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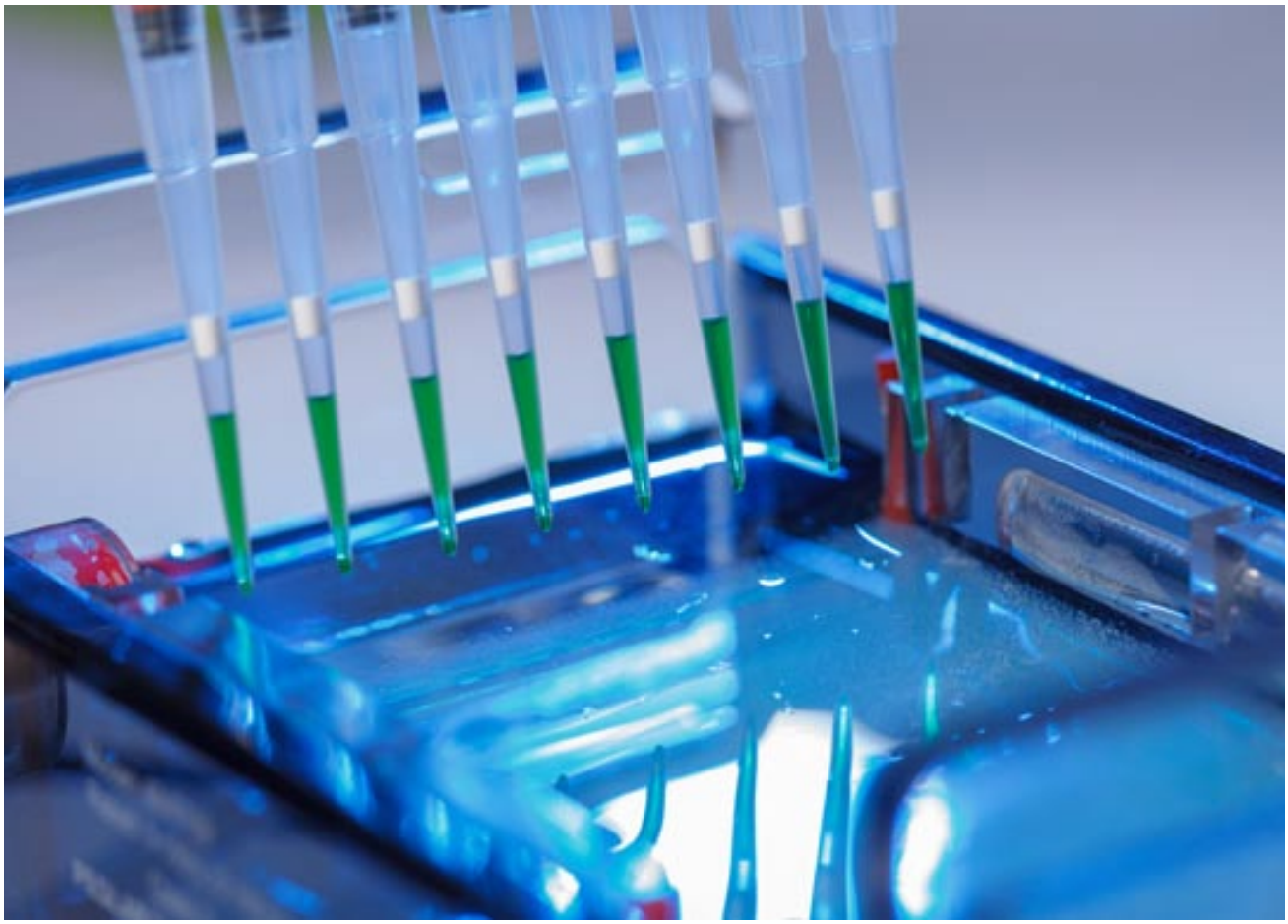
AGAROSE GELS



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Overview of the Agarose Gels

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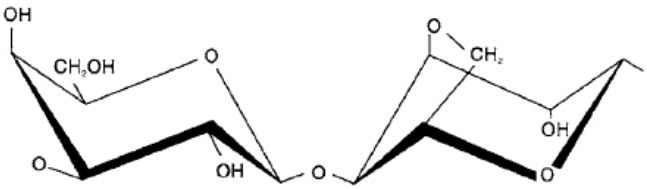
Agarose Gels

Technical Information

Definition

Agarose is a neutral polysaccharide extracted from the cell walls of certain Rhodophyceae algae, also known as agarophyte seaweeds because they are the raw material used in the production of agar-agar.

The structure of the polysaccharide is a galactan, formed by linking agarobioses 1-3, 1-4, as shown in the illustration. This chemical structure gives agarose the capacity to form gels that are very strong even at low concentrations. These gels have a macroreticular structure with a very open mesh which can be adjusted simply by varying the concentration of agarose.



The macroreticule of the agarose gel is formed by hydrogen bonds, which makes the gel thermo-reversible, thus it melts upon heating.
The hysteresis – difference between gelling and melting temperature – is greater than for any other hydrocolloid.

In addition, the absence of ionic groups makes the gel a neutral structure, thus there is no interaction with hydrophilic macromolecules which migrate through the gel mesh. The gel is an efficient sieve for these particles.

Applications

All applications for agarose take advantage of the special characteristics of the macroreticular gel. It is used as a sieve or support through which biological macromolecules such as proteins or nucleic acids can pass. Larger particles, such as viruses and subcellular fragments, are also able to move through the gel network.

Immunodiffusion
In this technique, macro-molecules migrate and are precipitated in the gel by molecular diffusion.

Electrophoresis
Agarose is suitable for the widest range of electrophoresis procedures as well as immuno-electrophoresis and electrofocusing. Driven by electrostatic fields, the macromolecules migrate through the macroreticular structure.

Gel Chromatography, Affinity Chromatography and Ion Exchange Chromatography
In these applications, the movement of macro-molecules is caused by the displacement of solvent along the gel formed in microspheres.

Supports for Biocatalysis
Agarose is derivatized and activated by organic synthesis to make supports for molecules with enzymatic activity. The capacity of gel beads as enzymatic support is much greater because enzymes can also be attached inside the beads. The structure is sufficiently open to allow the movement of coenzymes and substrates inside the gel.

Solid Culture Media
Solid or semi-solid media are used to grow plant cells and tissues. Culture media prepared with agarose (instead of agar) can be used for strict autotrophic bacteria.

Growth of Protein Crystals
The agarose gel regulates the diffusion of the protein molecules, allowing the formation of crystals suitable for crystallographic study.

There are other scientific and technical applications.

Agarose Selection Chart

	STANDARD MELTING	LOW MELTING
DNA Fragmente ≥ 1000 bp	D-1 LE (Standard-Anwendungen und Blotting) D-1 LE GQT (präparativ) D-1LE/QS D-1 ME (Standard-Anwendungen) D-2 LE (Standard-Anwendungen) D-3 (Standard-Anwendungen, PFGE) D-5 (hohe Beweglichkeit) BIOMAX F.P. DNA (DNA Typisierungen)	LM S.LM LM GQT (präparativ)
DNA Fragmente ≤ 1000 bp	MS-6 METAGEL MS-8 (hochauflösend) MS-12 (Standard-Anwendungen und Blotting)	NuGel GQT LM SIEVE (präparativ) MS-4 (hochauflösend)

General Applications

	Analytische Separation ≥ 1000 bp	Analytische Separation ≤ 1000 bp	Präparative Elektrophorese	PFGE	DNA Typisierung	Blotting	Hohe Auflösung	In-Gel Anwendungen	Kapillar-elektrophorese	Gewebe-/ Zellkulturen	Protein-elektrophorese
D-1 LE	✓				✓	✓					
D-1 ME, HE, SHE											✓
D-1 LE GQT	✓		✓		✓	✓					
D-2 LE	✓										✓
D-3	✓			✓		✓					
D-5	✓			✓							
BIOMAX	✓				✓	✓					
LM	✓										
LM GQT	✓		✓					✓			
NuGel GQT		✓	✓				✓	✓			
LM SIEVE		✓	✓				✓	✓			
S.LM									✓	✓	
E.LM									✓	✓	
MS-4		✓					✓				✓
MS-6 METAGEL		✓					✓				✓
MS-8		✓					✓				✓
MS-12		✓				✓					
F.P.DNA	✓				✓	✓					

Agarose Gels

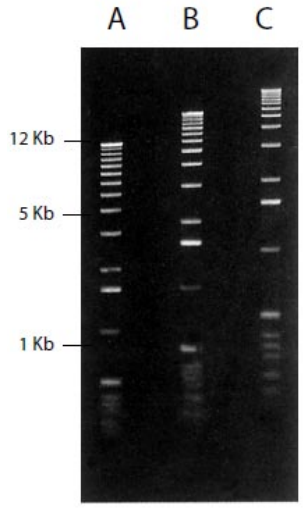
D-1 Agarose

Description

D-1 Agarose is available in 5 types: Low EEO, Medium EEO, High EEO, Special High EEO and Quick Soluble, for different uses.

