer containing $MgSO_4$, which provides optimal final reaction conditions (1.5 mM Mg^{2+}) for most experiments.

In order to allow optimization of reaction conditions, additional $MgCl_2$ is provided. The specificity and performance of TrueScript can be further improved with the use of 2x PAN Mate Additive (Cat No. PAN737041), which is designed for GC or AT-rich DNA, "dirty" templates or sequences with a high level of secondary structure.

Polymerases

TrueScript™ DNA-Polymerases

Reagent Specifications

- **10x TrueScript Buffer:** 600mM Tris-HCl, 60mM $(NH_4)2SO_4$, 100mM KCl, 20mM MgSO4, pH 8.3 at 25 °C
- **$MgCl_2$ Stock Solution:** 50 mM $MgCl_2$

TrueScript Storage Buffer
20mM Tris-HCl, pH 7.5, 100mM NaCl, 0.1mM EDTA, 2mM DTT, 50 % Glycerol, and stabilizers.

Storage Conditions
TrueScript™ can be stored for 12 months at -20 °C.

Associated Activities
Endonuclease and exonuclease activities were not detectable after 4 hours of incubation of 1 mg of pBR322 plasmid DNA and 0.5 mg Hind III-digested Lambda DNA at 72 C in the presence of 20 units of PowerScript short.

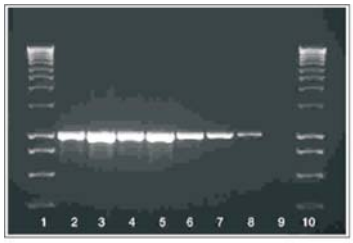
Unit Definition
One unit is defined as the amount of enzyme that incorporates 10nmoles of dNTPs into acid- insoluble form in 30 minutes at 72 C.

PCR Reaction Conditions (for a 50 µl volume)

10x PAN Hot Start Buffer	5 µl
50 mM $MgCl_2$	0.5 - 1 µl
100 mM dNTP Mix (see below)	0 - 2 µl
Template and Primers	as required
PAN Hot Start	1 - 3 µl
Water (ddH_2O)	up to 50 µl

100 mM dNTP Mix is available as a separate product (Cat No: PAN73028)

Denature: 94 - 97° C
Extension: 68° C (allowing 0.5 - 1 minutes/Kb)
Owing to TrueScript´s inherent 3' - 5' exonuclease activity, the enzyme must be added last to a reaction in order to prevent primer damage.
This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.



High performance with TrueScript
A serial dilution of template was performed to demonstrate the high performanceof TrueScript, even at low DNA concentrations.
Lane 1 + 10: *PANLadder I*
Lane 2: *0.5 ng λ DNA*
Lane 3 - 9: *10-fold dilution series*

TrueScript DNA-Polymerases	250 units	MB-1170250
	500 units	MB-1170500

PAN Mix DNA-Polymerases

Description

Features and applications

- Convenient pre-mixed, pre-optimized 2x solution
- Reduced risk of contamination
- Dramatically decreases the time required for reaction set-up
- Reproducible results
- Routine PCR applications
- Products suitable for TA cloning
- High throughput

PAN Mix is a complete ready-to-use 2x reaction mix containing an ultra-stable DNA polymerase. Developed to perform PCR assays of many common genomic and cDNA templates, the user has simply to add water, template and primers. PAN Mix dramatically reduces the time required to set up reactions, thereby minimizing the risk of contamination. Greater reproducibility is ensured, by reducing the number of pipetting steps that can lead to errors.

PAN Mix has been optimized for a wide variety of templates, however an additional 50mM of $MgCl_2$ solution is included should any fine adjustments be required.

Reagent Specifications
$MgCl_2$ Stock Solution: 50 mM $MgCl_2$

Storage Conditions
PAN Mix can be stored for up to 6 months at -20 °C, or up to 2 weeks at +4 °C. Repeated freeze/thaw cycles should be avoided.

Associated Activities
Endonuclease and exonuclease activities were not detectable after 4 hours of incubation of 1 mg of pBR322 plasmid DNA and 0.5 mg Hind III-digested Lambda DNA at 72 °C in the presence of 20 units of PowerScript short.

Unit Definition
One unit is defined as the amount of enzyme that incorporates 10nmoles of dNTPs into acid- insoluble form in 30 minutes at 72 °C.

PAN™ BIOTECH GmbH

Polymerases

PAN Mix DNA-Polymerases

PCR Reaction Conditions (for a 50 µl volume)

PAN Mix	25 µl
Template and Primers	as required
Water (ddH_2O)	up to 50 µl

Denature: 94 - 96° C
Elongate: 70 - 72° C (allowing 15 - 30 seconds/Kb)

For optimal resolution of PCR products, we recommend the use of Tris-Acetate EDTA (TAE) buffer for gel preparation and electrophoresis.

This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.

High consistent yield with PAN Mix
125 bp product from plasmid, 2-fold template dilution 12.5 ng starting conc.

PAN Mix DNA-Polymerases	100 reactions 500 reactions	MB-1830100 MB-1830500

PAN Mix red DNA-Polymerases

Description

Features and applications

- Convenient pre-mixed, pre-optimized 2x solution
- Reduced risk of contamination
- Dramatically decreases the time required for reaction set-up
- Reproducible results
- Direct gel loading
- Routine PCR applications
- Products suitable for TA cloning
- High throughput

Reagent Specifications
$MgCl_2$ Stock Solution: 50 mM $MgCl_2$

Storage Conditions
PAN Mix red can be stored for up to 6 months at -20 °C, or up to 2 weeks at +4 °C. Repeated freeze/thaw cycles should be avoided.

