Jena Bioscience
Building Blocks of Life

Endpoint PCR

- Direct and Multiplex PCR
- Thermostable DNA Polymerases
- dNTP Mixes, Bundles & Singles
- Buffer and Enhancer
- Gel, Loading and Staining

IFTA AG
Certified QMS and EMS according to
DIN EN ISO 9001 and DIN EN ISO 14001
Reg.-No.: ICV03597 034 and ICV03597 534

ACCCACGAAAGGGAA ATAAGC AACO TTCAGGGAAGAA CTAUAACTGCCAC ACCCACGAAAGGGAA ATAAGC AACO TTCAGGGAAGAA
TTCAGGGAAGAA CTAUAACTGCCAC **ACCCACGAAAGGGAA ATAAGC AACO TTCAGGGAAGAA CTAUAACTGCCAC** ACCCACGAAAGGGAA
GAAAGGGAA ATAAGC AACO TTCAGGGAAGAA CTAUAACTGCCAC ACCCACGAAAGGGAA ATAAGC AACO TTCAGGGAAGAA CTAUAACTGCCAC

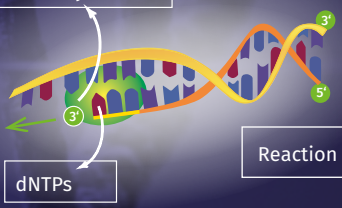
Molecular Biology

Endpoint PCR from Jena Bioscience

RNA/DNA Preparation

Isolation of genomic DNA/RNA and plasmid DNA

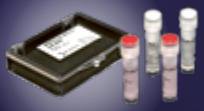
Endpoint PCR Components & Mixes



Thermostable DNA Polymerases

Reaction Buffers

dNTPs

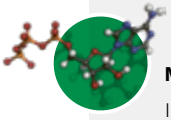


Ready-to-use Mixes

Downstream Applications

- Restriction Enzymes
- DNA Ladders
- Modifying Enzymes
- DNA Cleanup Kits

Building Blocks of Life



Nucleotides & Nucleosides

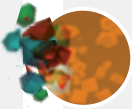
In our chemistry division, we have hundreds of natural and modified nucleotides in stock. In addition, with our pre-made building blocks and in-house expertise we manufacture even the most exotic nucleotide analog from mg to kg scale.

Click Chemistry, Probes & Epigenetics

Our Probes & Epigenetics as well as Click Chemistry sections offer innovative reagents for the functionalization, conjugation and labeling (fluorophores, haptens) of (bio) molecules complemented by epigenetic modification analysis tools.

LEXSY Expression

In the field of recombinant protein production, Jena Bioscience has developed its proprietary LEXSY (Leishmania Expression System) technology. It is based on an S1-classified unicellular organism that combines easy handling with a eukaryotic protein folding and modification machinery. Besides everything you need to establish LEXSY in your lab we also offer custom expression of recombinant proteins.



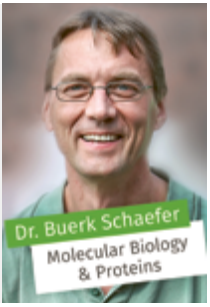
Crystallography & Cryo-EM

For the crystallization of biological macro-molecules – which is often the bottleneck in determining the 3D-structure of proteins – we offer specialized reagents for protein stabilization, crystal screening, crystal optimization, and phasing that can reduce the time necessary to obtain a high resolution protein structure from several years to a few days.

Molecular Biology & Proteins

For applications in the field of Molecular Biology we offer single reagents, complete kits and optimized master mixes. This section includes products for DNA or RNA purification, amplification and modification with focus on PCR-related techniques.

For your questions regarding **Endpoint PCR** contact me directly: **pcr@jenabioscience.com**



Jena Bioscience

Building Blocks of Life

Established in 1998 by a team of scientists from the Max-Planck-Institute of Molecular Physiology (Dortmund), Jena Bioscience utilizes more than 25 years of academic know-how to develop innovative reagents for clients from both research and industry in 100+ countries. To date, Jena Bioscience still remains an owner-operated business.

