BioDynamics Laboratory Inc.

Research Use Only

Molecular Biology Product Catalog

miRNA Cloning Kit

miRNA Fractionation Kit

DNA Ligation Kit

Prestained RNA Marker

Prestained DNA Marker

Prestained Protein Marker

DNA Detection Kit under Visible Light

RNA Detection Solution under Visible Light

Rapid Protein Staining Solution

Alkaline Phosphatase

and more•••

Funakoshi

Contents

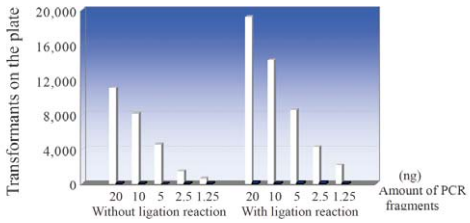
High Efficient PCR Cloning Kit

Hetero-Stagger PCR Cloning Kit, DynaExpress

TA cloning of PCR product is known as a much less efficient cloning method than cohesive end and blunt end cloning method. DynaExpress Hetero-Stagger PCR Cloning Kit enables highly efficient and fast cloning of PCR products. This novel method does not require any enzymatic procedures such as restriction enzyme, ligase, exonuclease, uracil DNA glycosylase and Cre-*loxP* recombinase reactions.

Instead, the method requires 2 PCR reactions. The PCR reactions are set up to generate 2 PCR products containing different extra terminal sequences. The products and a compatible vector harboring 9 bases single-strand extensions with complementary sequences, pHST, are mixed, heat-denatured and annealed to form a heteroduplex product. Ligation reaction is not required, because the complementary extension of the vector and the insert are so long. The mixture of annealed vector and the PCR products can be used directly for the transformation of chemical competent cells.

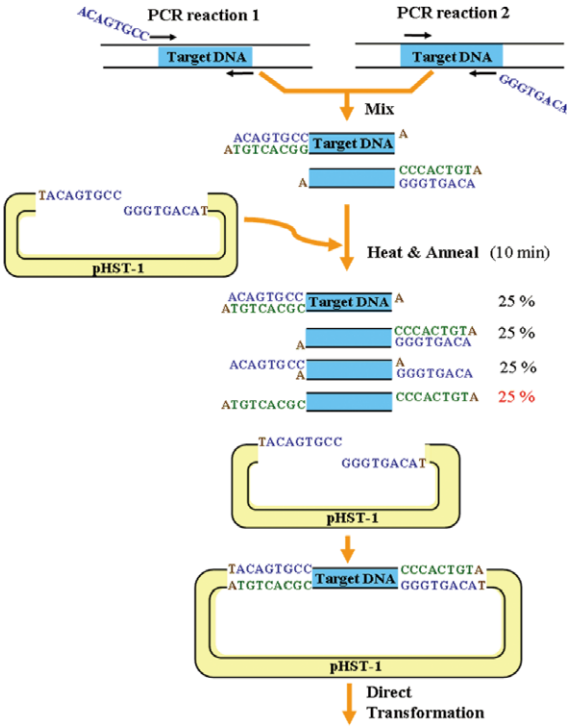
- High ligation efficiency.
- Simple procedure (mix, heat and anneal).
- Does not require any enzymatic reactions.
- Direct use for transformation after annealing.
- Choice of insert orientation.
- Applicable to both proofreading and non-proofreading DNA polymerase.
- Total time from PCR product to plating is just one and a half hours.



Example of the cloning experiment by using the kit

Several amounts of about 1 kb PCR fragments were cloned according to the standard protocol using the DynaExpress Hetero-Stagger PCR Cloning Kit. Half amounts of the transformed competent cells (150 μl) were spread onto LB agar plates. The white bars and the blue bars show the numbers of white colonies and blue colonies, respectively. There are few blue colonies!

Brief Procedure



Kit Components

- pHST-1 vector, linearized
- pHST reverse sequence primer
- pHST forward sequence primer
- Annealing buffer
- Ligase mixture*

* Ligase mixture may be added, alternatively, to the annealing mixture and incubated to make covalently linked recombinant molecules. The efficiency of the transformant is increased up to about two times.

1. 2 PCR primers contain 8 or 9 extra bases at the 5' ends depending on non-proofreading or proofreading thermostable DNA polymerase. The other 2 primers have no extra bases. 2 PCR reactions are set up to generate 2 PCR products containing different extra terminal sequences.
2. Perform the 2 separate PCR reactions to produce 2 PCR products.
3. Set up the annealing mixture and heat to 95℃ for 5 min and cool gradually to room temperature for 5 min.
4. Transform chemically competent *E. coli* cells (for example, JM109) with the annealing mixture directly.

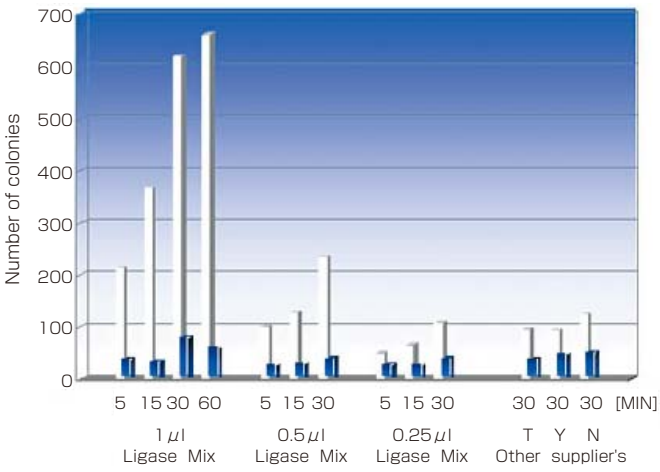
Product Name	Code	Unit
Hetero-Stagger PCR Cloning Kit, DynaExpress (20 reactions) Size : 20 reactions	DS158	1 kit

High Efficient DNA Ligation Kit

DNA Ligation Kit ver.2, DynaExpress

DNA Ligation Kit ver.2 enables highly efficient ligation of cohesive or blunt end DNA fragments within 5-30 minutes at 16℃ -25℃ . Simple ligation reaction can be started by adding 2 × Ligation Buffer and Ligase Mixture to a mixture of vector and insert DNA solution. The ligation reaction mixture can be used directly to the transformation of chemically competent cells.

- High ligation efficiency.
- Simple and quick procedure.
- Use ligation mixture for transformation directly after ligation reaction.



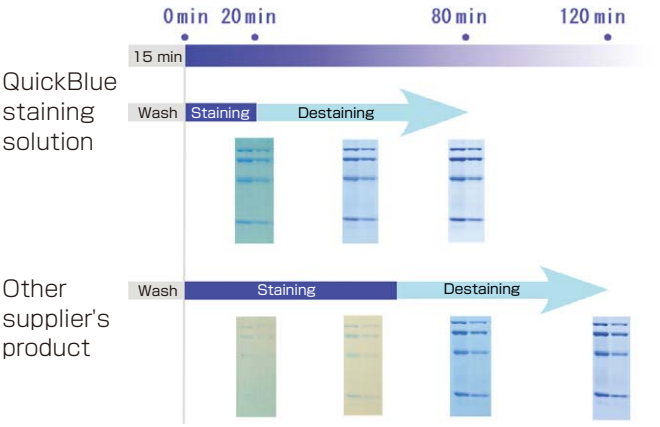
DynaExpress DNA Ligation Kit

Product Name	Code	Unit
DNA Ligation Kit, Version 2, Mini, DynaExpress (10-40 reactions) Size : 10-40 reactions Kit Components : 2 × Ligation Buffer 400 μl, Ligation Mixture 10 μl	DS105	1 kit
DNA Ligation Kit, Version 2, DynaExpress (50-200 reactions) Size : 50-200 reactions Kit Components : 2 × Ligation Buffer 500 μl × 4, Ligation Mixture 50 μl × 1	DS110	1 kit
DNA Ligation Kit, Version 2, Large, DynaExpress (250-1,000 reactions) Size : 250-1000 reactions Kit Components : 2 × Ligation Buffer 500 μl × 20, Ligation Mixture 50 μl × 5	DS115	1 kit

Rapid Protein Staining in Polyacrylamide Gel

QuickBlue Staining Solution

- All processes, including washing and destaining, can be performed within approximately 90 minutes.
- Protein bands on the gel in QuickBlue Staining Solution will be visible after several minutes of staining.
- Detection limit is larger than 8 ng of protein (BSA).
- Only deionized water is required for washing and destaining.