Applications

- D-1 LE: with Low EEO*.
  High electrophoresis mobility
  - Nucleic acid analytical and preparative electrophoresis.
  - Blotting.
  - Protein electrophoresis such as radial immunodiffusion.
- D-1 ME: with intermediate EEO*
  - Nucleic acids electrophoresis.
  - Protein electrophoresis (serum protein and immunoelectrophoresis).
- D-1 HE: with high EEO*
  - Used in techniques such as serum protein, immunoelectrophoresis and counterimmunoelectrophoresis.
- D-1 SHE: with very high EEO*
  - For techniques that require high EEO.
  - To blend with lower EEO agarose in order to prepare agarose with desired EEO value.
- D-1 QS (Quick Soluble):
  - This type of agarose is based on the same superior performance, parameters, applications and functional tests as those of agarose.
  - An additional characteristic of this particular type of agarose is the special particle size distribution, providing an easier and faster dissolution step.



D1-LE Agarose gels in IX TAE buffer A-0.75%, B-1%, C-1.25%
Marker: 1Kb ladder.
Electrophoresis conditions: submarine gel, 2 hours 30 min, 4.5 V/cm in 1X TAE buffer.

Features

- Extraordinary mechanical resistance for more reliable
- and easier handling.
- Possibility of varying pore size in accordance with
- particle size by modifying the gel concentration.
- Easy preparation of the gel by simple dilution in aqueous
- buffers either by standard boiling or microwaving.
- Greater thermal stability due to high hysteresis
- (difference between gelling and melting temperatures).
- Excellent transparency of the gel and high visibility.
- Exceptionally low absorption of staining agents.
- Absence of toxicity (polyacrylamide is neurotoxic).

*EEO Electroendosmosis

Specifications & Functional Tests

	D-1 LE/QS	D-1 ME	D-1 HE	D-1 SHE
Moisture	≤ 10%	≤ 10%	≤ 10%	≤ 10%
Ash	≤ 0.4%	≤ 0.5%	≤ 1.0%	≤ 1.0%
EEO*	0.05-0.13	0.16-0.19	0.23-0.26	0.23-0.26
Sulfate	≤ 0,1 %	≤ 0,14%	≤ 0,2%	≤ 0,2%
Clarity 1.5 % (NTU)	≤ 3	≤ 4	≤ 4	≤ 4
Gel strength (1%) g/cm^2	≥ 1200	≥ 1000	≥ 750	≥ 750
Gel strength (1,5 %) g/cm^2	≥ 2500	≥ 2500	≥ 1200	≥ 1200
Gelling temperature (1,5 %)	36°C ± 1.5 °C	36°C ± 1.5 °C	36°C ± 1.5 °C	36°C ± 1.5 °C
Melting temperature	88°C ± 1.5 °C	88°C ± 1.5 °C	88°C ± 1.5 °C	88°C ± 1.5 °C
DNAse / RNAse activity	none detected	-	-	-
DNA resolution	fine resolved	-	-	-
Gel background	very low	-	-	-

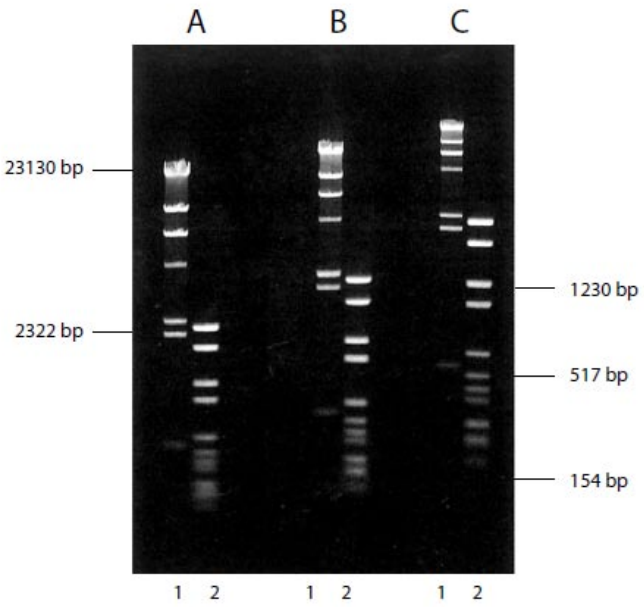
Agarose Gels

D-1 LE GQT Agarose

Description

GQT Agarose is similar to D-1 LE, a standard gelling/ melting temperature agarose with high gel strength.

This agarose is GQT (Genetic Quality Tested) which ensures that preparative electrophoresis can be performed and DNA recovered without damaging its properties and structure. D-1 LE GQT gels can be used in Molecular Biology techniques.



D1-LE Agarose gels in IX TAE buffer A-0.75%, B-1%, C-1.25%
Markers: lane 1 - Lambda DNA. HindIII. ; lane 2 - pBR328DNA.BgII+pBR328DNA. HinfI.
Electrophoresis conditions: submarine gel, 2 hours, 4.5 V/cm in 1X TAE buffer.

Features

- Extraordinary mechanical resistance for more reliable
- and easier handling.
- Possibility of varying pore size in accordance with
- particle size by modifying the gel concentration.
- Easy preparation of the gel by simple dissolution
- in aqueous buffers either by standard boiling or
- microwaving.
- Greater thermal stability due to high hysteresis.
- Excellent transparency of the gels.
- Low absorption of staining agents.
- Absence of toxicity.

Applications

- Analytical and preparative gel electrophoresis for nucleic acids ≥ 1000 bp.
- Blotting assays.
- Recovery of DNA fragments for further applications
  (enzymatic processing or cloning).

Functional Tests

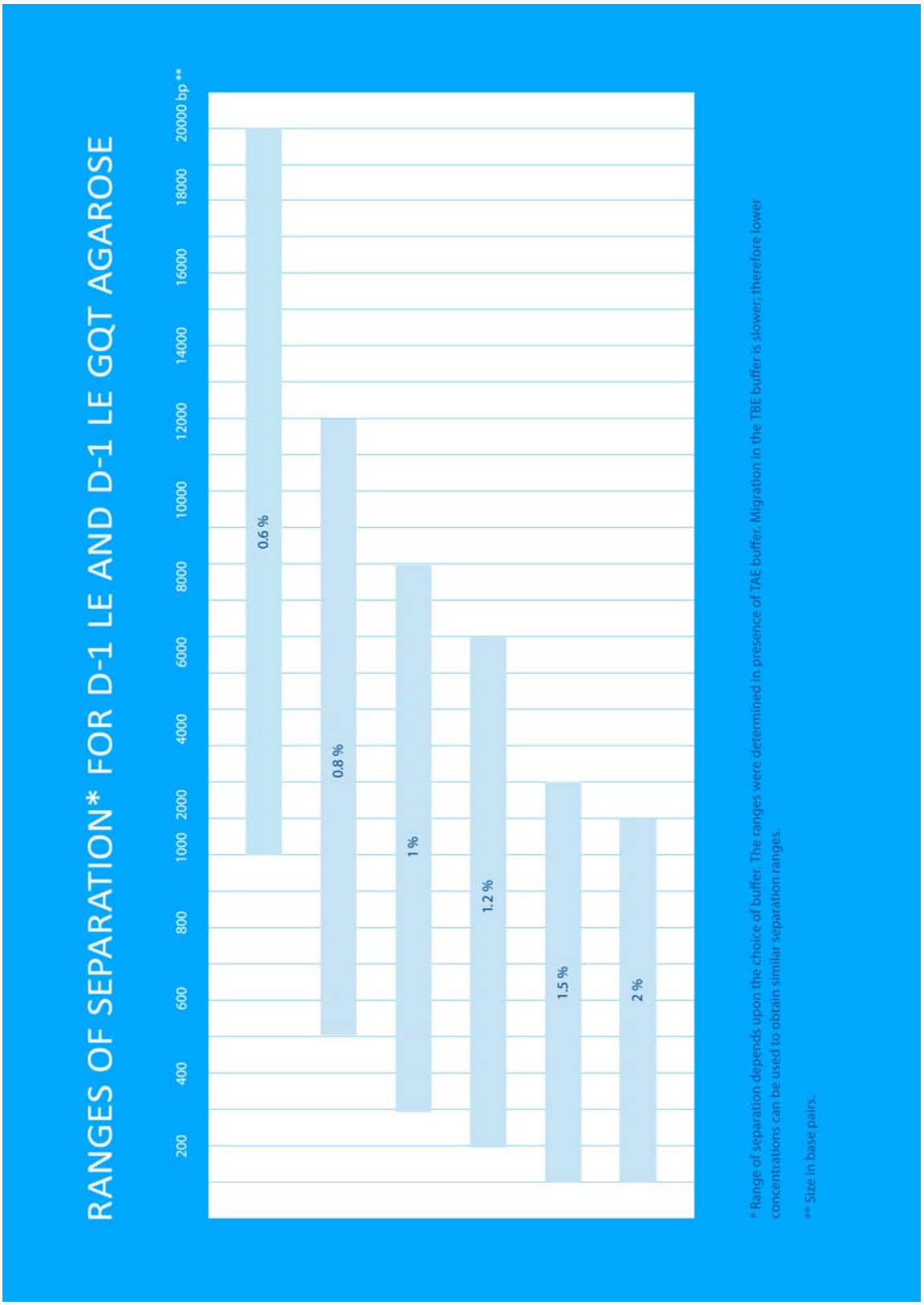
- DNA resolution: bands appear sharp and finely resolved.
- DNAse/RNAse activity: none detected.
- DNA binding: none detected.
- Gel background: very low after EtBr staining.
- Inhibition to restriction enzymes and ligase: none detected.