PAN Mix red is a complete ready-to-use 2x reaction mix containing an ultra-stable Taq DNA polymerase. It contains an additional inert red dye that permits easy visualization and direct loading onto a gel. There is no need to add loading buffer as the mix is of sufficiently high density to sink to the bottom of the gel.

PAN Mix red has been developed to perform PCR assays of many common genomic and cDNA templates; the user has simply to add water, template and primers. It dramatically reduces the time required to set up reactions, thereby minimizing the risk of contamination. Greater reproducibility is ensured, by reducing the number of pipetting steps that can lead to errors.

PAN Mix red has been optimized for a wide variety of templates, however an additional 50 mM of $MgCl_2$ solution is included should any fine adjustments be required.

PCR Reaction Conditions (for a 50 µl volume)

PAN Mix	25 µl
Template and Primers	as required
Water (ddH_2O)	up to 50 µl

Denature: 94 - 96° C
Elongate: 70 - 72° C (allowing 15 - 30 seconds/Kb)

For optimal resolution of PCR products, we recommend the use of Tris-Acetate EDTA (TAE) buffer for gel preparation and electrophoresis.

This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.

PAN Mix red DNA-Polymerases	100 reactions 500 reactions	MB-1800100 MB-1800500

Polymerases

PAN Hot Mix and PAN Hot Mix red

Description

Features and applications

- Same high specificity and performance as PAN Hot Start DNA Polymerase
- Enhanced specificity and reduced background
- Convenient pre-mixed, pre-optimized 2x solutions
- Reduced risk of contamination
- Dramatically decreases the time required for reaction set-up
- Reproducible results
- Ultra-high specificity for multiplex reactions
- Products suitable for TA cloning

Reagent Specifications

$MgCl_2$ Stock Solution: 50 mM $MgCl_2$

Storage Conditions

PAN Hot Mix and PAN Hot Mix red can be stored for up to 6 months at -20 °C, or up to 2 weeks at +4 °C. Repeated freeze/thaw cycles should be avoided.

PAN Hot Mix is a complete ready-to-use heat-activated 2x reaction-mix, which simply requires the user to add only water, template and primers, and then pre-heat to 95 °C for 10 minutes to successfully carry out PCR assays. The 10 minute activation step eliminates the presence of non-specifics such as primer-dimers and mis-primed products, since the enzyme is inactive at initial low temperatures.

PAN Hot Mix red combines all of the features and advantages of PAN Hot Mix, and contains an additional inert red dye. This non-toxic, non-hazardous red dye allows users to load samples directly onto a gel, without the need to add loading buffer since the mix is of sufficiently high density to sink to the bottom of the gel. Adequate mixing is also ensured when reactions are set up.

PAN Hot Mix and PAN Hot Mix red are based on our PAN Hot Start DNA Polymerase, which leaves an 'A' overhang, and have been optimized for a wide variety of templates. An additional 50mM MgCl2 solution is included should any fine adjustments be required.

PAN Hot Mix and PAN Hot Mix red dramatically reduce the time needed to set up reactions, thereby reducing the risk of contamination. Greater reproducibility is ensured, by reducing the number of pipetting steps that can lead to pipetting errors.

PCR Reaction Conditions (for a 50 µl volume)

PAN Hot Mix /PAN Hot Mix red	25 µl
Template and Primers	as required
Water (ddH_2O)	up to 50 µl

Activation: Pre-heating step of 10 minutes at 95° C
Denature: 94 - 96° C
Elongate: 70 - 72° C (allowing 15 - 30 seconds/Kb)

Low template concentrations may result in smearing.
This can be remedied by reducing the duration of the 95° C activation step.
For optimalresolution of PCR products, we recommend the use of Tris-Acetate EDTA (TAE) buffer for gel preparation and electrophoresis.

This data is intended for use as a guide only; conditions will vary from reaction to reaction and may need optimization.

2-fold dilutions of human genomic template, starting at 50 ng. Amplicon of approx. 800 bp using PAN Hot Mix (left) and a competitor product (right).

PAN Hot Mix	100 reactions	PAN725019
	500 reactions	PAN725020
PAN Hot Mix red	100 reactions	PAN725021
	500 reactions	PAN725022

Modifying Enzymes

PAN Ligation Kit

Description

Features and applications

- Dramatically decreases the time required for DNA cloning
- Rapid 5 to 15 minute protocol at room temperature
- Efficient and reliable ligations of cohesive and blunt-ended DNA fragments
- No loss of transformation efficiency
- Cloning of DNA from: PCR fragments, plasmids, cosmids, genomic, phage and viral DNA
- Linker ligation
- Re-ligation of linearized plasmids
- Ligation of double-stranded oligonucleotides into vectors (plasmid and phage)

