Nucleic Acid Electrophoresis

SERVA
serving scientists

Reagents and Equipment

All you need for...
Nucleic Acid Electrophoresis

The combination of technically sophisticated equipment with high-quality reagents delivers best results in the electrophoretic separation of nucleic acid fragments. A uniform electric field, a uniformly dissolving agarose and buffers with constantly approved specifications are best conditions for perfect separations, complemented by high-quality, ready-made markers and detection reagents.

1. Electrophoresis Buffers
2. Reagents
3. Agarose Gel Media
4. DNA Standards
5. SERVA Stains for Nucleic Acids
6. PAGE of Nucleic Acids
7. Equipment

High resolution agarose, ultra-pure electrophoresis reagents and robust equipment for superior electrophoretic separation of nucleic acids

1 Electrophoresis Buffers, Ready-to-Use

SERVA's ready-to-use electrophoresis buffers save not only time but guarantee best results because they are made from high-quality reagents and application tested.

Product	Size	Cat. no.
TAE Buffer, 10x	1 L	42553.01
	10 L	42553.04
TAE Buffer, 50x, molecular biology grade	1 L	42549.01
TBE Buffer, 10x	2x 500 ml	42557.01

2 Reagents

Reagents "electrophoresis grade" are in-house tested for electrophoresis applications. "Molecular biology grade" reagents are guaranteed DNase/RNase-free.

Product	Size	Cat. no.
Acetic acid 100 %, analytical grade	1 L	45633.01
Boric acid, electrophoresis grade	1 kg	15166.02
Bromophenol Blue-Na-salt	5 g	15375.01
	25 g	15375.02
Ethylenediamine tetraacetic acid-Na_2-salt, analytical grade	100 g	11280.01
	1 kg	11280.02
	5 kg	11280.03
Ethylenediamine tetraacetic acid-Na_2-salt, molecular biology grade	250 g	39760.01
Glycerol from plant 87 % molecular biology grade	1 L	39788.01
Tris(hydroxymethyl)aminomethane, molecular biology grade	500 g	37186.02
	1 kg	37186.03
	2.5 kg	37186.04
Tris(hydroxymethyl)aminomethane, electrophoresis grade	500 g	37181.01
	1 kg	37181.02
	2.5 kg	37181.03
Sucrose, analytical grade	500 g	35579.02
	5 kg	35579.03

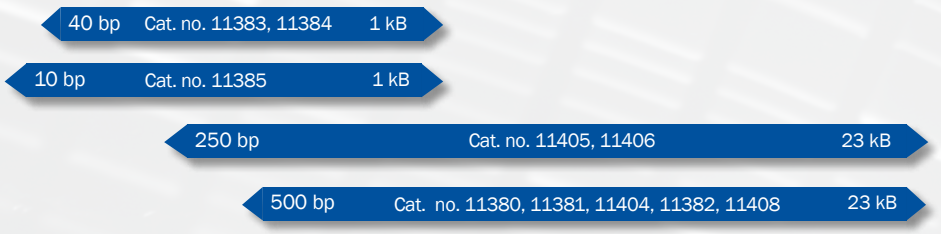
- **Ready-to-use solutions for saving time and work**
- **Application tested for best results in electrophoresis**

3 Agarose Gel Media

Agarose is a highly purified naturally occurring polysaccharide. Preparation of agarose gels involves simply heating the powdered agarose in buffer to dissolve it. It gels upon cooling. Like acrylamide, the pore size of an agarose gel is inversely dependent on the agarose concentration. The pores in agarose gels are generally much larger than those in acrylamide gels and are widely used in separation of nucleic acids.

There are many different types of agarose available. The best choice for routine DNA electrophoresis is Agarose SERVA Wide Range (cat. no. 11406) or Agarose for DNA electrophoresis (cat. no. 11404). This offers good gel strength and low impurities that might interfere with subsequent procedures. Other qualities like Agarose SERVA for PCR (cat. no. 11383) and Agarose SERVA 3:1 (cat. no. 11385) are made for efficient separation of small DNA fragments <1000 bp.