Specifications

Moisture	≤ 10%
Ash	≤ 0.4%
EEO (Electroendosmosis)	0.05-0.13
Sulfate	≤ 0,1 %
Clarity 1.5 % (NTU)	≤ 3
Gel strength (1%)	≥ 1200 g/cm^2
Gel strength (1,5%)	≥ 2500 g/cm^2
Gelling temperature (1,5%)	36°C ± 1.5 °C
Melting temperature	88°C ± 1.5 °C

Agarose Gels

Ranges of Separation* D-1 LE and D-1 LE GQT Agarose



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Agarose Gels

D-2 Agarose

Description

D-2 Agarose has a higher gelling temperature than D-1 Agaroses. This gives higher thermal stability to the gels.

Features

- Extraordinary mechanical resistance for more reliable and easier handling.
- Possibility of varying pore size in accordance with particle size by modifying the gel concentration.
- Easy preparation of the gel by simple dissolution in aqueous buffers either by standard boiling or microwaving.
- Greater thermal stability due to high hysteresis (difference between gelling and melting temperatures).
- Excellent transparency of the gels.
- Excellent elasticity and flexibility of the gels.
- Great capacity for derivatization and cross-linking, which allows coupling of enzymes, antigens and other substances to the gel structure.
- Exceptionally low absorption of staining agents.
- Absence of toxicity.

*EEO Electroendosmosis

Applications

D-2 LE: with low EEO

- Nucleic acid electrophoresis.
- Protein electrophoresis (immunoelectrophoresis and counterelectrophoresis).
- Preparation of agarose beads.

D-2 LE.LV: with very low viscosity

- Preparation of agarose beads, especially at very high concentrations.

Specifications & Functional Tests

	D-2 LE	D-2 LE.LV
Moisture	≤ 10%	≤ 10%
Ash	≤ 0.4%	≤ 0.5%
EEO*	0.14	0.14
Sulfate	≤ 0,2 %	≤ 0,2%
Clarity 1.5 % (NTU)	≤ 4	≤ 4
Gel strength (1%) g/cm^2	≥ 900	≥ 500
Gel strength (1.5 %) g/cm^2	≥ 1200	≥ 900
Gelling temperature (1.5%)	42°C ± 1.5 °C	41°C ± 1.5 °C
Melting temperature (1.5%)	87°C ± 1.5 °C	87°C ± 1.5 °C
Viscosity 6% (cps)		≤ 400
DNAse / RNAse activity	non detected	-
DNA resolution	finely resolved	-
Gel background	very low	-

Agarose Gele

D-3 Agarose

Description

D-3 Agarose has a very high molecular weight, much higher than other agaroses, a characteristic that results in extremely high gel strength. Gel structure and exclusion limit are similar to D-1 Agarose.

Features

- Extraordinary mechanical resistance for more reliable and easier handling.
- Possibility of varying pore size in accordance with particle size by modifying gel concentration.
- Extremely high gel strength allowing for lower gel concentrations, enabling the product to be used notonly with high molecular weight nucleic acids such as chromosomes, but also with large-sized particles such as viruses and ribosomes.
- Greater thermal stability due to high hysteresis (difference between gelling and melting temperatures).
- Excellent transparency of the gels.
- Exceptionally low absorption of staining agents.
- Absence of toxicity.
- Due to its high gel strength dissolution by autoclaving is recommended for best performance.

Applications

- Conventional electrophoresis: can be used with a broad range of particle sizes by modifying gel concentration.
- Pulsed Field Gel Electrophoresis: possible because of its high gel strength.
- Precast Electrophoresis Gel: D-3 can be dissolved by autoclaving, removing risk of bacteriological contamination.
- Agarose Beads: higher gel strength allows operation at higher pressure, permitting greater flow of liquids without damage to the beads.

*EEO Electroendosmosis

Specifications & Functional Tests

	D-3
Moisture	≤ 10%
Ash	≤ 0.4%
EEO*	0.13
Sulfate	≤ 0,1 %
Clarity 1.5 % (NTU)	≤ 4
Gel strength (1%) g/cm^2	≥ 1600
Gel strenght (1.5 %) g/cm^2	≥ 3000
Gelling temperature (1.5 %)	36°C ± 1.5 °C
Melting temperature	88°C ± 1.5 °C
DNAse / RNAse activity	None detected
DNA resolution ≥ 1000 bp	Finely resolved
Gel background	Very low

Agarose Gels

D-5 Agarose

Description

D-5 Agarose is a linear polymer with a very high molecular weight, giving gel structures unlike those of traditional agaroses. This characteristic, added to the very low sulfate content, produces a strong intercatenary interaction, yielding a gel with very high gel strength and higher exclusion limit.

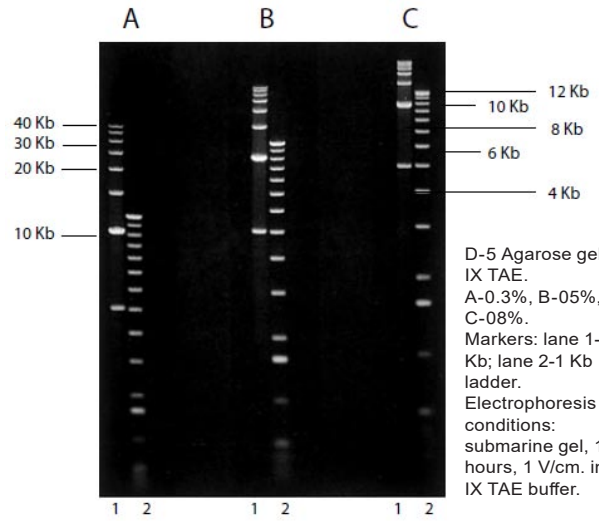
Features

- Extremely high gel strength allowing for lower gel concentrations (0.3%), enabling it to be used not only with high molecular weight nucleic acids, including chromosomes, but also with large sized particles like viruses and ribosomes.
- High electrophoretic mobility. DNA mobility is greater when compared with D-1LE. Electrophoresis times are reduced depending upon buffer and agarose concentration used.
- Easy preparation of the gel by simple dissolution in aqueous buffers either by standard boiling or microwaving.
- Greater thermal stability due to high hysteresis (difference between gelling and melting temperatures).
- Exceptionally low absorption of staining agents.
- Absence of toxicity.

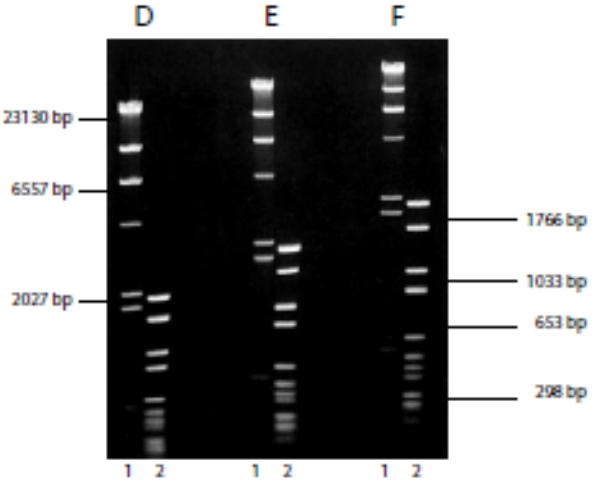
Applications

- Conventional Electrophoresis: can be used in a wide range of concentrations.
- Pulsed Field Gel Electrophoresis: because of its higher exclusion limit, larger molecules can be separated.
- Blotting.
- Agarose Beads preparation.
- Cell and enzyme immobilization.