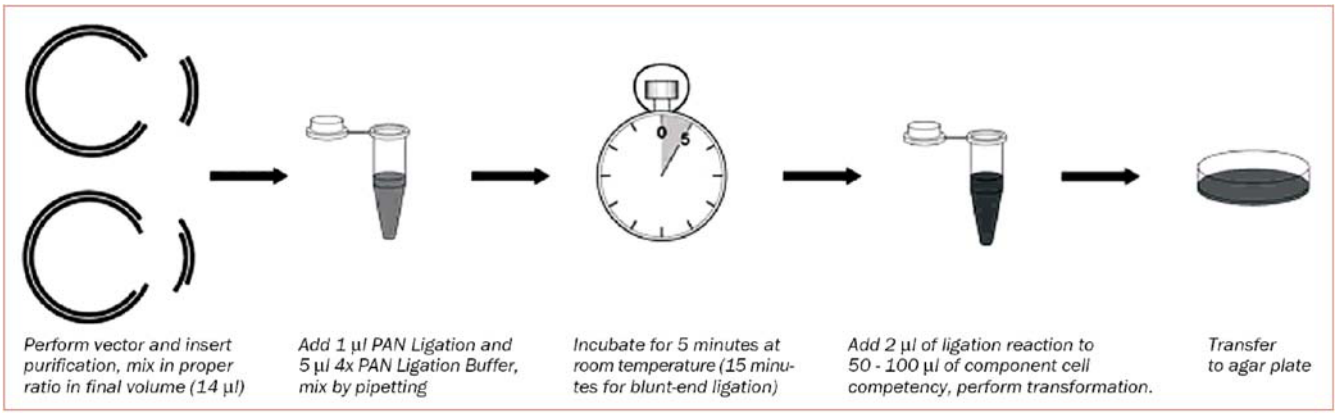
PAN Ligation is designed to carry out fast and efficient ligation of both cohesive and blunt ended DNA at room temperature. PAN Ligation is a T4 DNA Ligase that has been mutated to improve enzyme activity, and contains a specially developed 4x PAN Ligation Buffer. The enzyme catalyses the joining of 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.

PAN Ligation will ligate 99 % of λ/HindIII cohesive-ended fragments, or 80 % of λ/EcoRV 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.

Storage Conditions
PAN Ligation Kit can be stored for 12 months at -20 °C. Avoid multiple freeze/thaw cycles.

Storage and Dilution Buffer
10mM Tris-HCl, pH 7.4, 100mM NaCl, 1 mM DTT, 0.1mM EDTA and 50 % glycerol.

Q/C Assay Conditions
Each batch of PAN Ligation is tested for ligation to a single band, of the products of both HindIII and EcoRV cut Lambda DNA. The ligated DNA is then re-cut to ensure no alteration of restriction pattern.



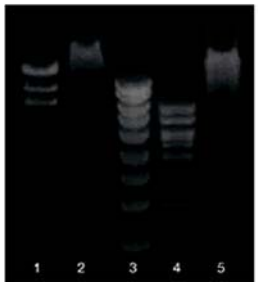
Perform vector and insert purification, mix in proper ratio in final volume (14 µl)

Add 1 µl PAN Ligation and 5 µl 4x PAN Ligation Buffer, mix by pipetting

Incubate for 5 minutes at room temperature (15 minutes for blunt-end ligation)

Add 2 µl of ligation reaction to 50 - 100 µl of component cell competency, perform transformation.

Transfer to agar plate



Ligation of cohesive or blunt-ended fragments with PAN Ligation Kit. Lambda DNA was 10x over-digested with EcorV or Hind III, followed by heat inactivation. DNA fragments were ligated using the PAN 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 PAN Ligation Kit*
Lane 3: *PANLadder*
Lane 4: *EcorV-digested Lambda DNA (Blunt ends)*
Lane 5: *EcorV-digested Lambda DNA ligated with PAN Ligation Kit*

PAN Ligation Kit	50 reactions	MB-950000
	100 reactions	MB-951000

Modifying Enzymes

Proteinase K

Description

Features and applications

- Broad-spectrum serine protease
- Active under denaturing conditions
- Stable at high temperatures
- Molecular biology grade
- Available as powder and stabilized stock solution
- Inactivation of RNases/DNases during nucleic acid extraction
- Protein modification
- General protein digestion
- Determination of enzyme localization

Recommendations for Use

- Dissolve to 20 mg/ml in 50 mM Tris-HCl, 2 mM calcium acetate, pH 8.0
- Proteinase K may be used at 56 °C for up to 4 hours, or 37 °C for overnight incubations
- Proteinase K has an optimal pH of 7.5 - 12.0
- To remove common contaminants from nucleic acid preparations use at a working concentration of 5 µg/ml

Storage Conditions
Proteinase K can be stored for 12 months at -20 °C.

Contaminants

- **RNase Activity:** No detectable ribonuclease activity detected with MS2RNA after 6-hour incubation at 37 °C
- **DNase Activity:** No detectable nicking activity detected with pBR322 after 6-hour incubation at 37 °C

Unit definition
One unit is defined as the amount of enzyme that will liberate 1.0 mmol of tyrosine per minute at 37 °C, pH 7.5.

Proteinase K is an enzyme used to digest most proteins in molecular-biological techniques. The enzyme may be used at 56 °C for up to 4 hours, or 37 °C for overnight incubations. Proteinase K solution is stabilized with a specially formulated buffer, and can be used directly from the freezer.