Product Name	Code	Unit
QuickBlue Staining Solution Size : 500 ml (about 20 mini gels, 8 × 10 cm, 1 mm thick)	DS500	500 ml

Alkaline Phosphatase from psychrophilic bacterium

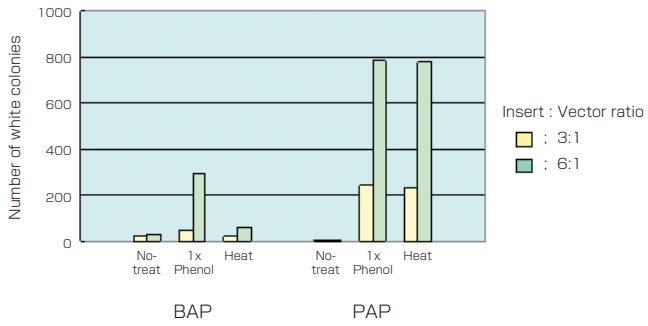
Alkaline phosphatase from the psychrophilic strain *Shewanella* sp. SIB1 (PAP) has both merits of BAP and CIAP.

- Alkaline phosphatase from the psychrophilic strain *Shewanella* sp. SIB1 (PAP) can be easily heat inactivated as SAP and CIAP. BAP cannot be easily inactivated even by phenol extraction.
- The enzyme can easily remove phosphate from not only protruding 3'-end but also blunt end or recessed 5'-end at 60℃ for 30 min, because the activity of the enzyme at 60℃ is about four times higher than that at 37℃. (In contrast, SAP and CIAP are rapidly inactivated at 60℃.)

Advantages of PAP

While BAP is hard to be inactivated, PAP is easily inactivated by heat.

As shown in the figure below, PAP treatment produces a larger number of white colonies on plates than BAP treatment after transformation. Because active BAP still remains the activity after inactivation treatments, it removes phosphate of insert DNA during the ligation reaction and results in decrease of the ligation efficiency. The experiment shows that PAP is easily inactivated before ligation but not BAP. In order to get sufficient amount of white colonies after BAP treatment, insert DNA must be added at high insert : vector ratio in ligation reaction to overcome surviving BAP or more than two times of phenol extraction must be carried out to remove BAP sufficiently.



1 μg of the *Eco*R I cleaved pBluescript SK (+) vector was dephosphorylated by 0.5 unit of BAP or 5 units of PAP at 37℃. After dephosphorylation, the reaction mixtures were treated as follows.

1. **No-treatment:** The reaction mixtures were directly used for ligation reaction.
2. **Phenol:** Equal volume of phenol was added to the reaction mixtures and vortexed for 30 seconds. Then the mixtures were extracted by ether, and precipitated with ethanol. The precipitates were dried up, dissolved in dH_2O and used for ligation reaction.
3. **Heat:** The reaction mixtures were heated at 95℃ for 5 min for PAP, or at 100℃ for 5 min for BAP. These were directly used for ligation reaction.

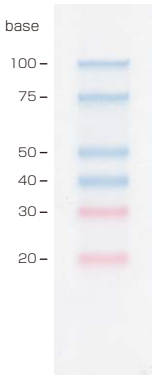
After above treatments, *Eco*R I cleaved, dephosphorylated pBluescript SK (+) vector was ligated to a 1kb insert DNA fragment. Competent cells of XL1-Blue were transformed with the ligation products. The number of white colonies was shown in the figure.

Product Name		Code	Unit
Alkaline Phosphatase, *Shewanella* sp. SIB1, Recombinant <PAP>	1,000 units	DE110	1 set
Alkaline Phosphatase, *Shewanella* sp. SIB1, Recombinant <PAP>	5 × 1,000 units	DE112	1 set

Prestain Marker for Small RNA Plus, DynaMarker™

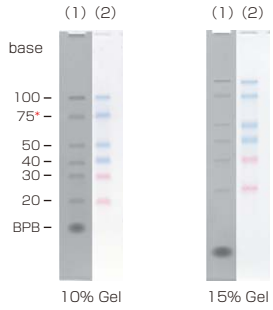
The DynaMarker™ Prestain Marker series for Small RNA are pre-stained molecular weight markers for small size RNA. They are suitable for monitoring denaturing polyacrylamide gel electrophoresis and transferring onto the membranes.

- Migration of each band in this marker matches that of 20, 30, 40, 50, 75 and 100 bases unstained RNAs with 95% accuracy.
- These pre-stained markers are suitable for monitoring denaturing polyacrylamide gel electrophoresis and for blotting onto the membranes.
- These markers are highly visible indicators with dual colors of blue and red.
- These markers are ready-to-use mixture. They don't require heat treatment or any denaturing agents.



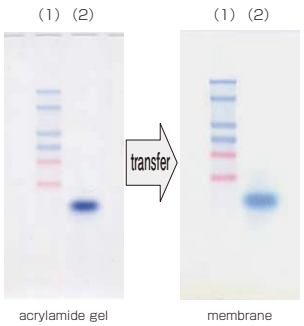
DynaMarker™ Prestain Marker for Small RNA Plus
Electrophoresis profile of DynaMarker™ Prestain Marker for Small RNA Plus (5 μl) on 10% acrylamide containing 7.5 M urea gel with 1× TBE buffer as running buffer.

The DynaMarker™ Prestain Marker series for Small RNA are unique products. They consist of colored single-stranded nucleic acids. The apparent molecular weight of bands in DynaMarker™ Prestain Marker for Small RNA series are in excellent agreement with sizes of unstained RNAs of 20, 30, 40, 50, 75 and 100 bases in length (about 95% accuracy).



Electrophoresis profile of DynaMarker™ Small RNA Ⅱ (see p.10) + 75 base RNA* (1) and DynaMarker™ Prestain Marker for Small RNA Plus (2) on 10% and 15% acrylamide containing 7.5 M urea gel/1× TBE.

* 75 base RNA is from a newly synthesized RNA. A 75 base RNA is not included in DynaMarker™ Small RNA Ⅱ.



Left: Electrophoresis profile of DynaMarker™ Prestain Marker for Small RNA Plus (1) and RNA sample (2) on 10% acrylamide containing 7.5 M urea gel/1× TBE.

Right: Blotting of (1) and (2) onto the nylon membrane.

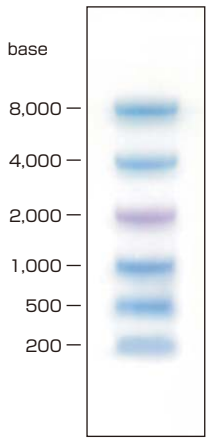
Product Name	Code	Unit
Prestain Marker for Small RNA Plus, DynaMarker (30 loadings)	DM253	150 μl

Prestained Size Marker for Large Size RNA

Prestain Marker for RNA High, DynaMarker™

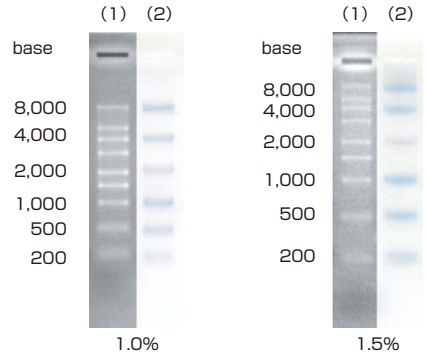
The DynaMarker™ Prestain Marker for RNA High is a pre-stained molecular weight marker for large size RNAs, and is suitable for denaturing agarose gel electrophoresis and blotting onto membrane.

- A migration of this marker is about 90% accuracy.
- This marker is a highly visible indicator with dual colors of blue and purple.
- This marker is ready-to-use mixture. It doesn't require heat treatment or denaturing agents.

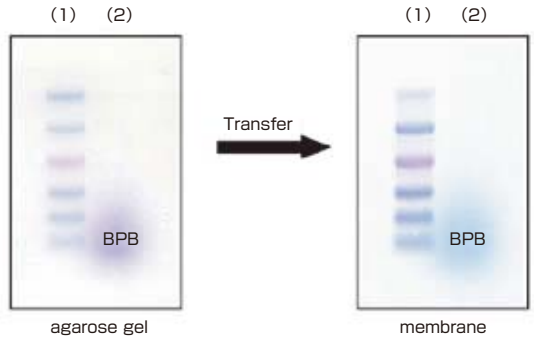


Electrophoresis profile of DynaMarker™ Prestain Marker for RNA High (6 μl) on 0.8% agarose-2.2 M formaldehyde gel/1 × MOPS buffer as running buffer.

The DynaMarker™ Prestain Marker for RNA High is a terrific tool for RNA research. This marker consists of 6 colored nucleic acids with the apparent molecular weights of 200, 500, 1,000, 2,000, 4,000 and 8,000 bases of RNAs. As the colored bands are made from nucleic acid chains, these behaviors in electrophoresis are similar to those of nucleic acids, but not to those of small molecular dyes such as Bromophenol blue and Xylenecyanol in sharpness and molecular weight accuracy. The DynaMarker™ Prestain Marker for RNA High is suitable for monitoring electrophoresis and blotting onto the membrane.



Electrophoresis profile of DynaMarker™ RNA High (1) and DynaMarker™ Prestain Marker for RNA High (2) on 1.0% and 1.5% agarose-2.2 M formaldehyde gel/1× MOPS buffer as running buffer.