*EEO Electroendosmosis



D-5 Agarose gels in IX TAE.
A-0.3%, B-05%, C-08%.
Markers: lane 1-5 Kb; lane 2-1 Kb ladder.
Electrophoresis conditions: submarine gel, 16 hours, 1 V/cm. in IX TAE buffer.



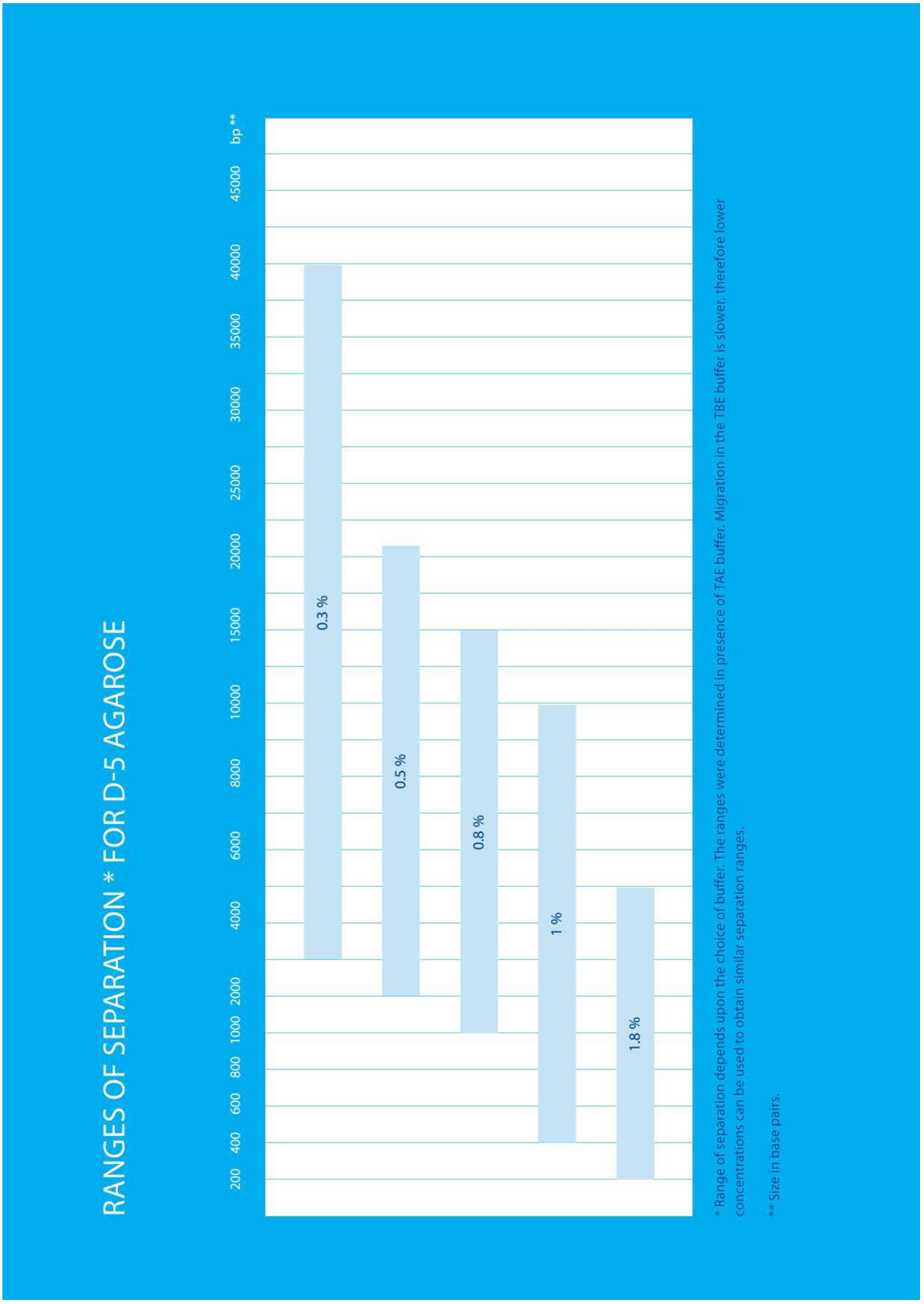
D-5 Agarose gels in IX TAE. D-0.5%, E-1%, F-1.5%.
Markers: lane 1-Lambda DNA. HindIII; lane 2-pBR328DNA BglI+pBR328DNA. HinfI.
Electrophoresis conditions: submarine gel, 2 hours, 4.5 V/cm. in 1X TAE buffer.

Specifications & Functional Tests

Moisture	≤ 10%
Ash	≤ 0.25%
EEO*	0.12
Sulfate	≤ 0,12 %
Clarity 1.5 % (NTU)	≤ 4
Gel strength (1%) g/cm^2	≥ 1800
Gel strength (1.5 %) g/cm^2	≥ 3200
Gelling temperature (1.5 %)	36°C ± 1.5 °C
Melting emperature	88°C ± 1.5 °C
DNAse / RNAse activity	None detected
DNA resolution ≥ 1000 bp	Finely resolved
Gel background	Very low

Agarose Gels

Ranges of Separation for D-5 Agarose



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Agarose Gels

BioMax Agarose

Description

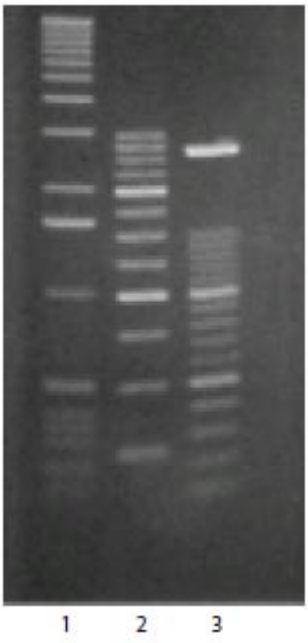
BioMax is an agarose ideal for routine rapid separation of DNA and RNA fragments as well as PCR products, the preparation of plasmids, and for screening, cloning and blotting techniques.

Features

- Easy dissolution and rapid gelling.
- Excellent transparency and low background staining gives clear band visibility.
- Sharp and well defined bands.
- Very low DNA binding.

Applications

- BioMax has high gel strength even at low concentrations, so use rates are 0.75 - 2%.
- It is effective in blotting and in separations of nucleic acid fractions from 250 bp to 23 Kb.



Markers:
Lane 1 : 1 Kb ladder,
Lane 2: 250 bp ladder,
Lane 3: 100 bp ladder

Specifications & Functional Tests

	BioMax
Ash	≤ 0.45%
Sulfate	≤ 0,15 %
Clarity 1.5 % (NTU)	≤ 4
Gel strenght (1%) g/cm^2	≥ 1000
Gel strength (1.5 %) g/cm^2	≥ 2000
Gelling temperature (1.5 %)	36°C ± 1.5 °C
Melting temperature 1.5 %	88°C ± 1.5 °C
DNAse / RNAse activity	Non detected

Agarose Gels

F. P. DNA Agarose

Description

Finger Printing DNA Agarose is a powerful tool in laboratories performing forensic testing, paternity determination, cell line verification, tissue typing, etc. F.P. DNA Agarose meets all requirements for DNA identity applications.

Features

- Low EEO.
- High gel strength, forming easy-to-handle gels.
- No DNA binding.
- No DNAse and RNAse activity.
- Clear and sharp bands.
- High efficiency transfer for DNA (blotting).
- No smearing.
- No gel background.
- No variability in agarose quality and performance between batches.

*EEO Electroendosmosis

Specifications & Functional Tests

	F.P. DNA
Moisture	≤ 10%
Ash	≤ 0.4%
EEO*	≤ 0.13
Sulfate	≤ 0.14 %
Gel strength (1%) g/cm²	≥ 1400
Gelling temperature (1.5 %) g/cm²	36°C ± 1.5 °C
Melting temperature 1.5 %	88°C ± 1.5 °C
DNAse / RNAse activity	nicht detektiert
DNA binding	nicht detektiert
DNA resolution	Clear and sharp bands produced when a 23 Kb DNA size Standard is electrophoresed transferred and probed.
DNA background	Non detected

Agarose Gels

LM Agarose

Description

Low Melting (LM) Agaroses are derivatized by organic synthesis which generates methoxylate groups from the basic agarose structure. The main properties of these agaroses are their low melting and gelling temperatures when compared with standard agaroses.