Proteinase K	100 mg	MB-4300002

Molecular Weight Markers

PANLadder™ I

Description

Features

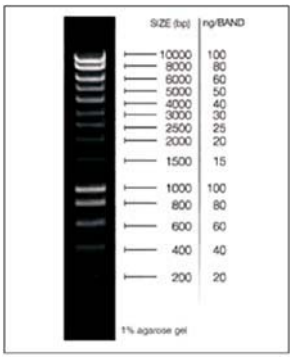
- 14 bands from 200 bp - 10 000 bp
- Accurate quantitation
- Easy identification and orientation
- Ready-to-use format

PANLadder™ 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.

PANLadder™ I produces a pattern of 14 regularly spaced bands, ranging from 200 to 10,000 bp. To allow easy identification and orientation, the 1000 and 10,000bp bands have the highest intensity. When the standard loading volume of 5 ml per lane (720 ng of DNA) is being used, each band corresponds to a precise amount of DNA.

A 5x sample loading buffer is supplied for your convenience. Under no circumstances should it be used to dilute/load ladder.

Storage Conditions
PANLadder™ I can be stored at -20 °C until first use and thereafter at +4 ° C for up to 6 months. Avoid multiple freeze/thaw cycles.



PANLadder I	200 lanes	PAN733025
	500 lanes	PAN733026

Molecular Weight Markers

PANLadder™ IV

Description

Features

- 10 bands from 100 bp - 1000 bp
- Accurate quantitation
- Easy identification and orientation
- Ready-to-use format

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

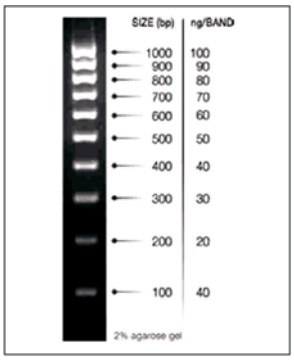
PANLadder™ IV produces a pattern of 10 regularly spaced bands, ranging from 100 bp to 1000 bp. To allow easy identification and orientation, the 1000 bp band has the highest intensity. Each band is an exact multiple of 100bp.

When the standard loading volume of 5 µl per lane (580 ng of DNA) is being used, each band corresponds to a precise quantity of DNA.

A 5x sample-loading buffer is supplied for your convenience. Under no circumstances should it be used to dilute/load ladder.

Storage Conditions

PANLadder™ IV can be stored for up to 6 months at -20 °C, or up to 12 months at +4 °C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.



PANLadder IV	200 lanes	PAN733029
	500 lanes	PAN733030

7

PANLadder™ V

Description

Features

- 12 bands from 25 bp - 500 bp
- Accurate quantitation
- Easy identification and orientation
- Ready-to-use format

PANLadder™ V is a ready-to-use molecular weight marker for size determination and quantification 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 PANLadder™ V from the vial to the gel.

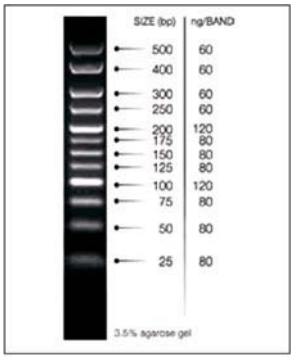
PANLadder™ V produces a pattern of 12 regularly spaced bands, ranging from 25 bp to 500 bp. To allow easy identification and orientation, the 100 bp and 200 bp bands have the highest intensity.

When the standard loading volume of 5 µl per lane (960 ng of DNA) is being used, each band corresponds to a precise quantity of DNA.

A 5x sample-loading buffer is supplied for your convenience. Under no circumstances should it be used to dilute/load ladder.

Storage Conditions

PANLadder™ V can be stored for up to 6 months at -20 °C, or up to 12 months at +4 °C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.



PANLadder V	200 lanes	PAN733031
	500 lanes	PAN733032

Molecular Weight Markers

PANLadder™ VI

Description

Features

- 10 bands from 10,090 bp - 48,500 bp
- Accurate quantitation
- Easy identification and orientation
- Ready-to-use format
- For pulse-field electrophoresis only

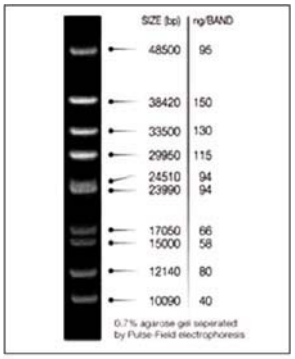
PANLadder™ VI is a ready-to-use molecular weight marker, especially designed for accurate quantification and size determination. The use of pulse-field electrophoresis is necessary for superior resolution of fragments ranging from 29,950 bp to 48,500 bp. This ready-to-use format reduces handling steps and saves time; simply transfer PANLadder™ VI from the vial to the gel.

PANLadder™ VI produces a pattern of 10 regularly spaced bands, ranging from 10,090 bp to 48,500 bp.

When the standard loading volume of 10 µl per lane (922 ng of DNA) is being used, each band corresponds to a precise quantity of DNA. To allow easy identification and orientation, a band at 38420 bp has the highest intensity.

A 5x sample-loading buffer is supplied for your convenience. Under no circumstances should it be used to dilute/load ladder.

Storage Conditions
PANLadder™ VI can be stored for up to 6 months at -20 °C, or up to 12 months at +4 °C. Avoid multiple freeze/thaw cycles. Gentle vortexing is recommended prior to use.