Jena Bioscience

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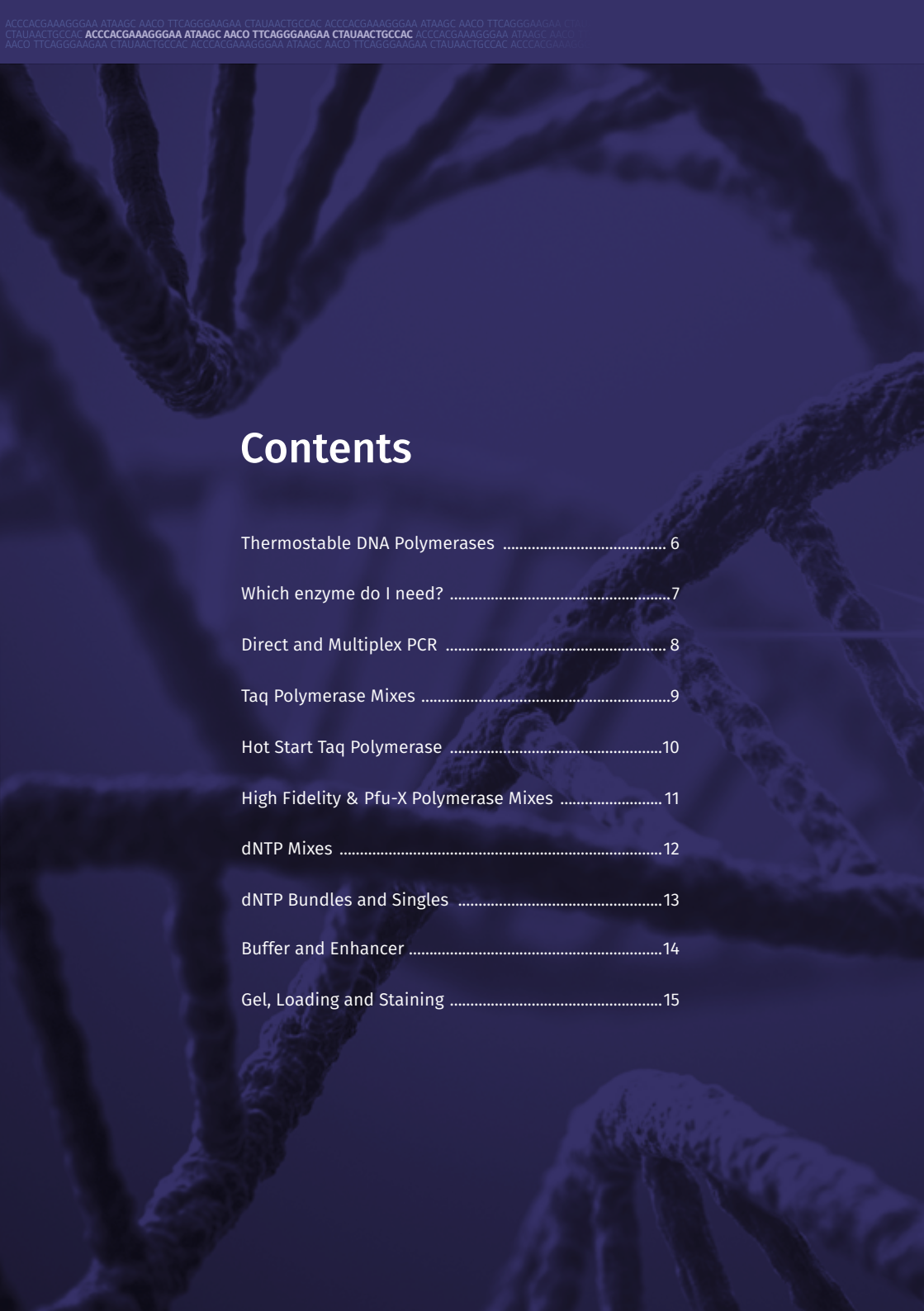