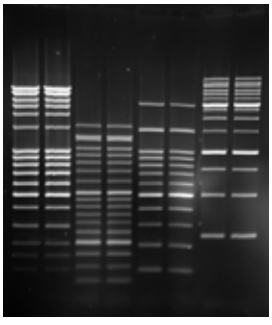
Separation ranges of SERVA agaroses



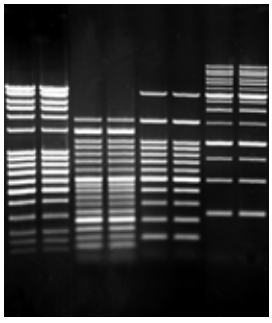
Agarose	Routine analysis	High resolution <1000 bp	Cloning	In-Gel applications	Gene technology grade	DNA/RNA recovery	Blotting
Agarose SERVA	✓						✓
Agarose SERVA low melting			✓	✓		✓	
Agarose SERVA for DNA electrophoresis	✓		✓				✓
Agarose SERVA Wide Range	✓		✓				✓
Agarose SERVA Premium			✓		✓	✓	✓
Agarose SERVA Premium low melting			✓	✓	✓	✓	
Agarose SERVA 3:1		✓	✓				✓
Agarose SERVA for PCR		✓	✓		✓	✓	✓
Agarose SERVA for PCR low melting		✓	✓	✓	✓	✓	
Agarose SERVA Tablets			✓		✓	✓	✓

Agarose SERVA Tablets – convenient and fast but no compromise regarding resolution

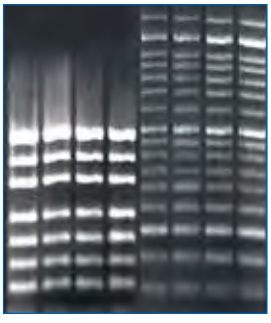
Product	Size	Cat. no.
Agarose SERVA	100 g	11380.02
	250 g	11380.03
	500 g	11380.05
Agarose SERVA low melting	5 g	11408.01
	25 g	11408.02
Agarose SERVA for DNA electrophoresis	100 g	11404.03
	250 g	11404.04
	500 g	11404.07
	1 kg	11404.05
Agarose SERVA Wide Range	250 g	11406.01
	500 g	11406.02
	1 kg	11406.03
Agarose SERVA Premium	100 g	11381.02
	250 g	11381.03
Agarose SERVA Premium low melting	25 g	11382.01
	100 g	11382.02
Agarose SERVA 3:1	25 g	11385.01
	100 g	11385.02
Agarose SERVA for PCR	100 g	11383.02
Agarose SERVA for PCR low melting	25 g	11384.01
	100 g	11384.02
Agarose SERVA Tablets, 0.5 g/tablet	100 g	11405.01



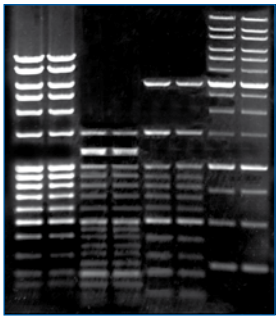
Agarose SERVA
Wide Range



Agarose SERVA
Premium



Agarose SERVA 3:1



Agarose SERVA Tablets

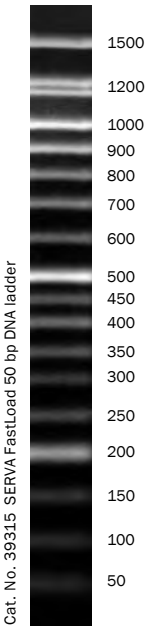
4 DNA Standards

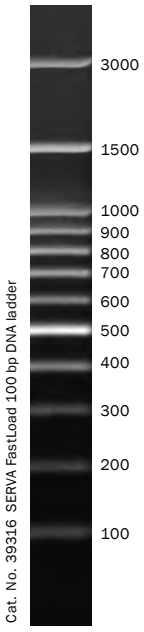
SERVA offers two types of DNA molecular weight size markers.
SERVA FastLoad DNA Ladders are ready-to-use DNA ladders for fragment ranges from 50 – 1500 bp, 100 – 3000 bp and 250 bp – 25 Kbp. SERVA DNA standards lyophilized consist of a range of lyophilized DNA molecular weight standards covering traditional MW standards made by digestion of phage λ DNA as well as 100 bp and 1 Kbp ladders for PCR fragment analysis.