PANLadder VI	200 lanes	PAN733033
	500 lanes	PAN733034

7

Reagents for Molecular Biology

PAN DNA Clean

Description

Features and applications

- Column-free PCR clean-up
- Post-PCR recovery of up to 98 %
- Cost-effective, simple and rapid protocol
- Products are suitable for immediate downstream applications
- PCR clean-up
- Removes primers, primer-dimers, dNTPs and restriction enzymes
- DNA or dsRNA purification or concentration

PAN DNA Clean is a novel, inexpensive solution, which provides a column-free method for nucleic-acid purification. Using a simple and rapid procedure, PAN DNA Clean 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.

Simple, Flexible and Column-free Protocol
PAN DNA Clean removes proteins (such as restriction enzymes, polymerases, etc.), primers, primer-dimers and dNTPs.

A very straightforward protocol allows the precipitation of nucleic acids ≥75 bp without the need for organic solvents, glass milk or expensive spin-columns. Unlike many column-based methods, PAN DNA Clean maximizes recovery with nucleic acid solutions, whether of low, medium or high concentration.

PAN DNA Clean purifies nucleic acid without the use of chaotropic salts (which often contribute to denaturation of the DNA duplex).

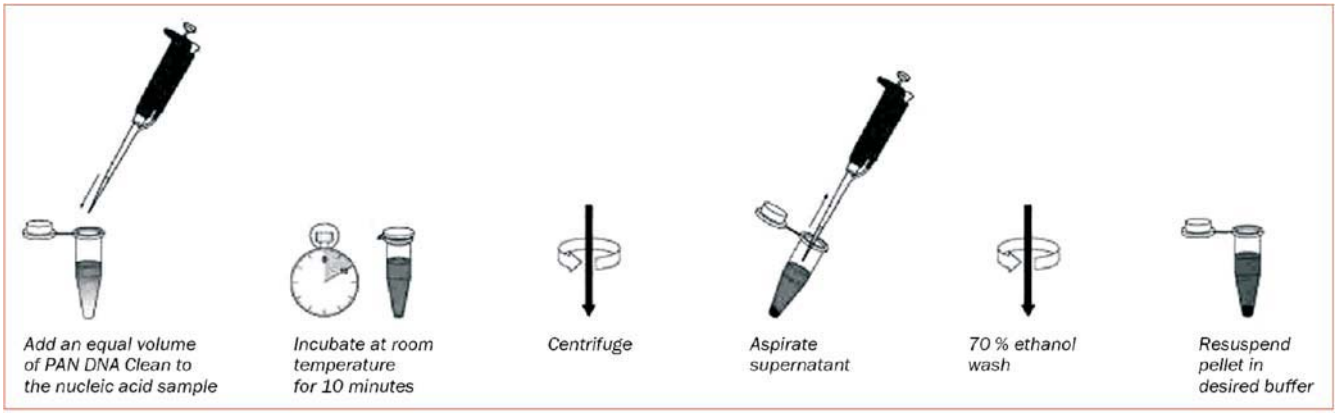
PAN DNA Clean enables the researcher to re-suspend the cleaned-up nucleic acids in any buffer and volume of choice, thus permitting the purification process to be tailored specifically to suit the experiment.

Reagents for Molecular Biology

PAN DNA Clean

Optimized Nucleic Acid Recovery
PAN DNA Clean has been tailored to maximize the amount of nucleic acid recovered after purification, providing up to 98 % recovery of the original sample for immediate downstream applications, such as cloning and sequencing. PAN DNA Clean exhibits great versatility, achieving unsurpassed recovery rates, independently of the amount of nucleic acid or its concentration.

Storage Conditions
PAN DNA Clean solution can be stored at room temperature for 12 months. Do not freeze. Avoid exposure to light.



Lane 1: *PCR mix before cleaning, 125 bp fragment*
Lane 2: *PCR mix treated with PAN DNA Clean 1:1*
Lane 3: *PCR mix treated with PAN DNA Clean 1:2*
Lane 4: *Purification with PCR Clean up Kit (Silica membrane)*
Lane 5: *PANLadder I*

PAN DNA Clean	1 x 5 ml	PAN737042
	2 x 12,5 ml	PAN737046

PAN Dye Enhancer

Description

Features and applications

- Reduces auto-sequencing costs
- Ready-to-use format
- No optimization required
- Auto-sequencing of plasmid and PCR templates

PAN Dye Enhancer reduces the costs involved in auto-sequencing, by reducing the amount of dye-terminator needed in a reaction. Auto-sequencing reactions can leave up to 80 % of dye terminators unused, which normally require removal prior to sequencing.