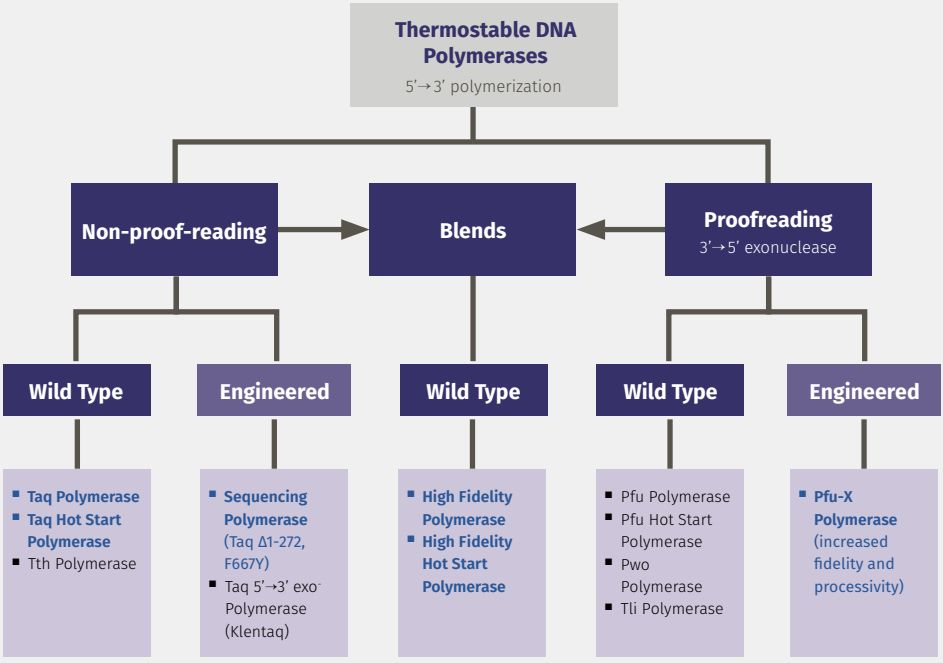
Contents

Thermostable DNA Polymerases

Thermostable DNA polymerases are heat-resistant, template-dependent enzymes that add free nucleotides to the 3'-end of a newly synthesized complementary DNA strand.

They can be divided into proofreading enzymes (with inherent 3'-5' exonuclease activity) and non-proofreading enzymes that lack exonuclease activity. 3'-5' exonuclease activity occurs upon incorporation of a mismatched base: The polymerase reverses its direction by one base pair, excises the mismatch, re-inserts the correct base and continues replication.

DNA polymerases are commercialized in various forms including engineered mutants and blends of polymerases to achieve optimal results in a large variety of DNA synthesis reactions (Figure. 1).



Taq: Thermus aquaticus, Tth: Thermus thermophilus, Pwo: Pyrococcus woesei, Pfu: Pyrococcus furiosus, Tli: Thermococcus litoralis.
■ *Enzymes available from Jena Bioscience*

Figure 1

Proofreading and non-proofreading enzymes are marketed as wild type, engineered mutants, and blends thereof covering a very broad range of applications.

Which enzyme do I need?

The available portfolio of our polymerases (Fig. 1) allows choosing the most appropriate enzyme for a particular application. In most cases it is desired that a PCR yields large amounts of DNA with high specificity (no by-product DNA) and high fidelity (minimum number of mutations).

Since these requirements sometimes may be contradictory – and also depend on the buffer system and the cycling regime – Jena Bioscience offers the polymerases Taq Pol, Taq Hot Start, High Fidelity, High Fidelity Hot Start, Hot Start, Pfu-X and Sequencing Pol that cover the entire range of applications (see Table).

Enzyme	Efficiency / Yield	Specificity	Fidelity / Error rate [1], [2]	Application
Taq Polymerase	++	++	10^{-5}	▪ Standard PCR / optimized for minimal by-product formation ▪ Routine and plate based PCR, automated pipetting
Taq Hot Start Polymerase	++	+++	10^{-5}	▪ High specificity PCR / high sensitivity PCR ▪ Diagnostic PCR
High Fidelity Polymerase	+++	++	2×10^{-6}	▪ High fidelity PCR / long range PCR (> 30 kb) ▪ Amplification of GC-rich and other difficult templates
High Fidelity Hot Start Polymerase	+++	+++	2×10^{-6}	▪ High fidelity PCR with highest specificity and sensitivity ▪ Long range PCR, amplification of difficult templates and of small template amounts
Pfu-X Polymerase	+++	+++	2×10^{-7}	▪ Amplification with highest fidelity ▪ High speed amplification of difficult and long templates
Sequencing Polymerase	++	++	NA	▪ Incorporation of ddNTPs (Sanger Sequencing) ▪ SNP genotyping