Left: Electrophoresis profile of DynaMarker™ Prestain Marker for RNA High (1) and RNA sample (2) on 0.8% agarose-2.2 M formaldehyde gel/1× MOPS buffer as running buffer.

Right: Blotting of (1) and (2) onto nylon the membrane.

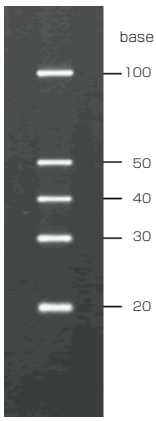
Product Name	Code	Unit
Prestain Marker for RNA High, DynaMarker (15 loadings)	DM260S	90 μl
Prestain Marker for RNA High, DynaMarker (30 loadings)	DM260	180 μl

for Small RNA Research

Small RNA Ⅱ, DynaMarker™

DynaMarker™ Small RNA Ⅱ is a single-stranded RNA (ssRNA) molecular weight marker.
Suitable for size determination of small RNA on denaturing-polyacrylamide gel electrophoresis.

- Contains 5 ssRNAs (20, 30, 40, 50 and 100 bases).
- Useful for analyzing siRNA and miRNA.
- Each band was highly purified to give high resolution on denaturing-polyacrylamide gel electrophoresis.



DynaMarker™ Small RNA Ⅱ
Electrophoresis profile of DynaMarker™ Small RNA Ⅱ (1 μl) on 12.5% of acrylamide, 7.5 M urea gel with 1 × TBE buffer as running buffer

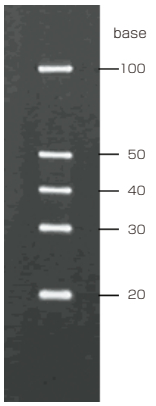
Product Name		Code	Unit
Small RNA Ⅱ, DynaMarker Size : 30 μl (30 loadings)	−80℃	DM192	1 set

for Small RNA Research

Small RNA Ⅱ Easy Load, DynaMarker™

DynaMarker™ Small RNA Ⅱ Easy Load is a ready-to-use (mixed with loading buffer) single-stranded RNA molecular weight marker for small-size RNAs.

- Contains 5 ssRNAs (20, 30, 40, 50 and 100 bases).
- Useful for analyzing siRNA and miRNA.
- Each band was highly purified to give high resolution on denaturing-polyacrylamide gel electrophoresis.
- RNA Loading Buffer PA is provided for easy sample preparation to run RNA samples on a denaturing polyacrylamide gel electrophoresis.



DynaMarker™
Small RNA Ⅱ Easy Load
Electrophoresis profile of DynaMarker™ Small RNA Ⅱ Easy Load (5 μl) on 12.5% of acrylamide, 7.5 M urea gel with 1 × TBE buffer as running buffer

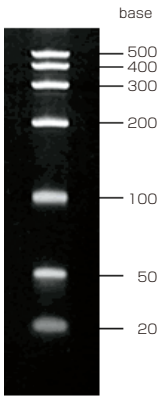
Product Name		Code	Unit
Small RNA Ⅱ Easy Load, DynaMarker Size : 125 μl about 25 loadings Kit Component : RNA Loading Buffer PA	−80℃	DM197	1 set

High Quality RNA Size Marker

RNA Low Ⅱ, DynaMarker™

Suitable for size determination of single-stranded RNAs in denaturing polyacrylamide gel electrophoresis

- 7 discrete fragments for easy recognition of RNA sizes: 20, 50, 100, 200, 300, 400, 500 bases.
- Approximately equal mass of RNA in each band assist to estimate mass of RNA in samples.
  The concentration of each RNA (20-500 bases) in the marker is approximately 0.1 μg/μl.
- Convenient 20-bases RNA for analysis of siRNA.



DynaMarker™ RNA Low Ⅱ
Electrophoresis profile of DynaMarker™ RNA Low Ⅱ (0.7 μg) on 5% of acrylamide, 8 M urea gel with 1 × TBE buffer as running buffer

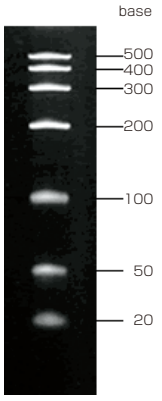
Product Name		Code	Unit
RNA Low Ⅱ, DynaMarker	−80℃	DM152	50 μg
Size : 50 μg/72 μl (in TE buffer)			

High Quality RNA Size Marker

RNA Low Ⅱ Easy Load, DynaMarker™

Ready-to-load DynaMarker™ RNA Low Ⅱ for denaturing polyacrylamide gel electrophoresis

- Ready-to-load RNA marker consists of 7 discrete fragments for easy recognition of RNA sizes: 20, 50, 100, 200, 300, 400, 500 bases.
- The concentration of each RNA in the marker is approximately 0.1 μg/5 μl (2.5-5 μl is recommended for loading to a well).
- RNA Loading Buffer PA is provided for easy sample preparation to run RNA samples on a denaturing polyacrylamide gel electrophoresis.



DynaMarker™ RNA Low Ⅱ Easy Load
Electrophoresis profile of DynaMarker™ RNA Low Ⅱ Easy Load (5 μl) on 5% of acrylamide, 8 M urea gel with 1 × TBE buffer as running buffer

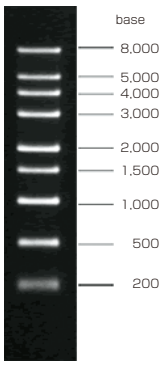
Product Name		Code	Unit
RNA Low Ⅱ Easy Load, DynaMarker	−80℃	DM157	1 set
Size : 25 μg/125 μl Kit Component : RNA Loading Buffer PA			

High Quality RNA Size Marker

RNA High, DynaMarker™

Suitable for size determination of single-stranded RNAs in denaturing agarose gel electrophoresis

- 9 discrete fragments for easy recognition of RNA sizes: 200, 500, 1,000, 1,500, 2,000, 3,000, 4,000, 5,000, 8,000 bases.
- Approximately equal mass of RNA in each band assists to estimate mass of RNA in samples.
  The concentration of each RNA (200-8,000 bases) in the marker is approximately 0.1 μg/μl.



DynaMarker™ RNA High
Electrophoresis profile of DynaMarker™ RNA High (0.9 μg) on formaldehyde-agarose (1%) gel

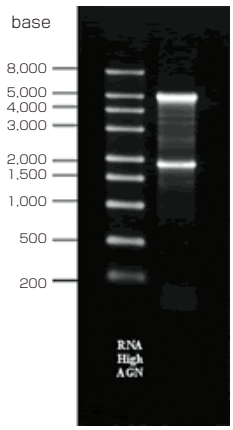
Product Name		Code	Unit
RNA High, DynaMarker	−80℃	DM160	50 μg
Size : 50 μg/56 μl (in TE buffer)			

Suitable for Electrophoresis of Non-denaturing Agarose Gel

RNA Easy Measurment N, DynaMarker™

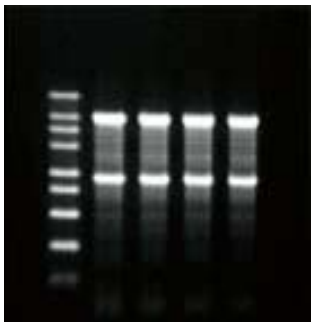
DynaMarker™ RNA Easy Measurement N enables easy measurement of RNA size on electrophoresis of non-denaturing agarose gel as well as on denaturing agarose gel.

- DynaMarker™ RNA High AGN consists of 9 discrete RNA fragments for easy recognition of RNA sizes and estimation of RNA mass: 200, 500, 1,000, 1,500, 2,000, 3,000, 4,000, 5,000, 8,000 bases.
- The concentration of each RNA (200-8,000 bases) in DynaMarker™ RNA High AGN is approximately 0.1 μg/μl.
- RNA Loading Buffer AG is provided for easy RNA preparation, which enables RNA electrophoresis on non-denaturing agarose gel (1X TAE, 0.5X TBE) as well as on denaturing agarose gel.



DynaMarker™ RNA Easy Measurment N
Electrophoresis profile of DynaMarker™ RNA High AGN on formaldehyde-agarose (1%) gel.
Left lane : 0.45 μg of DynaMarker™ RNA High AGN
Right lane : 0.4 μg of Human Total RNA

Denaturing agarose gel



Non-denaturing agarose gel

DynaMarker™ RNA High AGN (0.45 μg/well) and Human Total RNA (0.4 μg/well) were electrophoresed on denaturing agarose gel (left) and on non-denaturing agarose gel (right).