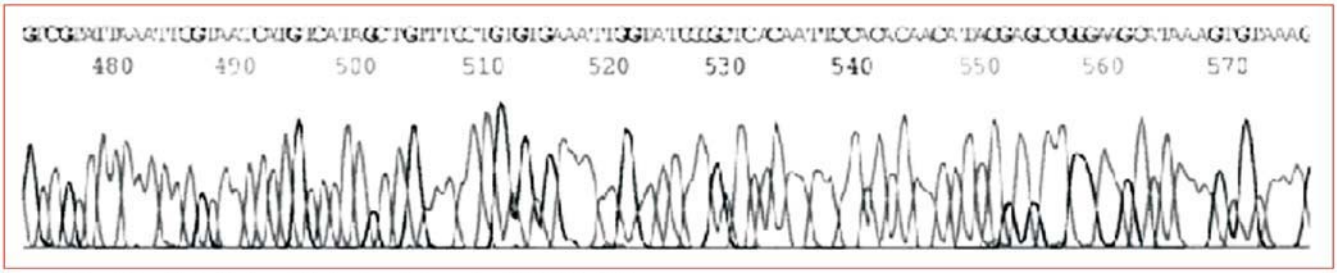
PAN Dye Enhancer works by providing optimal buffer conditions, which allow up to a 5-fold dilution of dye terminator without any loss of sequencing quality. PAN Dye Enhancer is suitable for sequencing of plasmid and PCR templates, and requires no optimization. For some templates it may be necessary to adjust the dilution factor.

Storage Conditions
PAN Dye Enhancer can be stored for 6 months at -20 °C.

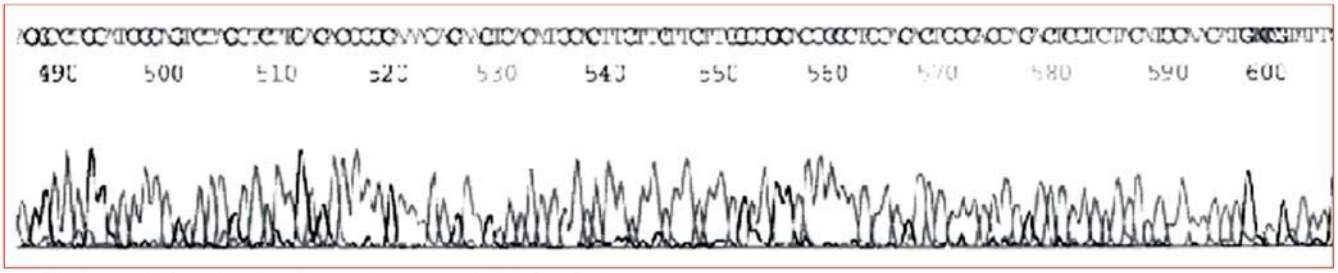
Reagents for Molecular Biology

PAN Dye Enhancer

Sample reactions using Half-Dye Mix. Reactions analyzed on ABI Prism 377 Auto-sequencer.



Plasmid Template: 1 in 3 dilution of big Dye terminator mix with PAN Dye Enhancer



PCR Template: 1 in 5 dilution of big Dye terminator mix with PAN Dye Enhancer

PAN Dye Enhancer	≈ 250 templates	MB-9600000
	≈ 500 templates	MB-9610000

7

X-Gal

Description

Features and applications

- Extremely pure, 99.5% by HPLC
- Intense blue precipitate upon hydrolysis
- Blue/White cloning systems
- Immunoblotting
- Immunocytochemical assays
- Microbiology and cell culture media

5-bromo-4-chloro-3-indolyl β-D-galactopyranoside (X-GAL) is a chromogenic substrate for β-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 b-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.

X-Gal	1 g	MB-10071000

Reagents for Molecular Biology

IPTG

Description

Features

- Induces E.coli lac operon activity
- > 99.6 % by HPLC
- Available as powder and stabilized stock solution
- 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

Isopropyl-β-D-thiogalactopyranoside (IPTG) is a chemical analogue of galactose, which cannot be hydrolysed by the enzyme β-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
Store solid dry and protected from light. IPTG can be stored for 12 months at -20 °C.

IPTG	5 g	MB-10080005

Agarose (molecular grade)

Description

Features

- DNase/RNase-free
- Excellent value and clarity
- High gel strength
- DNA/RNA electrophoresis
- Ideal for separating nucleic acids of a wide range of sizes, especially large fragments (> 10 Kb)

Agarose (DNase/RNase-free) is an extremely pure, high molecular biology grade agarose powder that has been extensively tested for RNase contamination. Agarose provides high resolution of DNA and RNA separated by electrophoresis and offers consistent resolution from lot to lot.

Storage Conditions
Cool, dry place

Analytical Specifications

Appearance:	White crystals or powder
Gel strength of 1.5 % (w/v) gel:	> 1220g/cm^2
Fusion point:	88 - 90° C
Gelling temperature:	37 - 39° C
EEO:	0.05 - 0.1
Moisture:	< 7 %
Sulfate:	< 0.06 %
DNase and RNase:	Absent

Agarose (molecular grade)	100 g	PAN741026
	500 g	PAN741025

Additives and Buffer

$MgCl_2$ Buffer

Description

$MgCl_2$ is a convenient concentration for most molecular experiments. Use 1 µl in a 50 µl reaction for a final Mg^{2+} concentration of 1mM.

$MgCl_2$ Buffer	3 x 1,2 ml	MB-9120001

Storage Conditions
50 mM $MgCl_2$ Solution should be stored at -20 °C. Avoid multiple freeze/thaw cycles.

Composition
$MgCl_2$ 50 mM in water, DNase/RNase-free

KCl Buffer (10x)

Description

10x KCl Buffer provides reliable performance with the convenience of 15 mM MgCl2, which is suitable for most applications. This makes it ideal for high-throughput experiments.

KCl Buffer (10x)	3 x 1,2 ml	MB-9150001

Storage Conditions
10x KCl Reaction Buffer should be stored at -20 °C. Avoid multiple freeze/thaw cycles.