References:

[1] The error rate of a polymerase is calculated as number of mutations per number of base pairs per DNA doublings (PCR cycles).
$ER = MF / (bp \cdot d)$
***ER:** Error rate* *MF: number of mutations (mutation frequency)*
***bp:** number of base pairs (fragment length)* *d: DNA doublings (number of PCR cycles)*

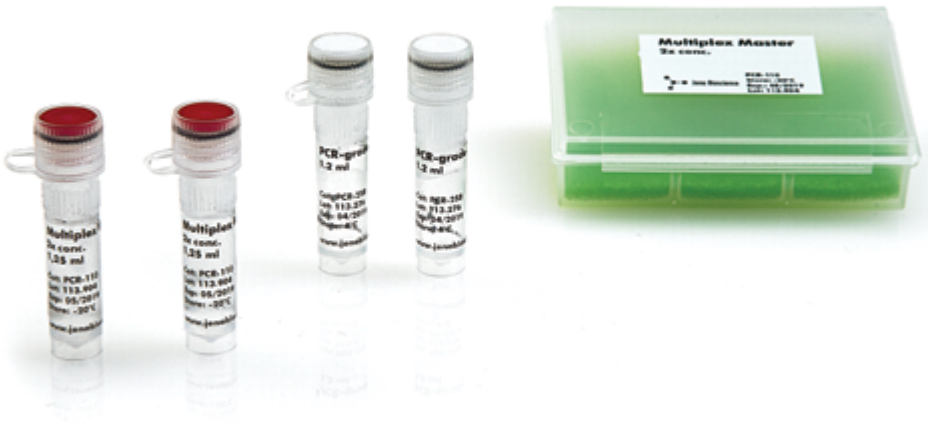
[2] Jena Bioscience, 2011

Direct and Multiplex PCR

Direct PCR Master is designed for PCR amplification directly from whole blood, animal tissues and plant tissues without the need of prior DNA purification processes.

Multiplex PCR Master is specially designed for the set-up of multiplex PCR reactions. It contains an optimized composition of polymerase, nucleotides, $MgCl_2$ and stabilizing components in a specifically developed buffer system allowing the parallel amplification of a multitude of fragments in a single PCR assay.

Product	Cat.-No.	Amount
Direct PCR Master	PCR-111S	2 × 1,25 ml (2 × conc.)
	PCR-111L	10 × 1,25 ml (2 × conc.)
Multiplex PCR Master	PCR-110S	2 × 1,25 ml (2 × conc.)
	PCR-110L	10 × 1,25 ml (2 × conc.)



Taq Polymerase Mixes

Taq Polymerase is the enzyme of choice for most routine PCR applications.

To allow choosing between convenience and flexibility, Jena Bioscience offers Taq polymerase in various types of formulations ranging from complete master mixes over core kits containing all required components in one box to individual enzyme packs.

Product	Cat.-No.	Amount
Ruby Taq Master (2×) ready-to-use, for direct gel loading	PCR-164S	4 × 1,25 ml (2 × conc.)
	PCR-164L	20 × 1,25 ml (2 × conc.)
	PCR-164XL	100 ml (2 × conc.)
Crystal Taq Master (2×) ready-to-use, for routine PCR applications	PCR-166S	4 × 1,25 ml (2 × conc.)
	PCR-166L	20 × 1,25 ml (2 × conc.)
	PCR-166XL	100 ml (2 × conc.)
Red Load Taq Master (5×) ready-to-use, for direct gel loading	PCR-108S	1 ml (5 × conc.)
	PCR-108L	5 × 1 ml (5 × conc.)
Taq Core Kit Kit of thermostable DNA polymerase, dNTPs and reaction buffer	PCR-214S	200 units
	PCR-214L	1000 units
	PCR-214XL	5000 units
Taq Polymerase thermostable, recombinant	PCR-211S	200 units
	PCR-211L	1000 units
	PCR-211XL	5000 units
Taq Polymerase / Labeling Buffer thermostable, recombinant	PCR-201S	200 units
	PCR-201L	1000 units
Sequencing Polymerase Taq Polymerase mutant for incorporation of ddNTPs	PCR-206S	200 units
	PCR-206L	1000 units

Hot Start Taq Polymerase

Hot Start PCR technique reduces non-specific amplifications and offers a convenient reaction set-up at room temperature. The polymerase is recommended for routine & diagnostic PCR applications, high throughput PCR or genotyping and provides an improved specificity and sensitivity when amplifying low-copy-number targets or working with complex backgrounds.