Product Name		Code	Unit
RNA Easy Measurement N, DynaMarker	−80℃	DM170	1 set
Size : about 25 loadings 25 μg, 0.9 mg/ml			
Kit Components : DynaMarker™ RNA High AGN (0.9 mg/ml), RNA Loading Buffer AG+ (1 ml)			

Detection of RNA Size Markers on Northen Hybridization

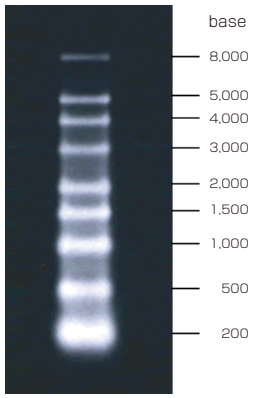
DNA Fragments for DynaMarker™ RNA High Probe

DNA fragments for DynaMarker™ RNA High Probe is useful for detection of DynaMarker™ RNA High (#DM160) and DynaMarker™ RNA High AGN (in DynaMarker™ RNA Easy Measurement N, #DM170) on hybridization.

- Detects all RNA bands of DynaMarker™ RNA High (#DM160) and DynaMarker™ RNA High AGN (in DynaMarker™ RNA Easy Measurement N, #DM170).
- Useful for generating radioisotope end labeled probes and non-radioisotope labeled probes.
- Contains 5' phosphorylated dsDNA fragments (5'-protruding ends) between 170-200 bp.

Northen hybridization with DNA fragments for DynaMarker™ RNA High Probe
DynaMarker™ RNA High was electrophoresed in formaldehyde-agarose (1%) gel and transferred onto nylon membrane. DNA fragments for DynaMarker™ RNA High Probe were labeled by non-radioisotope method and hybridized on the nylon membrane. After washing the blot, it was reacted with chemiluminescence substrate. Signal was exposed to a high speed film.

Profile of hybridization



Product Name	Code	Unit
DNA Fragments for DynaMarker, RNA High Probe	DM173	5 μg
Size : 5 μg/50 μl		

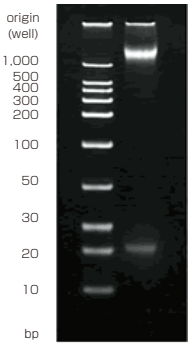
dsRNA Size Markers for Non-Denaturing Gel Electrophoresis

dsRNA, DynaMarker™

Suitable for size determination of double-stranded RNAs in non-denaturing polyacrylamide gel electrophoresis

- 10 discrete fragments for easy recognition of double-stranded RNA sizes: 10, 20, 30, 50, 100, 200, 300, 400, 500, 1,000 bp.
- The concentration of 20 bp dsRNA is adjusted to approximately 25 ng/μl.
  2 μl of DynaMarker™ dsRNA contains about 50 ng (sufficient to detect the band of 20 bp dsRNA). It is convenient for siRNA analysis.
- Product insert includes a protocol for dsRNA electrophoresis.

DynaMarker™ dsRNA
Electrophoresis profile of DynaMarker™ dsRNA (0.5 μg).
Left lane, dsRNA digested by dicer
Right lane, on 7.5% of acrylamide, 1 × TBE buffer as running buffer



Product Name		Code	Unit
dsRNA, DynaMarker	−80℃	DM180	25 μg
Size : 25 μg/100 μl, 0.25 mg/ml			

dsRNA Size Markers for Non-Denaturing Gel Electrophoresis

dsRNA Easy Load, DynaMarker™

Ready-to-load DynaMarker™ dsRNA for non-denaturing polyacrylamide gel electrophoresis.

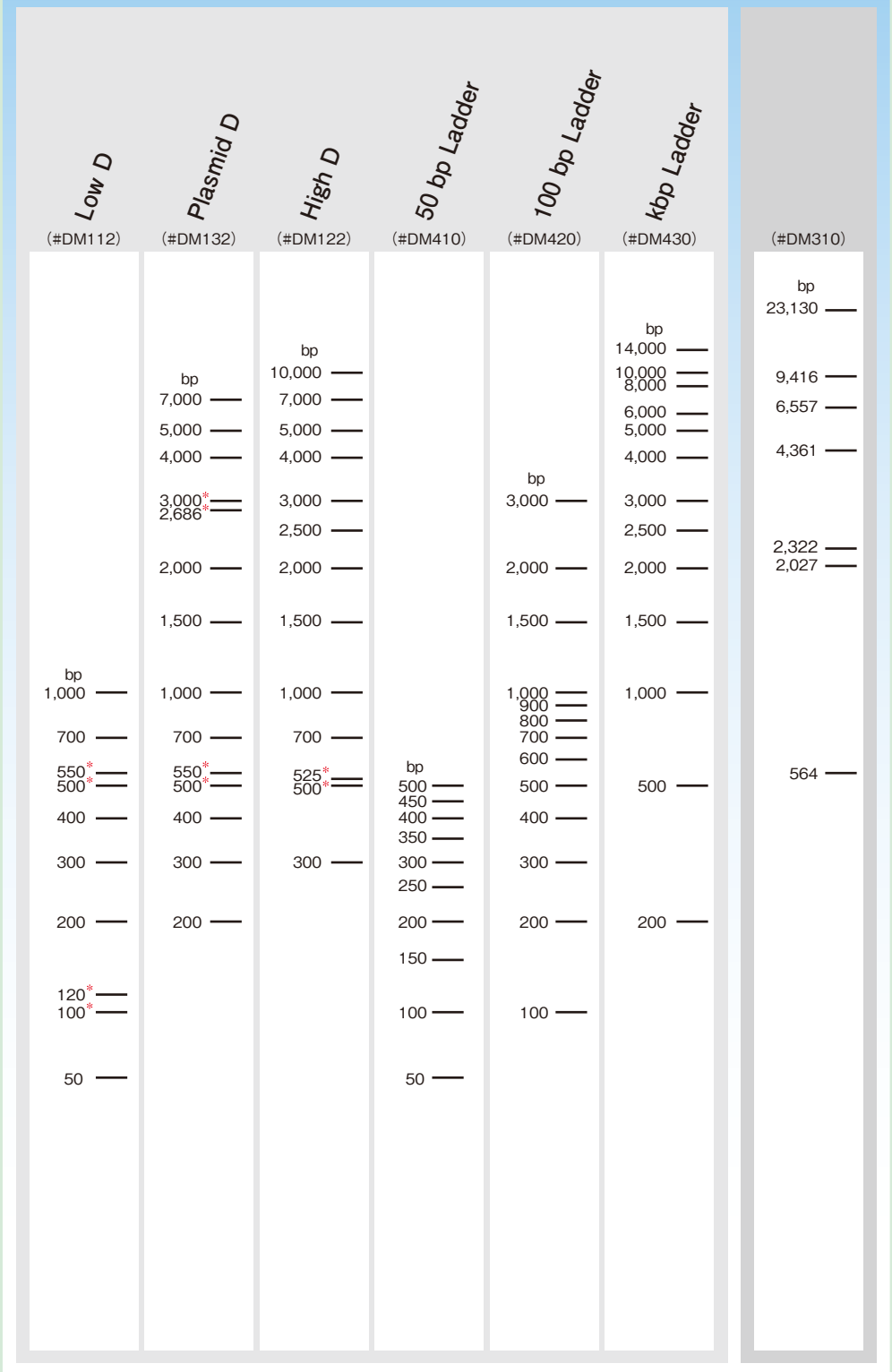
- Ready-to-load dsRNA marker consists of 10 discrete fragments for easy recognition of RNA sizes: 10, 20, 30, 50, 100, 200, 300, 400, 500, 1,000 bp.
- The concentration of 20 bp dsRNA is adjusted to approximately 10 ng/μl.
  5 μl of DynaMarker™ dsRNA Easy Load contains about 50 ng of 20 bp dsRNA (sufficient to detect the band). It is convenient for siRNA analysis.
- 6 × dsRNA Loading Buffer is supplied for easy sample preparation to run dsRNA samples on a non-denaturing polyacrylamide gel electrophoresis.
- Product insert includes a protocol for dsRNA electrophoresis.