Composition
500 mM KCl, 100 mM Tris-Cl (pH 8.8 at 25 ° C), 15 mM $MgCl_2$, 1 % Triton X-100 15 mM.

HiSpec Additive

Description

Features and applications

- Eliminates background smears and spurious bands
- Improves specificity
- Compatible with all commercially available DNA polymerases
- Ideal for difficult templates
- Improving the specificity of any DNA polymerase in enzyme reactions

HiSpec additive is a popular compound designed to eliminate unwanted byproducts, such as background smears and spurious bands, during DNA amplification. HiSpec Additive is ideally suited to difficult templates with GC-rich regions or repetitive sequences.

Storage Conditions
HiSpec additive can be stored for 6 months at -20 °C.

HiSpec additive	3 x 1,2 ml	PAN737032

Additives and Buffer

PAN Mate Additive

Description

Features and applications

- Dramatically improves specificity and yield
- Compatible with all commercially available thermostable DNA polymerases
- Ideal for difficult templates
- Reduces smearing and background
- DNA Polymerase reactions where specificity is critical
- Enhancing the performance and specificity of any thermostable DNA polymerase

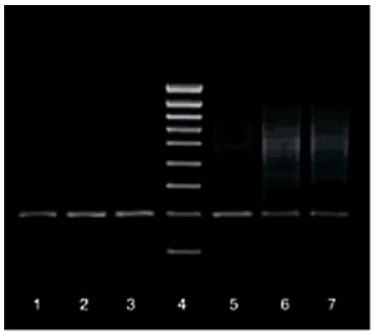
PAN Mate is a special 2x additive for use in reactions involving any thermostable DNA polymerase, and is designed to dramatically improve reaction specificity.

PAN Mate 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.

PAN Mate acts as a melting agent by allowing the DNA polymerase and oligonucleotides greater access to the template DNA. PAN Mate does not contain magnesium, dNTPs, or buffer components. In some cases it may be necessary to optimize the Magnesium concentration.

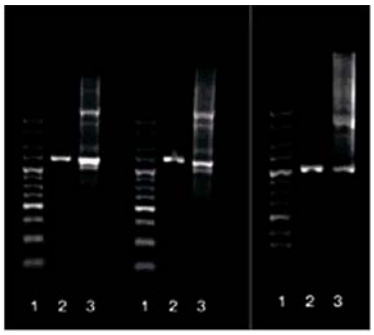
Note: PAN Mate should not be used in combination with any other additives for polymerase reactions. PAN Mate is a revised version of PAN 5x HiSpec Additive (PAN737032).

Storage Conditions
PAN Mate additive can be stored for 6 months at -20 °C.



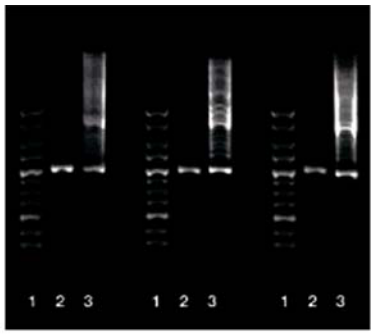
PCR of a 201 bp GC-Rich fragment > 66 % from Human TGF-8 gene

Lane 1 - 3: *With PAN Mate & 1.5 mM, 2.0 mM & 2.5 mM $MgCl_2$ respectively*
Lane 4: *PANLadder IV*
Lane 5 - 7: *Without PAN Mate or MgCl2*



PAN Mate assayed with three different polymerases on a 234 bp GC-Rich fragment > 66 % from Human ApoE gene

Lane 1: *PANLadder II*
Lane 2: *Treated with PAN Mate*
Lane 3: *Without PAN Mate*



PAN Mate assayed with three different polymerases on a 201 bp GC-Rich fragment > 66 % from Human TGF-b gene

Lane 1: *PANLadder II*
Lane 2: *Treated with PAN Mate*
Lane 3: *Without PAN Mate*

PAN Mate Additive	2 x 1,2 ml	PAN737041

Nucleotides

dNTP Sets

Description

Features and applications

- Ultra-pure: > 99 % trisphosphate by HPLC
- Extended shelf-life of 24 months at -20 ° C
- Free from PCR inhibitors
- DNase, RNase and Nickase free
- Manufactured by Bioline in a purpose-built facility

Suitable for a wide variety of applications such as:

- Standard and long range PCR assays
- cDNA synthesis
- qPCR
- Microarrays
- DNA sequencing
- DHPLC
- Labeling

A set of ready-to-use molecular grade 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. For use in DNA polymerization reactions, DNA labeling and sequencing processes. Dependable PCR grade. All dNTPs are supplied as Lithium salts in purified water at pH 7.5. Lithium salts have greater resistance to repeated freezing and thawing cycles than Sodium salts, and Lithium salt dNTP preparations remain sterile over the entire shelflife due to the bacteriostatic activity of Lithium towards various microorganisms.