The low melting temperature allows for the recovery of undamaged nucleic acids below the denaturation temperature. The low gelling temperature ensures that the agarose will be in a liquid state at a temperature range where In-Gel manipulations can be performed without prior extraction of the DNA from the gel slice.

Features

- Lower gel strength than standard agaroses. Even so, gels can be handled easily.
- Higher clarity (gel transparency) than gels of standard agaroses.
- Greater sieving capacity.

LM Agaroses are classified in three categories, depending on the degree of derivatization. Gelling/ melting temperatures and gel strength are the most important differences.

Applications

LM (LOW MELT): with the highest gelling/melting temperatures and gel strength.
- Electrophoresis of DNA fragments ≥1000 bp.
- Tissue and cell culture.
- Viral plaque assays.

S.LM (SUPER LOW MELT): with lower gelling/melting temperatures and lower gel strength than LM.
- Capillary electrophoresis.
- Tissue and cell culture.
- Viral plaque assays.

E.LM (EXTRA LOW MELT): with lower gelling/melting temperatures and lower gel strength than S.LM.
- Capillary electrophoresis.
- Tissue and cell culture.
- Viral plaque assays.

Specifications & Functional Tests

	LM	S.LM	E.LM
Moisture	≤ 10%	≤ 10%	≤ 10%
Ash	≤ 0.4%	≤ 0.4%	≤ 0.4%
EEO*	≤ 0.12	≤ 0.13	≤ 0.13
Sulfate	≤ 0.12 %	≤ 0.14 %	≤ 0.14 %
Clarity 1.5 % (NTU)	≤ 4	≤ 4	≤ 4
Gel strength (1%) g/cm^2	≥ 500	≥ 1400	≥ 1400
Gelling temperature (1.5 %)	24 - 28 °C	≤ 20	≤ 13
Melting temperature 1.5 %	≤ 65,5 °C	≤ 62	≤ 60
DNAse / RNAse activity	None detected	None detected	None detected
DNA resolution ≥ 1000 bp	Finely resolved	-	-
Gel background	Very low	-	-

EEO* Electroendosmosis

Agarose Gels

LM GQT Agarose

Description

LM GQT Agarose is a low melting temperature agarose with the highest resolving capacity for large DNA fragments, ≥1000 bp, including PCR products. This agarose is GQT (Genetic Quality Tested) certified. This ensures that In-Gel applications can be performed in remelted agarose, avoiding difficult DNA extraction steps. LM GQT Agarose is ideal for digestion by agarose enzymes, which makes it very easy to recover large DNA fragments suitable for cloning or enzymatic processing.

Applications

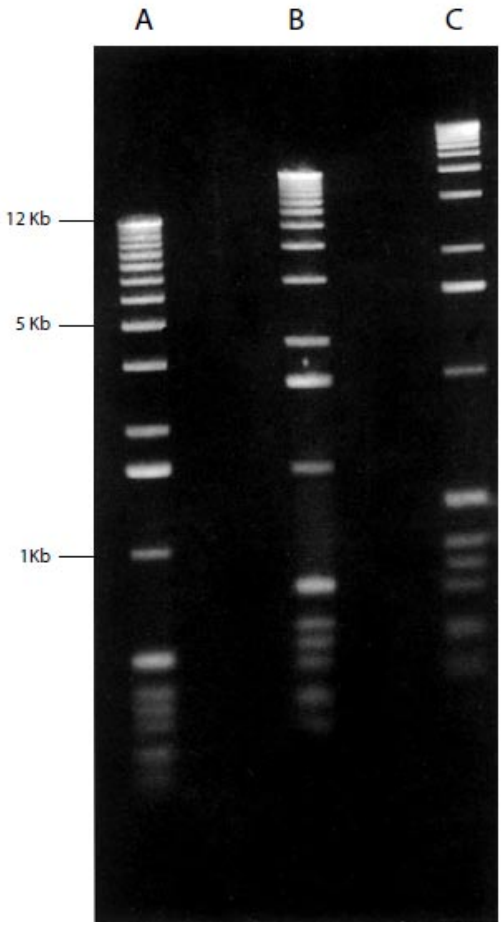
- Electrophoresis of DNA fragments ≥1000 bp.
- In-Gel enzymatic processing (digestion, ligation, PCR).
- Preparative electrophoresis.
- Analysis and recovery of large DNA fragments for further applications.

Functional Tests

- DNA resolution: bands appear sharp and finely resolved.
- DNAse/RNAse activity: none detected.
- DNA binding: none detected.
- In-Gel enzymatic processing: passes test.
- Enzymatic degradation by agarase: passes test.
- Gel background: very low after EtBr staining.

Specifications

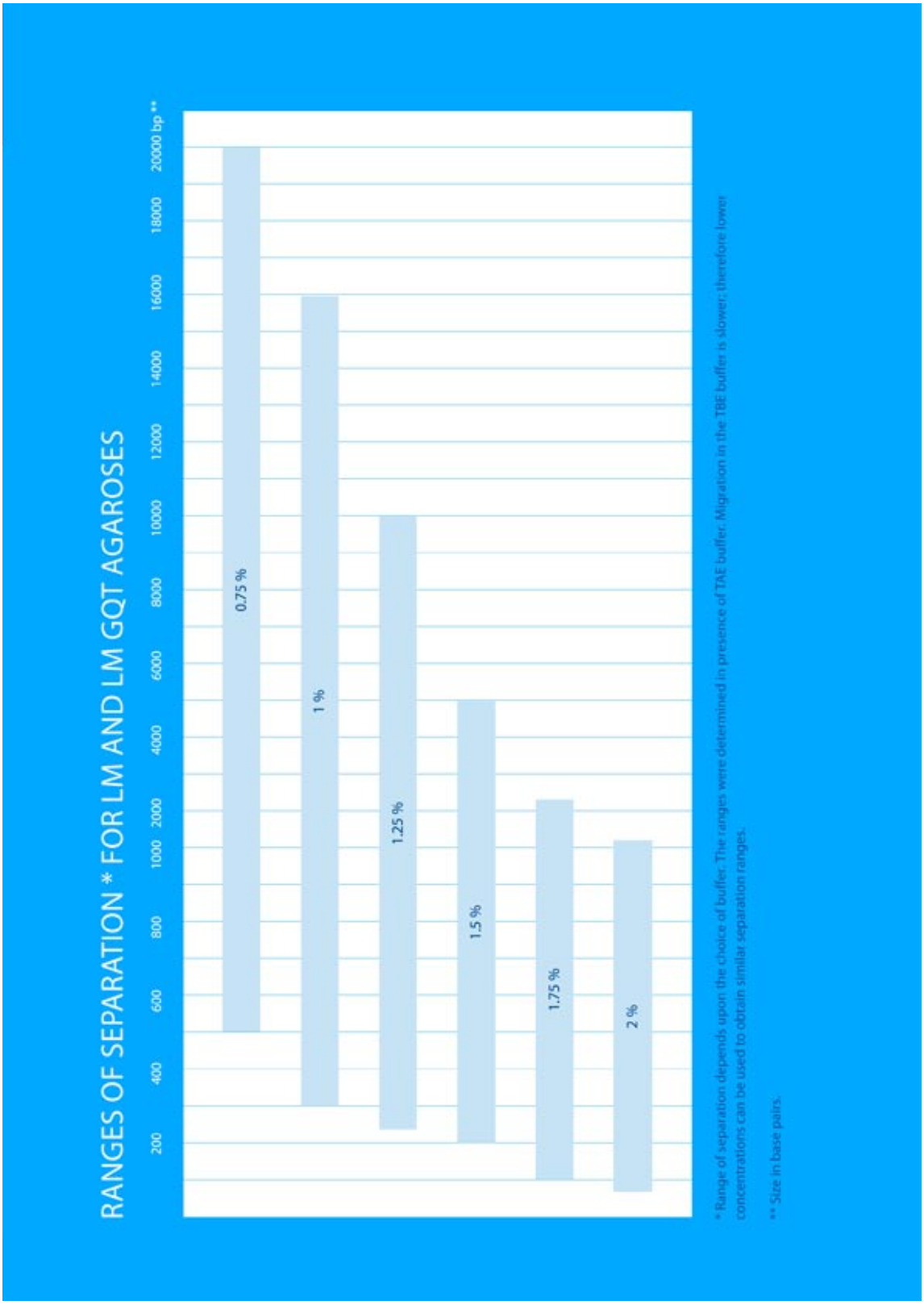
Moisture	≤ 10%
Ash	≤ 0.4%
EEO (Electroendosmosis)	≤ 0.12
Sulfate	≤ 0,1 %
Gel strength (1%)	≥ 250 g/cm^2
Gelling temperature (1.5%)	24°C - 28°C
Melting temperature 1.5% (°C)	≤ 65.5



LM GQT Agarose at different concentrations.
A-0.75%, B-1% and C-1.25%.
Marker: 1Kb ladder, 0.5 µg/lane.
Running conditions: 1X TAE buffer, 4,5V/cm, 2 hours 30 min.