Product Name		Code	Unit
dsRNA Easy Load, DynaMarker	−80℃	DM185	125 μl
Size : 125 μl, about 25 loadings Kit Component : 6 × dsRNA Loading Buffer			

DynaMarker™ Selection Guide

DNA Size Markers (p.17)

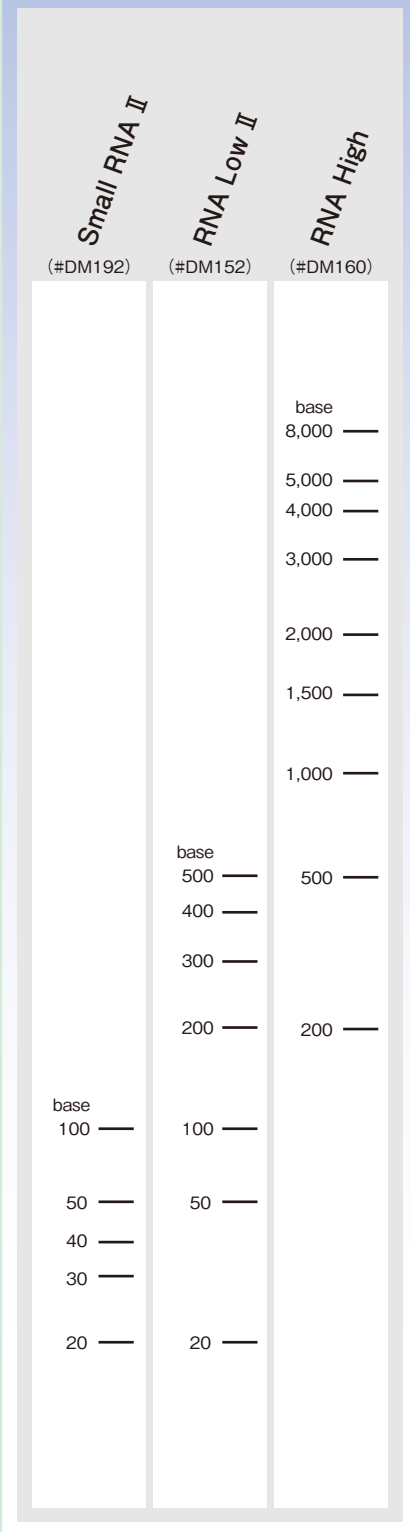
DynaMarker™ DNA



λ *Hin* d Ⅲ

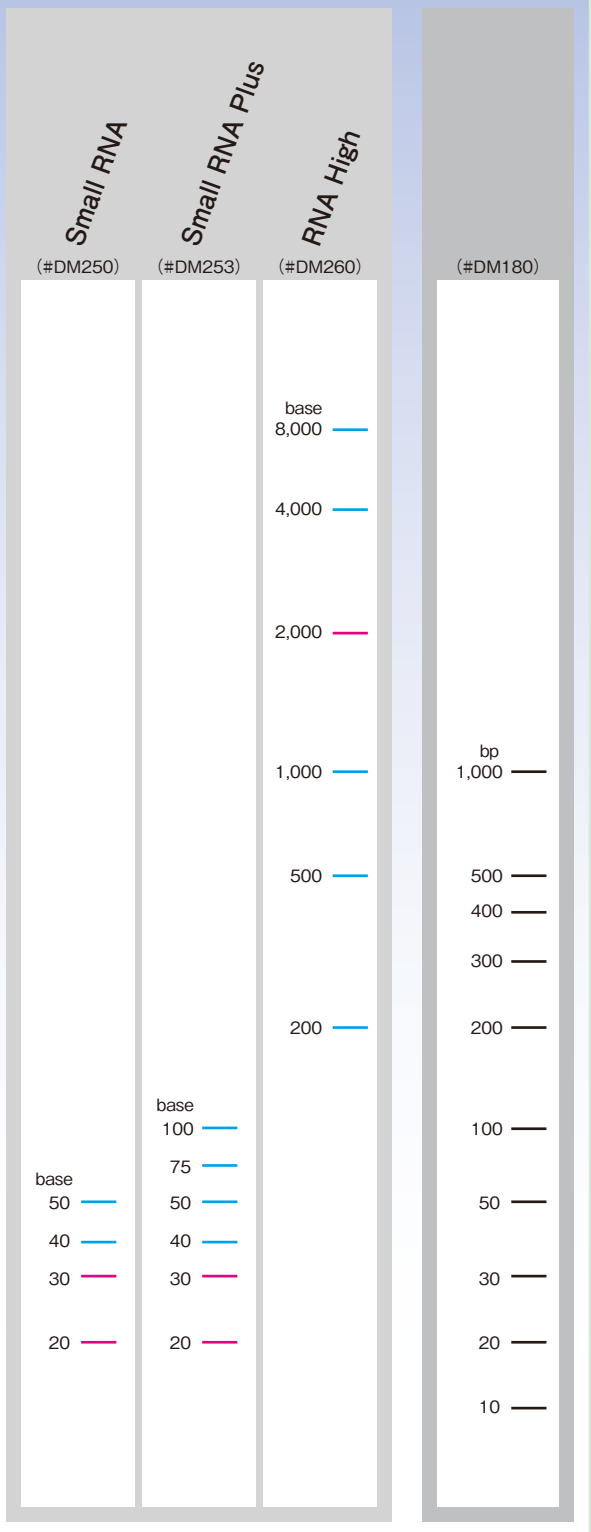
RNA

DynaMarker™ RNA

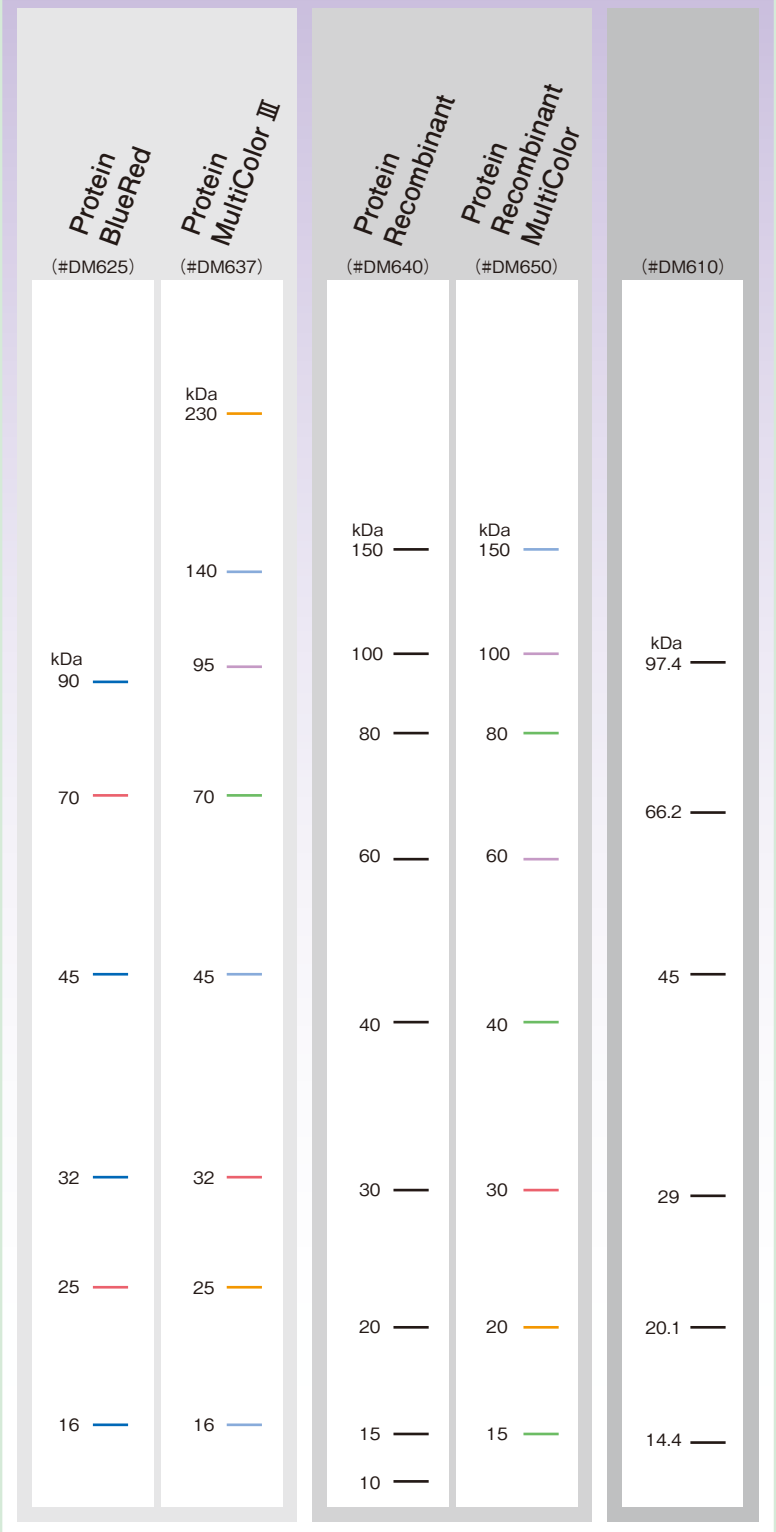


* reference indicator

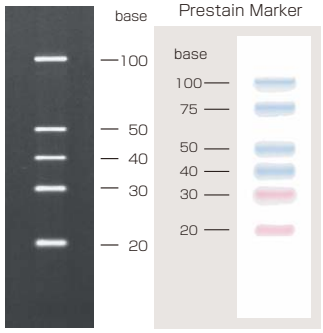
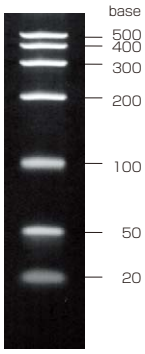
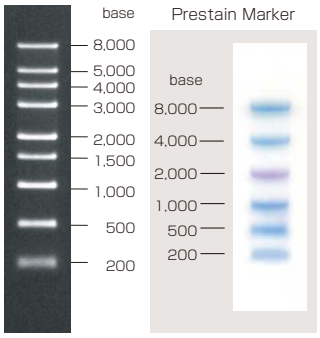
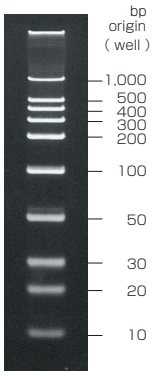
Size Markers (p.8～13)