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

Caracteristics	dATP	dCTP	dGTP	dTTP
Product	dATP Lithium 100 mM Solution	dCTP Lithium 100 mM Solution	dGTP Lithium 100 mM Solution	dTTP Lithium 100 mM Solution
Nomenclature	2'-deoxyadenosine-5'-triphosphate	2'-deoxyadenosine-5'-triphosphate	2'-deoxyadenosine-5'-triphosphate	2'-deoxyadenosine-5'-triphosphate
Formula	$C_{10}H_{12}N_5O_{12}P_3Li_4$	$C_9H_{12}N_3O_{13}P_3Li_4$	$C_{10}H_{12}N_5O_{13}P_3Li_4$	$C_{10}H_{13}N_2O_{14}P_3Li_4$
Molecular Weight	514.9 g/mol	490.9 g/mol	530.9 g/mol	505.9 g/mol
λmax pH 7.0	259 nm	272 nm	252 nm	267 nm
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}
A_{250}/A_{260}	0.78 ± 0.03	0.82 ± 0.03	1.16 ± 0.05	0.65 ± 0.03
A_{280}/A_{260}	0.15 ± 0.02	0.98 ± 0.03	0.66 ± 0.03	0.73 ± 0.02
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
dNTP (HPLC Area)	≥ 99 %	≥ 99 %	≥ 99 %	≥ 99 %
dNDP (HPLC Area)	< 1 %	< 1 %	< 1 %	< 1 %
DNases, RNases, Nicking Activity	Negative	Negative	Negative	Negative
Storage	at -20° C	at -20° C	at -20° C	at -20° C
Stability	≤ 24 months	≤ 24 months	≤ 24 months	≤ 24 month

dNTP set (dA, dC, dG, and dT)	100 mM	4 x 250 µl	PAN739025
	100 mM	4 x (4 x 250 µl)	PAN739026
	100 mM	4 x (20 x 250 µl)	PAN739027

Nucleotides

dNTP Mix

Description

Features and applications

- Convenient, pre-optimized and pre-mixed
- Ultra-pure: > 99 % trisphosphate by HPLC
- Extended shelf-life of 24 months at -20° C
- Free from PCR inhibitors
- DNase, RNase and Nickase free
- Manufactured by Bioline in a purpose-built facility

Suitable for a wide variety of applications such as:

- Standard and long range PCR assays
- cDNA synthesis
- qPCR
- Microarrays
- DNA sequencing
- DHPLC
- Labeling

dNTP Mix Reaction Guidelines

100 mM Mix contains 25 mM of each dNTP
Reaction Volume Master Mix Reactions
50 µl 0.5 µl 1000

40 mM Mix contains 10 mM of each dNTP
Reaction Volume Master Mix Reactions
50 µl 1.25 µl 400

This is a guide only, for long-range applications adjust accordingly.

A ready-to-use molecular grade dNTP Mix containing dATP, dCTP, dGTP and dTTP at pH 7.5 as Lithium salts in purified water.

The mix is designed to save hands-on time for researchers and minimize the possibility of contamination. For use in DNA polymerization reactions, DNA labeling and sequencing processes. Dependable PCR grade.

All dNTPs are supplied as Lithium salts in purified water at pH 7.5. Lithium salts have greater resistance to repeated freezing and thawing cycles than Sodium salts, and Lithium salt dNTP preparations remain sterile over the entire shelflife due to the bacteriostatic activity of Lithium towards various microorganisms.

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

Typical Analysis
Lithium salts, > 99 % deoxynucleoside triphosphates (HPLC, area %), < 1 % deoxynucleoside monophosphates and deoxynucleoside diphosphates.

Purity
The dNTPs are > 99 % pure by HPLC and are free of DNase, RNase, Protease, phosphatase and nicking activity.

dNTP Mix (dA + dC + dG + dT)	20 µmol	40 mM	500 µl	PAN739043
	50 µmol	100 mM	500 µl	PAN739028
	250 µmol	100 mM	4 x 500 µl	PAN739029

Nucleotides

dNTPs

Description

Features and applications

- > 99 % pure by HPLC
- Extended shelf-life of 24 months at -20° C
- Free from PCR inhibitors
- DNase, RNase and Nickase free
- Manufactured by Bioline in a purpose-built laboratory
- Custom, Bulk and OEM Nucleotides service

Suitable for a wide variety of applications such as:

- Standard and long range PCR assays
- cDNA synthesis
- qPCR
- Microarrays
- DNA sequencing
- Mutagenesis
- Genotyping
- DHPLC
- Labeling

Ultra-pure dNTPs are enzymatically synthesized from premium quality raw materials, using highly specific production systems in our purpose built facilities. The manufacturing process eliminates impurities and PCR-specific inhibitors such as modified nucleotides, tetraphosphates and pyrophosphates commonly observed in other commercially available dNTP products. The dNTPs are purified with quantitative HPLC and possess at least 99 % purity.

All dNTPs are supplied as Lithium salts in purified water at pH 7.5. Lithium salts have greater resistance to repeated freezing and thawing cycles than Sodium salts, and Lithium salt dNTP preparations remain sterile over the entire shelflife due to the bacteriostatic activity of Lithium towards various microorganisms.

Storage and Stability
dNTP can be stored for 24 months at -20 °C or -70 °C in a constant temperature freezer. Avoid multiple freezing/thawing. For long-term usage, aliquoting is recommended.

dATP	100 mM as 1 x 250 µl	25 µmole	PAN739036
dCTP	100 mM as 1 x 250 µl	25 µmole	PAN739038
dGTP	100 mM as 1 x 250 µl	25 µmole	PAN739037
dTTP	100 mM as 1 x 250 µl	25 µmole	PAN739039