Agarose Gels

Ranges of Separation for LM und LM GQT Agaroses



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Agarose Gels

NUGEL GQT Agarose

Description

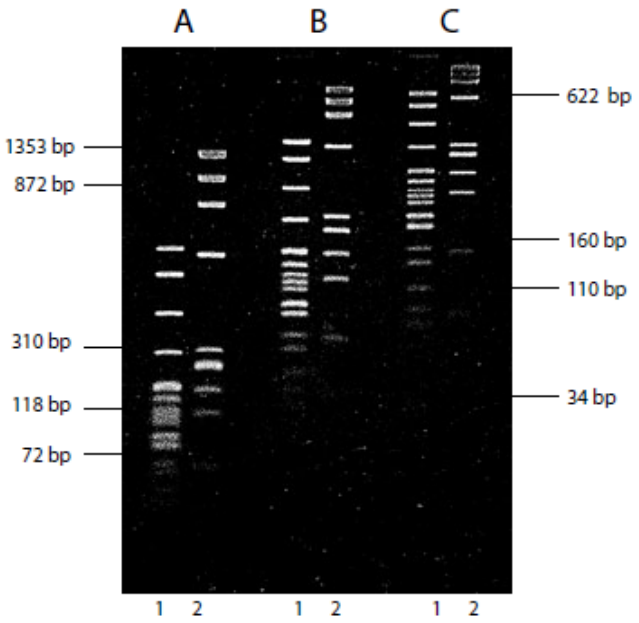
NuGel is a new low gelling/melting temperature Agarose GQT grade certified. This agarose, with high resolution capacity, finely resolves nucleic acid fragments from 50 bp to 1000 bp, especially PCR products.
Due to its low gelling/melting temperatures NuGel GQT Agarose is compatible with In-gel applications (enzymatic processing of nucleic acids directly in remelted agarose) thus, it is not necessary to recover DNA from agarose gels.
The low viscosity of NuGel GQT agarose makes it possible for gels of high concentrations, even 6%, to be prepared easily. At lower concentration (<2%) gels are fragile and difficult to handle, so special care must be taken when working. The best concentration range for easy handling is 3-6%.

Applications

- Analytical and preparative gel electrophoresis of small DNA fragments.
- In-Gel applications.

Functional Tests

- Fine resolution: DNA fragments ≤ 1000 bp.
- DNase/RNase activity: none detected.
- DNA binding: none detected.
- In-Gel enzymatic processing: passes test.
- Enzymatic degradation by agarase: passes test.
- Gel background: very low after EtBr.



NuGEL GQT Agarose gels in 1X TBE buffer. A-2%, B-3%, C-4%.
Markers: lane 1-pBR322 DNA. MspI, lane-2-ØX174 DNA.HaeIII.
Electrophoresis conditions: submarine gel, 2 hours, 4.5 V/cm. in 1X TBE buffer.

Specifications

Moisture	≤ 10%
Ash	≤ 0.45%
EEO (Electroendosmosis)	≤ 0.13
Sulfate	≤ 0,12 %
Clarity 4% (NTU)	≤ 6
Gel strength (4%)	≥ 800 g/cm²
Gelling temperature (4 %)	≤ 35 °C
Schmelzpunkt 4 %	≤ 65 °C

Agarose Gels

LM SIEVE Agarose

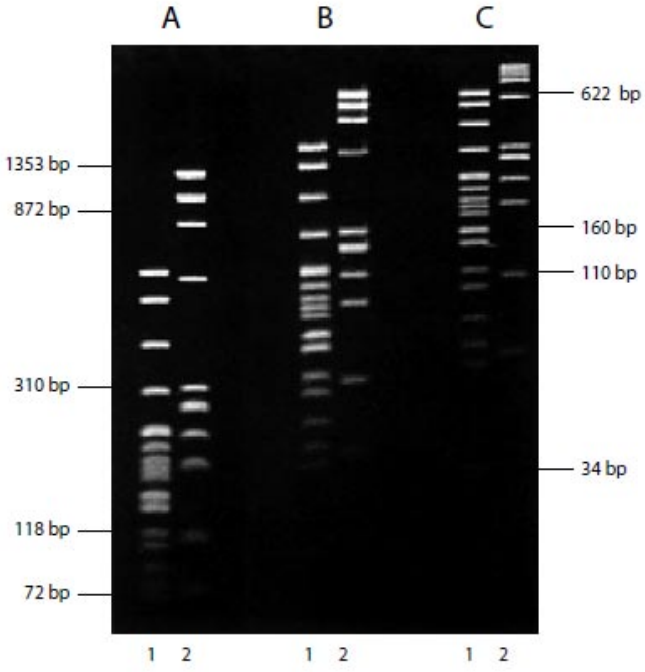
Description

LM SIEVE Agarose is a low melting temperature agarose with the highest resolving capacity for DNA fragments smaller than 1000 bp, especially PCR products ranging from 200 to 800 bp.

This agarose is GQT (Genetic Quality Tested) certified. This ensures that In-Gel applications can be performed in remelted agarose, avoiding difficult DNA extraction steps.

LM SIEVE Agarose is ideal for digestion by agarase enzymes, making it very easy to recover small DNA fragments suitable for cloning or enzymatic processing.

LM SIEVE Agarose can be used at high concentrations, forming gels with excellent clarity and a higher sieving capacity than standard melting agaroses. Due to their high gel strength, LM SIEVE Agarose gels are very easy to handle, even at concentrations as low as 2%.



LM-SIEVE Agarose gels in 1X TBE buffer A-2%, B-3%, C-4%.
Markers: lane 1 - pBR322DNA.MspI; lane 2 - øX174DNA. HaeIII.
Electrophoresis conditions: submarine gel, 2 hours 30 min., 4.5 V/cm in 1X TBE buffer

Applications

- Electrophoresis of DNA fragments ≤1000 bp.
- In-Gel enzymatic processing (digestion, ligation, PCR).
- Preparative electrophoresis.
- Analysis and recovery of small DNA fragments for further applications.

Functional Tests

- DNA resolution: bands appear sharp and finely resolved.
- DNAse/RNAse activity: none detected.
- DNA binding: none detected.
- In-Gel enzymatic processing: passes test.
- Enzymatic degradation by agarase: passes test.
- Gel background: very low after EtBr staining.

Specifications

Moisture	≤ 10%
Ash	≤ 0.3%
EEO (Electroendosmosis)	≤ 0.10
Sulfate	≤ 0,12 %
Gel strength (4%)	≥ 1000 g/cm^2
Gelling temperature (4 %)	≤ 35 °C
Melting temperature 4 %	≤ 65 °C

Agarose Gels

MS-4 Agarose

Description

A molecular screening agarose for improved resolution
of DNA fragments with 500 bp or less, especially primer–sized fragments.

At 3 % concentration, MS-4 Agarose gives a resolution of DNA fragments similar to gels made with polyacrylamide at concentrations of 8 %. While MS-4 may be dissolved carefully by microwaving, gels are best prepared by autoclaving.

Features

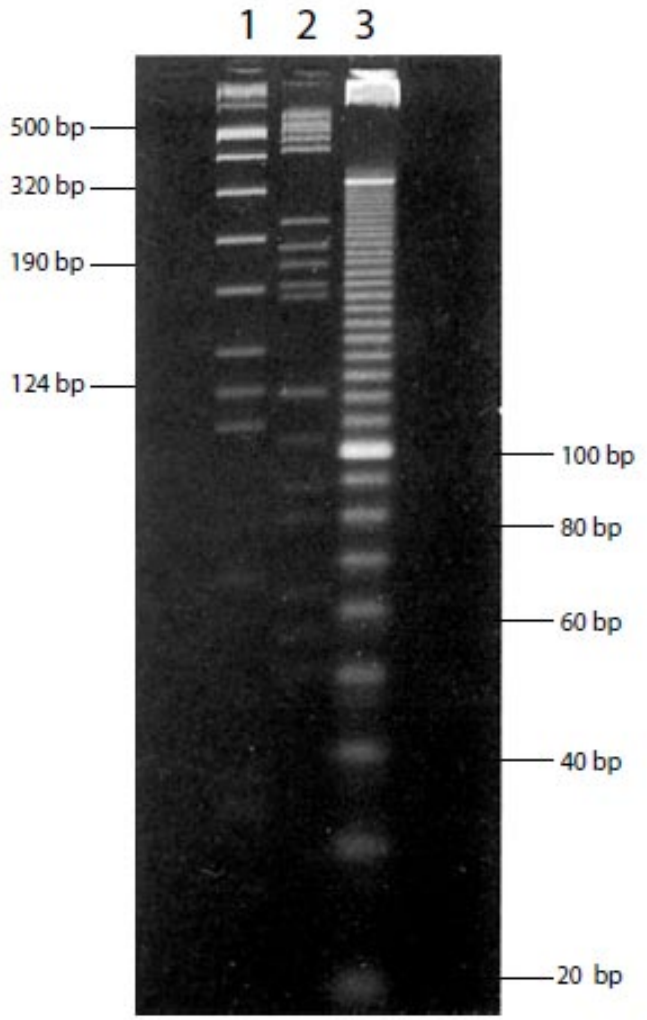
- Excellent resolution of DNA fragments lower than
  500 bp, especially smaller primer–sized fragments.
- Forms a very clear, transparent gel, even at concentrations of 5% or higher.
- Efficient mechanical handling at all concentrations.
  The chances of gels breaking or cracking when handled are greatly minimized.