Protein Size Markers (p.18～20)



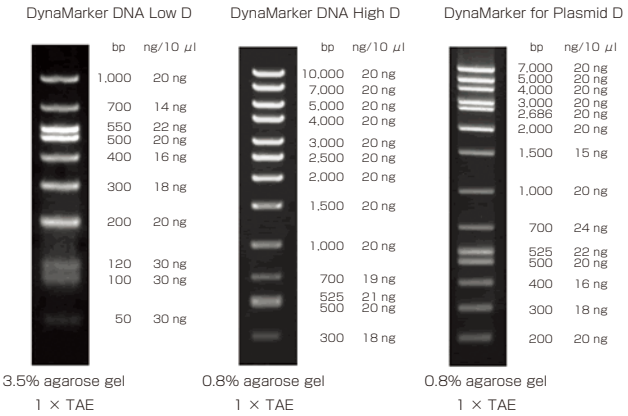
Selection Table for RNA Size Markers

	Single-Stranded RNA Marker			Double-Stranded RNA Marker
Molecular Size	small RNA	Low M.W. RNA	High M.W. RNA	10 ～ 1,000 bp
Gel Images	 (#DM192, #DM197) (#DM253)	 (#DM152, #DM157)	 (#DM160, #DM170) (#DM260)	 (#DM180, #DM185)
Standard type (Unstained)	Small RNA Ⅱ, DynaMarker™ (#DM192)	RNA Low Ⅱ, DynaMarker™ (#DM152)	RNA High, DynaMarker™ (#DM160)	dsRNA, DynaMarker™ (#DM180)
Ready-to-use type (Mixture with loading dye)	Small RNA Ⅱ Easy Load, DynaMarker™ (#DM197)	RNA Low Ⅱ Easy Load, DynaMarker™ (#DM157)	–	dsRNA Easy Load, DynaMarker™ (#DM185)
Pre-stained type	Prestain Marker for Small RNA Plus, DynaMarker™ (#DM253)	–	Prestain Marker for RNA High, DynaMarker™ (#DM260)	–
Suitable for non-denaturing gel	–	–	RNA Easy Measurement N, DynaMarker™ (#DM170)	–

High Quality DNA Size Markers

DNA Low D/DNA High D/for Plasmid D, DynaMarker™

- **Ready-to-use mixture**
  Mixed with tracking dye, ready-to-use.
- **For estimation of DNA amount in the gel !**
  A fixed amount of DNA fragments is in the solution of DynaMarker™ DNA Low D, DynaMarker™ DNA High D or DynaMarker™ for Plasmid D.
- **Designed for superior visibility**
  Easy recognition of DNA size on UV illuminator.



Product Name	Code	Unit
DNA Low D, DynaMarker	DM112	1 set
Materials Supplied : 6 × BPB Loading Dye (1 ml)		
DNA High D, DynaMarker	DM122	1 set
Materials Supplied : 6 × BPB Loading Dye (1 ml)		
DNA for Plasmid D, DynaMarker	DM132	1 set
Materials Supplied : 6 × BPB Loading Dye (1 ml)		

High Quality DNA Ladder Markers

DNA Ladders, DynaMarker™ Classic Markers

Product Name	Code	Unit
λ *Hind* Ⅲ Marker	DM310	1 set
Size : 100 µg/1 ml		
50 bp DNA Ladder, DynaMarker	DM410	1 set
Size : 60 µg/500 µl		
100 bp DNA Ladder, DynaMarker*	DM420	1 set
Size : 60 µg/500 µl		
kbp DNA Ladder, DynaMarker	DM430	1 set
Size : 100 µg/500 µl		

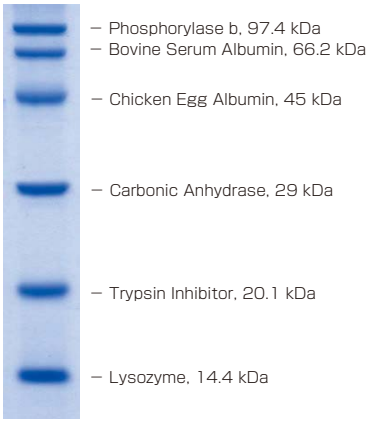
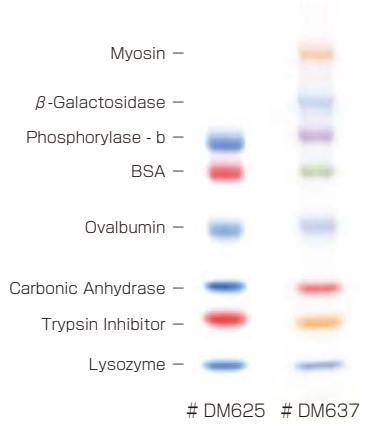
* This product is for agarose gel electrophoresis. It is not suitable for polyacrylamide gel electrophoresis.

Vivid Blue for Easy Sample Handling

BPB Loading Dye

Product Name	Code	Unit
BPB Loading Dye, 6 ×	DM210	4 × 1 ml
Size : 6 × concentrated tracking dye, useful for loading DNA samples into wells on agarose gel electrophoresis (1 ml × 4)		
BPB Loading Dye, 6 ×	DM212	2 × 1 ml
Size : 6 × concentrated tracking dye, useful for loading DNA samples into wells on agarose gel electrophoresis (1 ml × 2)		

Selection Table for Protein Size Markers

	Natural Protein Size Markers	Recombinant Protein Size Markers
Non-stained type	Protein Eco, DynaMarker™ (#DM610) 	Protein Recombinant, DynaMarker™ (#DM640) 
Pre-stained type	Protein BlueRed, DynaMarker™ (#DM625) Protein MultiColor Ⅲ, DynaMarker™ (#DM637) 	Protein Recombinant MultiColor, DynaMarker™ (#DM650) 

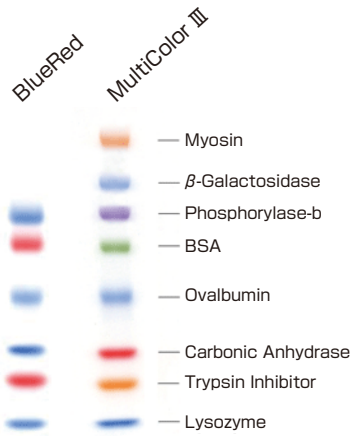
Prestained Protein Size Markers

Protein BlueRed/MultiColor Ⅲ, DynaMarker™

DynaMarker™ Protein BlueRed and MultiColor Ⅲ, which are new pre-stained DynaMarker™ Protein series, are useful for monitoring protein separation in SDS-PAGE and for assessing blotting efficiency in western blotting without staining.

DynaMarker™ Protein BlueRed is a dual-colored size marker (blue and red). DynaMarker™ Protein MultiColor Ⅲ is a size marker which has 5 colors (purple, blue, green, red and orange).

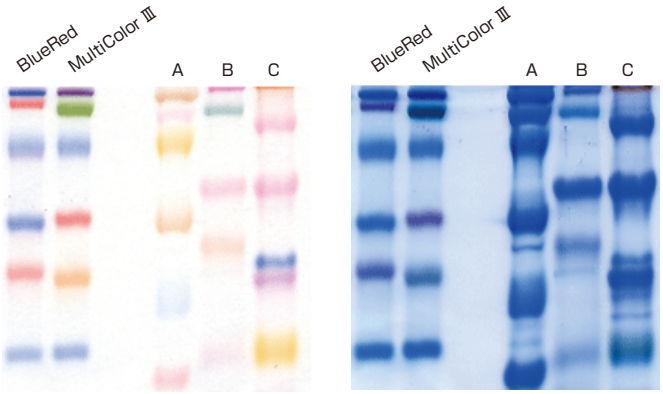
- Easy band recognition by dual and multiple colors.
- Bright and sharp bands.
- These markers are prepared from highly purified proteins stained equivalently with brilliant dyes. After coomassie-dye staining, sharp and uniform bands are still observable without extra bands.
- These markers are suitable for monitoring protein separation and for assessing blotting efficiency without staining.



DynaMarker™ **Protein BlueRed or MultiColor Ⅲ** is run on a 5-20% acrylamide gradient gel according to the method of Laemmli.

Comparison between DynaMarker™ Protein series and other commercial multi-color pre-stained markers (native protein).