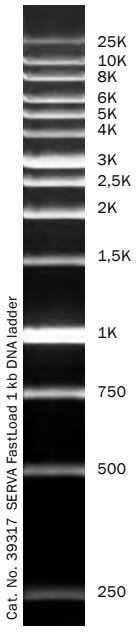
SERVA FastLoad DNA ladder

- Supplied in loading buffer
- The approximate mass of each band is indicated - easy mass estimation of DNA bands
- Can be stored for 6 months at 25 °C or for 12 months at 4 °C (long time storage at -20 °C)

Description	DNA fragments	Fragment range	Load per lane	Size	Cat. no.
50 bp DNA ladder	17	50 - 1500 bp 200 and 500 bp with increased intensity	5 µl (0.56 µg)	500 µl	39315.01
100 bp DNA ladder	12	100 - 3000 bp 500 and 1500 bp with increased intensity	5 µl (0.54 µg)	500 µl	39316.01
1 kb DNA ladder	14	250 bp – 25 kb, 3000 and 1000 bp with increased intensity	5 µl (0.52 µg)	500 µl	39317.01





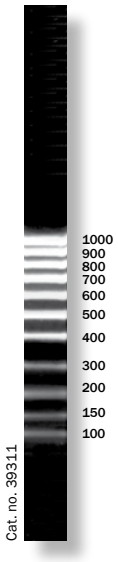


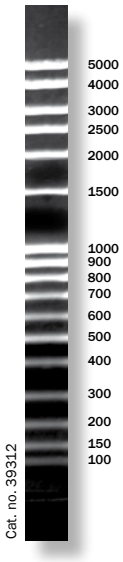
SERVA FastLoad DNA ladders are stable at 25 °C for up to 6 months - no cool transport, no thawing

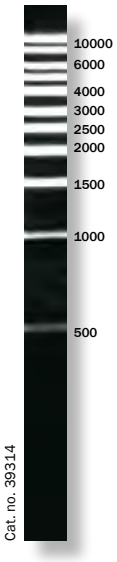
SERVA DNA standards lyophilized

- High-quality fragment ends, lyophilized - can be resuspended in buffer of choice, for e.g. fill-in, 5'-end label
- 1 x 1 ml sample buffer is included for easy and fast resuspension of the DNA fragments
- Equimolar ladder for easy quantification
- Equalized ladder for same staining intensities of bands

Description	DNA fragments	Load per lane	Size	Cat. no.
100 bp ladder equimolar	11	0.7 – 1.0 µg	50 µg	39311.01
100 bp ladder extended	17	0.8 – 1.0 µg	50 µg	39312.01
1 KBp ladder	11	0.5 – 0.7 µg	4x 50 µg	39314.01







For size determination of DNA fragments in agarose gels you need size markers of high quality under the respect of fragment size and purity

5 SERVA Stains for Nucleic Acids

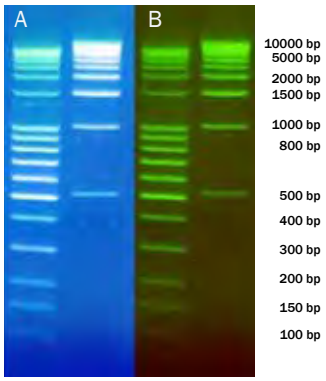
Besides the classical stain for agarose gels ethidium bromide SERVA offers a safe, non-carcinogenic alternative: SERVA DNA Stain G, SERVA DNA Stain Clear G and SERVA HiSens Stain G. They are at least as sensitive as ethidium bromide and can be used in exactly the same way in agarose gel electrophoresis.

The dyes emit a green fluorescence when bound to DNA or RNA. The fluorescence emission is similar to EtBr at ca. 530 nm when bound to nucleic acid. Pre- and post-staining is possible. The post-staining solution is reusable 2 – 3 times.

SERVA DNA Stain G has one fluorescence excitation maximum at ca. 300 nm and another at ca. 450 nm when bound to nucleic acid. Working dilution is 1:20,000 to 1:50,000.