Functional Tests

- DNA resolution: bands appear sharp and finely resolved.
- DNAse/RNAse activity: none detected.
- Gel background: very low after EtBr staining.
- DNA binding: very low.

Specifications

Moisture	≤ 10%
Ash	≤ 0.3%
EEO (Electroendosmosis)	≤ 0.12
Sulfate	≤ 0,11 %
Clarity (NTU)	≤ 6
Gel strength	≥ 500 g/cm² (bei 3%) ≥ 1000 g/cm² (bei 5%)
Gelling temperature	≤ 31 °C
Melting temperature	≤ 76 °C



MS-4 Agarose gel, 4% in 0.5X TBE buffer.
Markers:
lane 1- Molecular weigth marker VIII (Roche);
lane 2- Molecular weigth marker V (Roche);
lane 3-10 bp ladder.
Electrophoresis conditions: submarine gel,
2 hours 30 min., 4.5 V/cm in 0.5X TBE buffer.

Ranges of Separation

3%	80 - 500 bp
4%	30 - 300 bp
5%	10 - 200 bp

Agarose Gels

MS-6 METAGEL Agarose

Description

MS-6 Agarose is a high quality agarose specially formulated for molecular screening.
With MS-6 Agarose Hispanagar brings you an agarose with an improved efficiency resolution of small DNA fragments and PCR products.

Features

- High resolution capacity close to the resolution of polyacrylamide gels.
- Improved clarity of the gel, enhancing visualization, even at high concentrations.
- High gel strength which enables easy handling even when used at lower concentrations.

Functional Tests

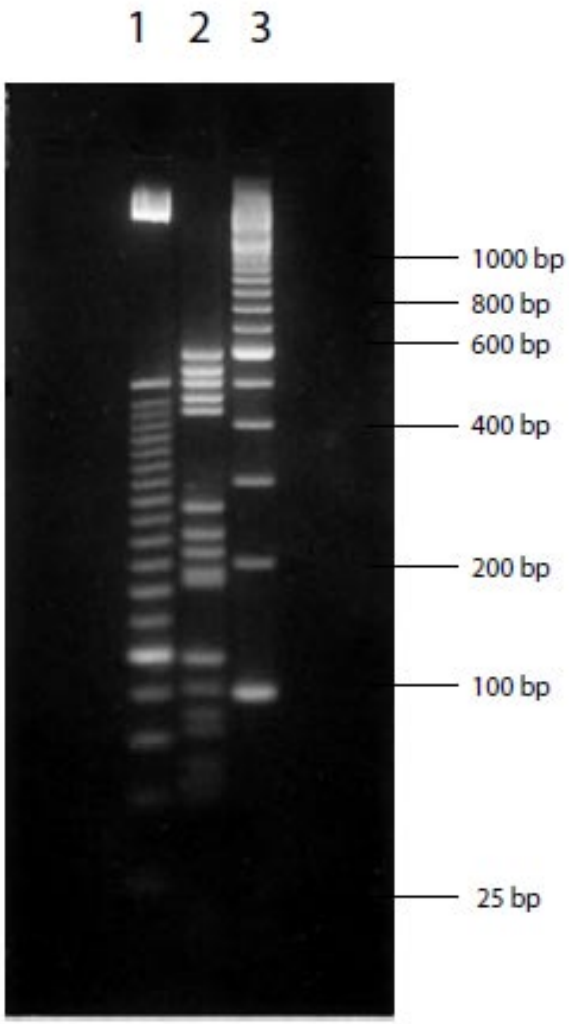
- DNA resolution: bands appear sharp and finely resolved.
- DNAse/RNAse activity: none detected.
- Gel background : very low after EtBr staining.
- DNA binding: very low.

Ranges of Separation

- 20 – 1200 bp at concentrations between 1.8 - 5% in 1X TAE buffer. To improve resolution capacity for smaller sizes TBE buffer should be used.
- To achieve the best resolution, MS-6 Agarose gels should be chilled at 4 - 8°C for 30 minutes before use.

Specifications

Moisture	≤ 10%
Ash	≤ 0.3%
EEO (Electroendosmosis)	≤ 0.12
Sulfate	≤ 0.1 %
Clarity (NTU)	≤ 4
Gel strength	≥ 800 g/cm² (bei 3%)
Gelling temperature	≤ 35 °C
Melting temperature	≤ 75 °C



MS-6 3% Agarose gel in 1X TAE buffer.
Markers: lane 1 – 25 bp ladder.; lane 2 – Molecular weight marker V (Roche).; lane 3 –100 bp ladder.
Electrophoresis conditions: submarine gel, 2h 30 min, 4.5 V/cm in 1X TAE buffer.

Agarose Gels

MS-8 METAGEL Agarose

Description

An agarose for molecular screening that improves resolution of small DNA fragments and PCR products.

The key to producing the MS (Molecular Screening) agaroses is harvesting the appropriate seaweed at precise time in its growth cycle. There are also certain modifications in the chemical structure of the polymer during the manufacturing process.
MS-8 Agarose was made for applications that require efficient separation of small DNA fragments and PCR products.

Features

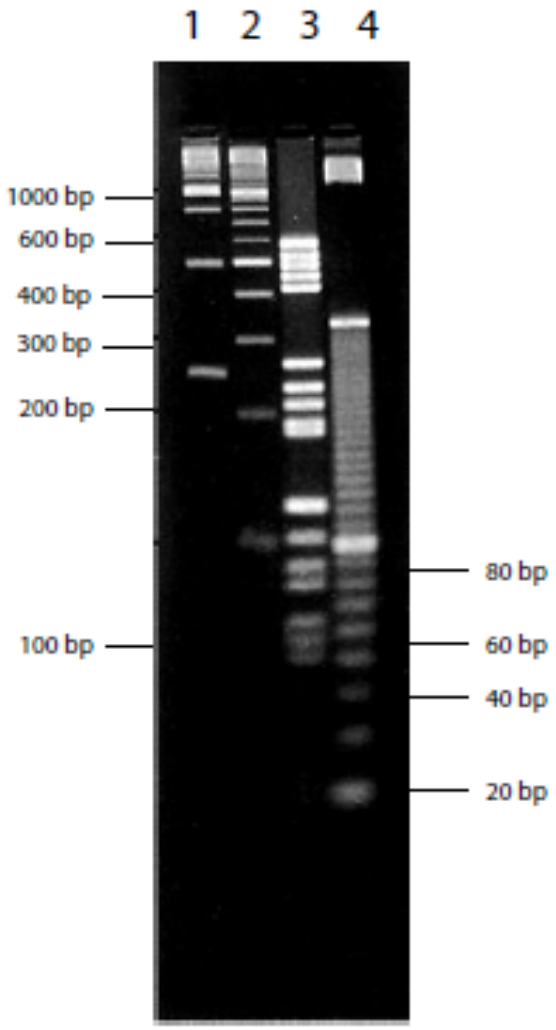
- High resolution of short PCR products and DNA fragments.
- Improved clarity of the gel, enhancing visibility.
- Better handling than competitive products because of a stronger gel structure and higher gel strength. The chances of gels breaking or cracking when handled are greatly minimized, even with lower concentrations of agarose.
- High gel strength allows use in blotting.

Functional Tests

- DNA resolution: bands appear sharp and finely resolved.
- DNAse/RNAse activity: none detected.
- Gel background: very low after EtBr staining.
- DNA binding: very low.