Each marker was run on a 12.5% polyacrylamide gel according to the standard method. DynaMarker™ Protein series cover adequate molecular weight range and offer bright-color and sharp bands. Highly purified proteins in the marker are covalently and stoichiometrically bonded with high quality dye, and each protein is adjusted to approximately equal amount. After coomassie-dye staining, sharp and uniform bands appear without extra bands.



Before staining　　After Coomassie Staining

Comparison markers of prestained DynaMarker™ Protein series and other commercially available multi-color prestained marker (native protein).

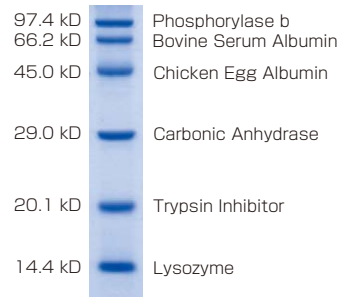
Product Name	Code	Unit
Protein BlueRed, DynaMarker	DM625	2 × 300 μl
Size : 600 μl (120 ~ 200 mini-gel lanes)		
Protein MultiColor Ⅲ, DynaMarker	DM637	2 × 300 μl
Size : 600 μl (120 mini-gel lanes)		

Protein Size Marker

Protein Eco, DynaMarker™

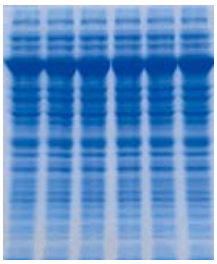
DynaMarker™ Protein Eco is used as a standard for determining molecular weight of proteins on SDS-PAGE.

- Ready-to-load protein size marker.
- Protein Loading Dye is provided for easy sample preparation for SDS-PAGE.



2.5 μl of **DynaMarker™ Protein Eco** was run on SDS-PAGE (12%)

Recombinant protein expressed in *E. coli* was lysed with Protein Loading Dye and run on SDS-PAGE (10%). Expressed protein was seen as thick bands.



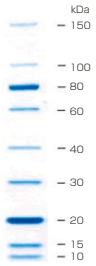
Product Name	Code	Unit
Protein Eco, DynaMarker	DM610	1 kit
Size : 300 μl, up to 120 lanes for mini-gel (1 mm gel thick, 8 × 10 cm mini-gel) Kit Component : Protein Loading Dye (1 ml)		

Recombinant Protein Size Marker

Protein Recombinant, DynaMarker™

DynaMarker™ Protein Recombinant is an accurate size protein molecular weight marker consisting of 9 recombinant proteins without glycosylation, ranging from 10 kDa to 150 kDa.

- Easy size estimation by size increment of 5, 10 or 20 kDa.
- Easy to distinguish each band.
- Ready-to-load protein marker, supplied in gel loading buffer.
- The two intensive bands (20 kDa and 80 kDa) enable easy identification of protein size.



DynaMarker™ Protein Recombinant
5 μl, 5-20% gradient gel

Product Name	Code	Unit
Protein Recombinant, DynaMarker	DM640	500 μl
Size : 500 μl 100 mini-gel lanes (100 loadings)		

Prestained Recombinant Protein Size Marker

Protein Recombinant MultiColor, DynaMarker™

DynaMarker™ Protein Recombinant MultiColor is a protein molecular weight marker consisting of pre-stained 8 recombinant proteins, ranging from 15 kDa to 150 kDa. The colors of proteins in the marker are blue, purple, green, red and orange. The 5 colors give easy recognition of protein bands.

- Easy size estimation by size increment of 5, 10 or 20 kDa bands.
- The accuracy of molecular weight for each band is > 95%.
- Ready-to-load protein marker, supplied in gel loading buffer.

DynaMarker™ Protein Recombinant MultiColor 10 μl

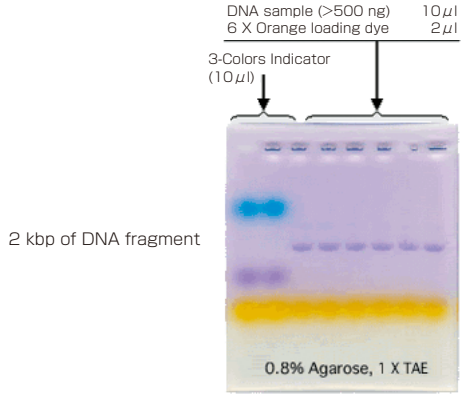
Product Name	Code	Unit
Protein Recombinant, MultiColor, DynaMarker	DM650	600 μl
Size : 600 μl, 60 mini-gel lanes (60 loadings)		

Easy and Safe DNA Detection in Gel

Gel Indicator™ Kit

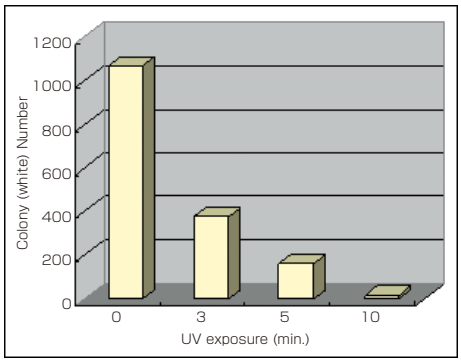
Easy to excise DNA bands from agrose gel without UV damage

- Excision of DNAs on your bench.
- Without ethidium bromide, DNA bands are visible.
- Free from UV, no damage to DNAs !
- Compatible with any commercial DNA purification kits.
- Higher sensitive detection of DNA by protocol Ⅱ.



Ligation and transformation using DNA excised with Gel Indicator™

About 500 bp of DNA fragments obtained by enzyme digestion were separated on agarose gel electrophoresis and were excised with Gel Indicator™ (see figure, 0 min), or on UV illuminator after staining with ethidium bromide. During UV exposure (see figure, 3, 5, 10 min), gel strips were turned over occasionally. DNA was extracted from the each excised gel strip by a commercially available spin kit.
The concentration of each obtained DNA was measured and the same amount of DNA was used for ligation with a plasmid vector. After ligation with T4 ligase, they were used for *E. coli* transformation. *E. coli* cells were inoculated on LB agar plates containing antibiotic and incubated at 37℃, overnight. The figure shows the number of white colonies on these LB agar plates.
In the experiment with Gel Indicator™, higher efficiency of transformation is shown.



Product Name	Code	Unit
Gel Indicator Kit	DM510	1 set
Kit Components : 3-Colors Indicator (1 ml), 6 × Orange Loading Dye (1 ml), Gel Indicator Solution (3 ml)		

Gel Indicator™ DX Kit

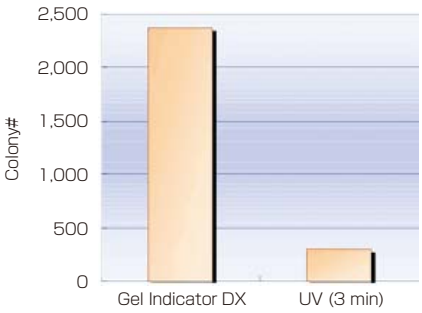
Excision of DNA without UV damage and higher sensitve detection of DNA

Exposure to ultra violet light gives damage to DNA samples, which causes unfavorable results in downstream experiments, such as transcription, PCR, and cloning. Using this kit, DNA can be detected as low as 20 ng and can be excised under visible light, avoiding ultra violet light.

1. Cariello, N.F., Keohavong, P., Sanderson, B.J., Thilly, WG., *Nuc. Acids Res*., **16** (1988) 4157.
2. Hartman, P.S., *Biotechniques*, **11** (1991) 747-748.

- Higher sensitivity of DNA detection: > 20 ng
  Two times greater sensitivity than that of Gel Indicator™.
- Free from UV, no damage to DNAs !
- DNA can be detected under visible light.

Higher Cloning Efficiency with Gel Indicator™ DX



Transformation Efficiency

DNA fragments (2,000 bp) were separated on agarose gel electrophoresis and were excised, with Gel Indicator™ DX (see left bar of the figure) or on UV illuminator after staining of ethidiumbromide (UV exposure for 3 min, right bar). DNA was extracted from each excised gel strip. The concentration of each DNA was measured and the same amount of DNA was used for ligation. *E. coli* cells were transformed with these ligated DNAs.

Higher Sensitivity of Gel Indicator™ DX

Detection of DNA

Serially diluted DNAs were loaded on the agarose gel (0.8%) containing Gel Indicator Solution DX. After Electrophoresis, the gel was colorized with GI Coloring Solution for high sensitive detection.