SERVA DNA Stain Clear G gives a very low background and has therefore a higher sensitivity as SERVA DNA Stain G. It has two secondary fluorescence excitation peaks (ca. 270 nm and 295 nm) and one strong excitation peak centered around 490 nm. Working dilution is 1:17,000 to 1:25,000.

SERVA HiSens Stain G is the most sensitive dye and detects 0.1 ng of a 4 Kb dsDNA band.



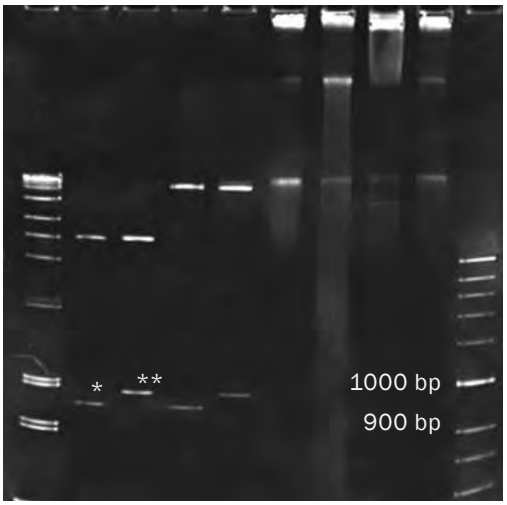
DNA samples were separated in a 1.5 % agarose gel. For pre-staining SERVA DNA Stain Clear G was diluted 1:25,000. The staining was visualized using a transilluminator at 312 nm.
Lane 1: SERVA DNA Standard 100 Bp ladder extended, cat. no. 39312.
Lane 2: SERVA DNA Standard 1KBp DNA ladder, cat. no. 39314
Agarose SERVA for DNA Electrophoresis, cat. no. 11404; BlueMarine™ 100, cat. no. BM 100; 35 min, 150 V.
A: without orange filter; B: with orange filter.

Product	Size	Cat. no.
Ethidium bromide aqueous solution, 1 % w/v	25 ml	21251.01
SERVA DNA Stain G	1 ml	39803.01
	5 x 1 ml	39803.02
SERVA DNA Stain Clear G	1 ml	39804.01
	5 x 1 ml	39804.02
SERVA HiSens Stain G	500 µl	39805.01

SERVA DNA Stain G/Clear G/HiSensStain G – non-carcinogenic alternatives for ethidium bromide

6 PAGE of nucleic acids

The most often used DNA separation methods applies agarose gels. In polyacrylamide gel electrophoresis (PAGE), the nucleic acids are retarded by a molecular mass-dependent chain-matrix interaction that occurs in addition to sieving. This results in a high resolution especially for small and linear fragments (<500 bp). Furthermore, gradient polyacrylamide gels are available to adjust the right separation distance even better. Hence, PAGE of nucleic acids is an alternative to agarose gels for PCR check, small sized nucleic acids or separating overlapping double-bands.



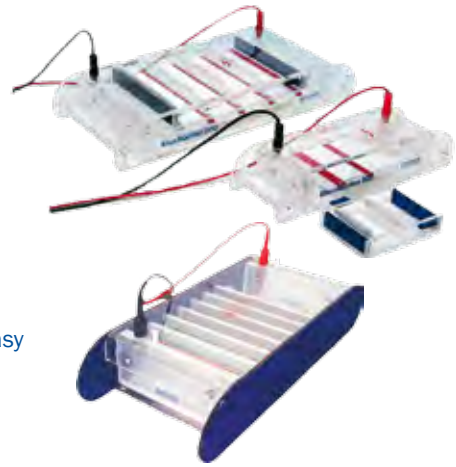
DNA separation on SERVAGel™ TG PRiME™ 8 % (cat. no. 43264) using SERVA PRiME™ DNA Sample Buffer (cat. no. 42544) and TBE Running Buffer (cat. no. 42557).
Conditions: 10 min 150 V, 75 min 250 V. Staining: SERVA DNA Stain Clear G (cat. no. 39804).
Lane 2-5: PRiME resolution of 30 bp difference between * and **.
Kindly provided by Henrike Miess, Pharmazeutisches Institut, Eberhard-Karls-Universität Tübingen