Product	Cat.-No.	Amount
Ruby Hot Start Master (2×) ready-to-use, for direct gel loading	PCR-165S	4 × 1,25 ml (2 × conc.)
	PCR-165L	20 × 1,25 ml (2 × conc.)
	PCR-165XL	100 ml (2 × conc.)
Crystal Hot Start Master (2×) ready-to-use, for highly sensitive and specific PCR applications	PCR-167S	4 × 1,25 ml (2 × conc.)
	PCR-167L	20 × 1,25 ml (2 × conc.)
	PCR-167XL	100 ml (2 × conc.)
Hot Start Core Kit Kit of aptamer-inhibited hot start pol for high specificity, dNTPs & reaction buffer	PCR-215S	200 units
	PCR-215L	1000 units
	PCR-215XL	5000 units
Hot Start Core Kit Ab+ Kit of antibody-blocked hot start DNA polymerase, dNTPs and reaction buffer	PCR-216S	200 units
	PCR-216L	1000 units
	PCR-216XL	5000 units
Hot Start Polymerase Heat-activatable DNA polymerase for high specificity, aptamer-inhibited	PCR-212S	200 units
	PCR-212L	1000 units
	PCR-212XL	5000 units
Hot Start Polymerase Ab+ Heat-activatable DNA polymerase for high specificity, antibody-blocked	PCR-213S	200 units
	PCR-213L	1000 units
	PCR-213XL	5000 units

Good to know: Why Hot Start Polymerase?

Standard thermostable polymerases (e.g. Taq) show optimal performance around 70°C. Nevertheless, a remaining enzymatic activity at room temperature may lead to unspecific products.

If using Hot Start Technology, the polymerase activity is blocked by an aptamer or antibody (Ab+) at ambient temperature and switched on automatically at the onset of the initial denaturation. The thermal activation prevents the extension of nonspecifically annealed primers and primer-dimer formation at low temperatures during PCR setup.

High Fidelity & Pfu-X Polymerase Mixes

High Fidelity Polymerase is based on a blend of Taq DNA polymerase and a proofreading enzyme specially designed for highly accurate and efficient amplification. It shows excellent results with extremely long (up to 30 kb), GC-rich or other difficult templates.

Pfu-X Polymerase is the ideal choice for applications where efficient amplification of DNA with highest fidelity is required. This engineered enzyme has a proofreading function that reduces error rates by a factor of 200 compared to Taq Polymerase.

Product	Cat.-No.	Amount
High Fidelity Core Kit Kit of thermostable pol for high accuracy, dNTPs & reaction buffer	PCR-234S	100 units
	PCR-234L	500 units
High Fidelity Hot Start Core Kit Kit of heat-activatable pol for high accuracy, dNTPs & react. buffer	PCR-235S	100 units
	PCR-235L	500 units
Pfu-X Core Kit Kit of proofreading DNA polymerase for highest accuracy, dNTPs and reaction buffer	PCR-237S	100 units
	PCR-237L	500 units
High Fidelity Polymerase Thermostable DNA polymerase for high accuracy	PCR-204S	100 units
	PCR-204L	500 units
High Fidelity Hot Start Polymerase Heat-activatable DNA polymerase for high accuracy & specificity	PCR-205S	100 units
	PCR-205L	500 units
Pfu-X Polymerase Proofreading DNA polymerase for highest accuracy	PCR-207S	100 units
	PCR-207L	500 units

dNTP Mixes

Molecular biology grade **dNTP Mixes** are specified for use in all molecular biology applications including real-time PCR, high-fidelity PCR, long-range PCR, LAMP, cDNA synthesis, reverse transcription, DNA labeling or sequencing. Jena Bioscience guarantees purities greater 99% (confirmed by RP-HPLC) combined with highest long term stability.