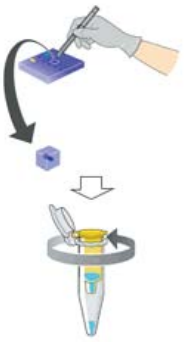
Product Name	Code	Unit
Gel Indicator DX Kit	DM580	1 set
Kit Components : Four-Colors Indicators (1 ml), 6 × Orange Loading Dye (1 ml), Gel Indicator Solution DX (3 ml), GI Coloring Solution (15 ml)		

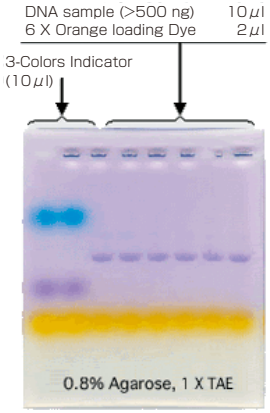
Combination Kit from DNA Excision to DNA Purification with Gel Indicator™

Gel Indicator™ DNA Extraction Kit

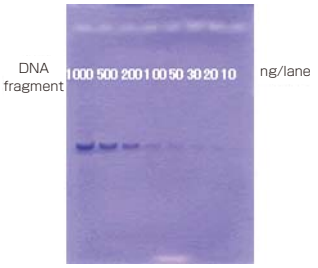
Gel Indicator™ DNA Extraction Kit can extract and purify DNA from agarose gels without UV damage. Obtained DNA is suitable for many applications, such as cloning, enzyme digestion, sequencing, and PCR. There are two protocols for DNA excision process. One is the rapid method (Protocol Ⅰ), DNA can be excised just after electrophoresis. The other is the high-sensitive DNA detection method (Protocol Ⅱ). DNA is detectable as much as 50 ng.

- Purify intact DNA with no UV damage.
- DNA bands are visible without ethidium bromide.
- Extraction is possible from agarose gel electrophoresis using 0.5 × TBE buffer as well as 1 × TAE buffer.
- Purified DNA is suitable for many applications; cloning, enzyme digestion, sequencing, PCR.
- Yield of DNA (linear) is 70-80%.
- For DNA cloning, this kit is designed to obtain linear DNA more preferentially than circular DNA. (The yield of circular DNA is less than 10%.)





Detection of DNA by Protocol Ⅰ



Detection of DNA by Protocol Ⅱ
Serially diluted DNA fragments (2,000 bp) were loaded to wells from right to left lanes. Agarose Gel Electrophoresis (0.8%), 1 × TAE

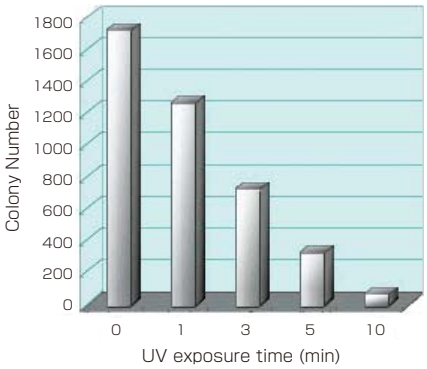
DNA extraction and purification protocol

1. Weight a gel slice and transfer it to a tube.
2. Add 3 volume of Gel Dissolving Buffer.
3. Incubate a tube containing gel and Gel Dissolving Buffer at 50-55℃.
4. After dissolving gel completely (5 min or more), add one gel volume of isopropanol to the dissolved gel and mix well.
5. Load the dissolved gel to a spin column. Centrifuge for 1 min at 7,000-10,000 × g. Discard the filtrate.
6. Wash with 700 μl of Wash Buffer (+EtOH)
7. Centrifuge for 1 min at 7,000-10,000 × g. Discard the filtrate.
8. Centrifuge again for 1 min at 7,000-10,000 × g.
9. Transfer the Spin Column to a new tube. Load 50 μl of Elution Buffer onto the Spin Column to elute. Centrifuge for 1 min at 7,000-10,000 × g.

Ligation and transformation, by DNA purified with Gel Indicator™ DNA Extraction Kit

DNA fragment, about a 2 kbp, resulted from enzyme digestion was separated on agarose gel electrophoresis. DNA was excised by the method of Gel Indicator™ DNA Extraction Kit. One of DNA in gel was extracted and purified by the method of Gel Indicator™ DNA Extraction Kit. (see figure, 0 min). Other DNA in gel was exposed to the ultraviolet ray (see figure, 1, 3, 5, 10 min) after staining of ethidiumbromide and purified with Gel Indicator™ DNA Extraction Kit.

During UV exposure (see figure, 1, 3, 5, 10 min) for excision DNA bands, a gel slice was turned over occasionally. The concentration of each obtained DNA was measured and the same amount of DNA was added to a plasmid vector. After ligation of these DNA mixture with T4 ligase, they were used for *E. coli* transformation. *E. coli* cells were inoculated on LB agar plates containing antibiotic, X-gal and IPTG, at 37℃, overnight. The figure shows the number of white colonies on these LB agar plates. This method of Gel Indicator™ DNA Extraction Kit shows much higher efficiency of transformation than the usual method of UV exposure.



Product Name	Code	Unit
Gel Indicator DNA Extraction Kit	DM550	1 kit
Size : 50 reactions Kit Components : 3-Colors Indicator, 6 × Orange Loading Dye, Gel Indicator™ Solution, Dissolving & Binding Buffer, Wash Buffer, Elution Buffer, Spin Column, Collection Tube		

RNA Detection under Visible Light

Gel Indicator™ RNA Staining Solution

Gel Indicator™ RNA Staining Solution stains RNA on polyacrylamide gel electrophoresis for excising RNA from the gel. The product is ready-to-use. The detection limit of RNA is as low as 50 ng. The sensitivity is approximately five times higher than that of UV shadowing. Even small RNA (around 20 mer) can also be stained well with Gel Indicator™ RNA Staining Solution.

- Convenient, ready-to-use solution, staining time is 20-30 min.
- Transilluminator is not required, RNA band is observable under visible light.
- Sensitivity of RNA detection: > 50 ng
  Five times higher sensitivity than that of UV shadowing!
- RNA can be extracted from stained gel by a crush and soak method followed by ethanol precipitation. The RNA is ready to use for RT-PCR, enzyme reaction and labeling reaction.

Sensitivity of Gel Indicator™ RNA Staining Solution

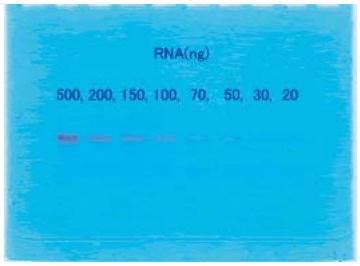


Fig.1 Staining with Gel Indicator™ RNA Staining Solution
Serially diluted small RNAs (21 base) were subjected to denaturing polyacrylamide gel electrophoresis (12.5% of polyacrylamide gel containing 7.5 M of Urea, 1 × TBE as running buffer) After Electrophoresis, the gel was stained with Gel Indicator™ RNA Staining Solution. It detected 50 ng of 21base RNA.

Recovery of RNA with Gel Indicator™ RNA Staining Solution

Fig. 2 Recovery of RNA with Gel Indicator™ RNA Staining Solution
RNA (100 base) prepared by *in vitro* transcription was subjected to denaturing-polyacrylamide gel electrophoresis. The RNA was excised and extracted by a crush and soak method after staining with Gel Indicator™ RNA Staining Solution. Obtained RNAs were analyzed by denaturing-polyacrylamide gel electrophoresis (5% of polyacrylamide gel containing 8 M of Urea, 1 × TBE as running buffer). Recovered RNA from gel using Gel Indicator™ RNA Staining Solution showed high integrity.
Left: RNA prepared by *in vitro* transcription
Right: Gel-purified RNA

Product Name	Code	Unit
Gel Indicator RNA Staining Solution, 100 ×	DM595	10 ml
Size : 10 ml, 100-fold concentrated		

DEPC-Treated/RNase-free Water

Product Name	Code	Unit
Water, DEPC-Treated Size : 1 ml tube × 5	DR110	5 × 1 ml
Water, DEPC-Treated Size : 50 ml bottle × 2	DR115	2 × 50 ml
Water, DEPC-Treated Size : 500 ml	DR117	500 ml
Water, RNase-free, Non DEPC-Treated RNase-free Water prepared by ultrafiltration Size : 1 ml tube × 5	DR120	5 × 1 ml
Water, RNase-free, Non DEPC-Treated RNase-free Water prepared by ultrafiltration Size : 50 ml bottle × 2	DR125	2 × 50 ml
Water, RNase-free, Non DEPC-Treated RNase-free Water prepared by ultrafiltration Size : 500 ml	DR127	500 ml

DNA, Salmon Sperm, Sonicated

Product Name	Code	Unit
DNA, Salmon Sperm, Sonicated Concentration : 10 mg/ml, free from DNase Size : 1 ml	F012	1 ml
DNA, Salmon Sperm, Sonicated Concentration : 10 mg/ml, free from DNase Size : 1 ml × 5	F013	5 × 1 ml

Anti- 6×Histidine Antibody

Product Name	Code	Unit
Anti-6-His, Mouse-Mono (H21-5) <Anti- 6×Histidine> Detection of Histidines tag	F008	100 μg

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