SERVAGel™ TG PRiME™	15 sample wells	12 sample wells	10 sample wells	Size
8 %	43284.01	43260.01	43261.01	10 gels
10 %	43285.01	43263.01	43264.01	10 gels
12 %	43286.01	43266.01	43267.01	10 gels
14 %	43287.01	43269.01	43270.01	10 gels
4 - 12 %	43288.01	43273.01	43274.01	10 gels
4 - 20 %	43289.01	43276.01	43277.01	10 gels
8 - 16 %	43290.01	43279.01	43280.01	10 gels

- **Easy, safe and reproducible**
- **High resolution, razor sharp bands**
- **PCR check, small size nucleic acid separations**

7 Equipment for Nucleic Acid Electrophoresis

BlueMarine™ 100/200/HTS



- Submarine chamber available in 3 formats (width x length)
  - | BM 100: 7 cm x 10 cm
  - | BM 200: 15 cm x 15 cm and 15 cm x 20 cm
  - | BM HTS: 17,5 cm x 19,2 cm
- Robust, acrylic electrophorese chambers
- Platinised metal rods instead of platinum wire as electrode, easy to change
- UV transparent gel try, casting gates and combs are include

Product	Size.	Cat. no.
BlueMarine™ 100	1 unit	BM-100
BlueMarine™ 200	1 unit	BM-200
BlueMarine™ HTS	1 unit	BM-HTS

BlueVertical™ PRiME™ & TankBlot

- Dual mini tank systems
- Accommodates 1 – 2 gels in cassettes with outer dimensions of 10 cm x 10 cm x 0.7 cm
- Leak-free inner core unit with a unique clamp system
- Unique, easy-to-handle blotting insert for tank blotting
- Gel Casting Stand for casting two gels
- Quality designed and made in Germany

Product	Size	Cat. no.
BlueVertical™ PRiME™	1 unit	BV-104
BlueVertical™ PRiME™ Casting Stand	1 unit	BV-104-CS
BlueVertical™ PRiME™ Blot Module	1 unit	BV-104-B
BlueVertical™ PRiME™ TankBlot	1 unit	BV-104-TB

BluePower™ Power Supply

- 400 Marine: For submarine agarose gel elctrophoresis
- 600 PRiME: For vertical PAGE nucleic acid electrophoresis
- Fully programmable (9 programms with 9 steps, each)
- Inlcudes timer and many safety features
- 4x 2 outlets

Product	Size	Cat. no.
BluePower™ 400 Marine™ Power Supply	1 unit	BP-400-MARI
BluePower™ 3000 HPE™ Power Supply	1 unit	BP-600-PRI

Digital Imaging and Analysis System

- Fast and convenient gel documentation system
- Inlcudes darkroom cabinet, UV filter, digital SLR camera
- Optional available: UV-, white- and blue-light transilluminator, epi-white light
- Small footprint: 42 x 55 x 52 cm)

Product	Size	Cat. no.
Digital Imaging and Analysis System	1 unit	DIAS-III

SERVA BlueCube 300/300L

- Small and compact gel documentation system
- Capturing SERVA DNA Stain Clear G and EtBr stained nuclei acids
- Inludes UV table drawer (312 nm, filter size 180 x 140 mm)
- Equipped with a two-filter system, one UV filter (∅ 25 mm)
- Includes one magnetic protection shield for safe handling of the gel
- A 1D analysis software is included with the device
- Version „300L“ comes with an external computer

Product	Size	Cat. no.
SERVA BlueCube 300	1 unit	BC-300
SERVA BlueCube 300L	1 unit	BC-300L

BIO-1000F Fluorescence Gel Scanner

- Detects 1 ng protein/band (for SERVA Lightning Red)
- Detects 0.04 ng DNA/band stained with EtBr-alternative fluorescent stain
- BlueLED illuminator with CCD image sensor
- Scanning area up to 127 mm x 178 mm

Product	Size	Cat. no.
BIO-1000 Fluorescence Gel Scanner	1 unit	Bio-1000F

Separation of nucleic acids and documentation with SERVA devices - always a good choice!

SERVA

serving scientists

SERVA WORLDWIDE

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