Product	Cat.-No.	Amount
dNTP Mix Equimolar Mix of 10 mM dATP, dCTP, dGTP and dTTP	NU-1006S	400 µl
	NU-1006L	2 × 1 ml
dNTP Mix Equimolar Mix of 25 mM dATP, dCTP, dGTP and dTTP	NU-1023S	200 µl
	NU-1023L	1 ml
dNTP Mix dUTP Premix of 10 mM dATP, dCTP, dGTP and 20 mM dUTP	NU-1020S	200 µl
	NU-1020L	1 ml

dNTP Bundles and Singles

Jena Bioscience is a primary manufacturer of premium quality dNTPs. Our dNTPs are synthesized using enzymatic technologies followed by chromatographic purification cascades. dNTPs are manufactured in a single step from their corresponding Ribo-NTPs.

Each lot is tested functionally by a set of PCR, RT-PCR and Klenow reactions. All dNTPs are screened for remains of bacterial/human DNA, DNases, RNases, nicking enzymes or proteases.

Product	Cat.-No.	Amount
dNTP Bundle 4 × 100 mM (dATP, dCTP, dGTP, dTTP)	NU-1005S	4 × 200 µl (4 × 20 µmol)
	NU-1005L	4 × 1 ml (4 × 100 µmol)
dATP-Solution – 100 mM Sodium salt solution	NU-1001L	1 ml
dCTP-Solution – 100 mM Sodium salt solution	NU-1002L	1 ml
dGTP-Solution – 100 mM Sodium salt solution	NU-1003L	1 ml
dTTP-Solution – 100 mM Sodium salt solution	NU-1004L	1 ml
dUTP-Solution – 100 mM Sodium salt solution	NU-1008L	1 ml
dITP-Solution – 100 mM Sodium salt solution	NU-1007L	1 ml

Jena Bioscience's annual manufacturing capacity of several hundred liters of 100 mM dNTP solutions. On request, Jena Bioscience provides bulk amounts at significant discounts, custom formulations, packaging & labeling.

All dNTPs and PCR Mixes are available as solids.

Learn more in our Lyophilisation brochure or get in touch (pcr@jenabioscience.com).

Buffer and Enhancer

Our **Buffer and Enhancer** section contains components optimized for applications ranging from routine PCR over DNA labeling to amplification of difficult templates.

It includes kits to facilitate amplification of GC-rich structures and to enhance PCR yields.

Product	Cat.-No.	Amount
PCR-grade Water	PCR-258S	10 × 1,2 ml
	PCR-258L	50 ml
	PCR-258XL	500 ml
Ruby Buffer	PCR-272	5 × 1,2 ml
Crystal Buffer	PCR-271	5 × 1,2 ml
KCl Buffer	PCR-262	5 × 1,2 ml
Labeling Buffer	PCR-263	5 × 1,2 ml
$MgCl_2$ Stock	PCR-266-25	4 × 1,5 ml (25 mM)
PCR Additives	PCR-252	500 reactions
dNTP Mix GCamplifier	PCR-257	100 µl

Gel, Loading and Staining

Our **Gel, Loading and Staining** section includes agarose, loading buffer and DNA staining solutions for gel electrophoresis. SYBR Green containing gel loading buffer provides an excellent DNA detection sensitivity and is the ideal alternative to classical EtBr-based gel staining procedures.

Product	Cat.-No.	Amount
LE Agarose	PCR-269S	100 g
	PCR-269L	500 g
Gel Loading Buffer – Blue	PCR-254-bl	5 × 1,8 ml
Gel Loading Buffer – Green	PCR-254-gr	5 × 1,8 ml
Gel Loading Buffer – Orange	PCR-254-or	5 × 1,8 ml
Gel Loading Buffer with DNA Stain – Blue	PCR-255-bl	5 × 1,8 ml
Gel Loading Buffer with DNA Stain – Green	PCR-255-gr	5 × 1,8 ml
Gel Loading Buffer with DNA Stain – Orange	PCR-255-or	5 × 1,8 ml
SYBR DNA Stain	PCR-273	5 × 1,8 ml

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