Specifications

		1.5%	3%
Moisture	≤ 10%		
Ash	≤ 0.35%		
EEO (Electroendosmosis)	≤ 0.12		
Sulfate	≤ 0,12 %		
Clarity (NTU)		≤ 5	
Gel strength g/cm²		≥ 600	≥ 1500
Gelling temperature °C			≤ 35.5
Melting temperature °C			≤ 80



MS-8 Agarose gel, 3% concentration in 1X TAE buffer.
Markers:
lane 1- 250 bp ladder.;
lane 2- 100 bp ladder.;
lane 3- Molecular weight marker V (Roche).;
lane 4- 10 bp ladder.
Electrophoresis conditions: submarine gel, 2 hours, 4.5 V/cm in 1X TAE buffer

Ranges of Separation

1.8%	400 - 1200 bp
3.0%	150 - 800 bp
4.5%	15 - 400 bp

These ranges are approximate and have been calculated in 1X TAE buffer.
To achieve the best resolution of MS- 8 agarose gels, they should be stored at 4° - 8° C for 30 minutes before use.

Agarose Gels

MS-12 METAGEL Agarose

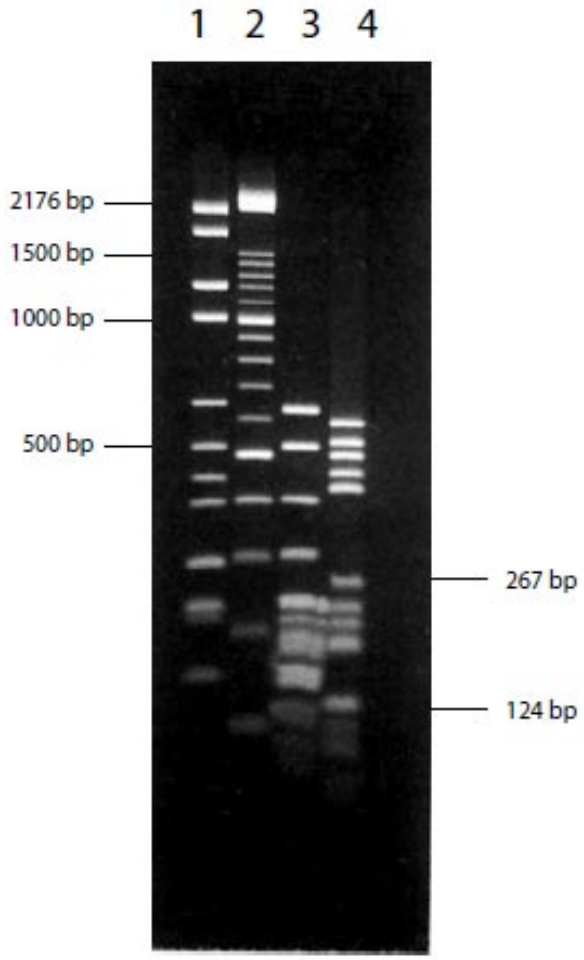
Description

This molecular screening agarose is designed to have a larger gel network than MS-8 and is recommended for use in the separation of DNA fragments smaller than 1500 bp.

Gels made with MS-12 have higher gel strength than competitive products. The gel is exceptionally firm but still flexible when handled, minimizing the danger of cracking or breaking.

MS-12 has the same melting and gelling temperature as regular agaroses, allowing faster and easier preparation of gels. MS-12 also gives excellent resolution at concentrations of ≤1 %.

MS-12 Agarose is recommended for all analytical applications, especially when DNA is recovered for subsequent use in enzymatic procedures.



MS-12 Agarose gel, 2% concentration in 0.5X TBE buffer.
Markers:
lane 1- pBR328DNA. BgII+pBR328DNA. HinfI.;
lane 2 - 100 bp ladder.;
lane 3 - pBR322DNA. MspI.;
lane 4 - Molecular weight marker V (Roche).
Electrophoresis conditions: submarine gel, 2 hours, 4.5 V/cm in 0.5X TBE buffer.

Functional Tests

- DNA resolution: bands appear sharp and finely resolved.
- DNAse/RNAse activity: none detected.
- Gel background: very low after EtBr staining.
- Blotting: very good transference for DNA fragments 154 – 2176 bp in 4 % gels.
- DNA binding: very low.

Specifications

		1.5%	4%
Moisture	≤ 10%		
Ash	≤ 0.35%		
EEO (Electroendosmosis)	≤ 0.12		
Sulfate	≤ 0,11 %		
Clarity (NTU)		≤ 5	
Gel strength g/cm²		≥ 2000	≥ 4200
Gelling temperature °C			≤ 40
Melting temperature °C			≤ 93

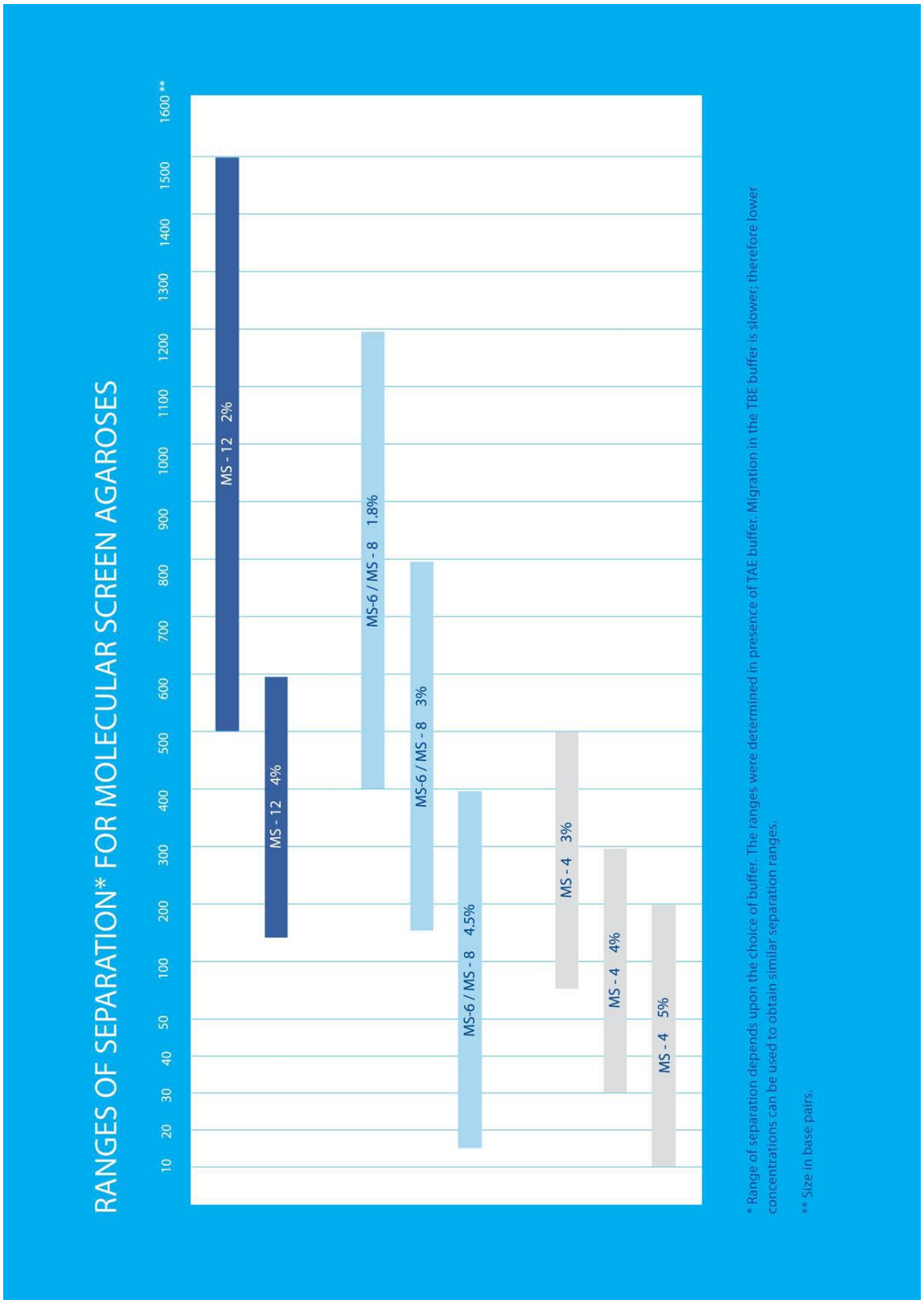
Ranges of Separation

2%	500 - 1500 bp
4%	150 - 600 bp

These ranges are approximate and have been calculated in 1X TAE buffer.

Agarose Gels

Ranges of Separations for Molecular Screen Agaroses



EP_027_E 12/2019 Subject to technical changes and errors.