Instruction Manual

WSE-1165
Mini-Slab

October 31st, 2016 Ver.1

Made in Tokyo

Supporting Life Research

Contents

Introduction

Thank you for purchasing ATTO' S "WSE-1165 Mini-Slab". This instruction manual (i.e. this document) is delivered to you together with the system so that you can make full use of the system. Not only those of you who use this system for the first time, but also those who have used it before, should read this document carefully to understand the contents. If you use this system for the first time, please read this document from the beginning in serial order. In addition to how to use it, this document includes information related to maintenance and guarantee. Please keep it at hand all the time to make its full use. If you have any inquiries about your purchased product or the instruction manual, please feel free to contact your distributor or us (please refer to the back cover).

About this manual

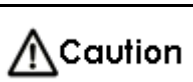
Before using the product, please read this document carefully. After reading it, please be sure to keep it for your future reference. When you relocate this system, be sure to attach this document to it. If there is any defect in this document such as misplaced or missing pages, or if this document is lost or stained, we will replace it with a new one. Please take a moment to contact the distributor you purchased the product from or our company' s customer service department (Please refer to the back cover). At that time, please inform us of your product name and model. This document was created with our most careful attention: however, should you find any queries, errors or omissions, please inform our company' s customer service department (Please refer to the back cover).

Safety precautions

To use this system safely, it must operate it properly. Do not use this product until you read this document thoroughly and understand the contents sufficiently. Precautions on usage and safety described in this document are applied to the use of this system only for the specified purpose. Do not use this system for any purpose or by any method other than described here. If you use this system for any purpose or by any method other than described in this manual, you will take responsible for all necessary safety measures as operator. If you operate the system for the first time, you need to be given instructions from an experienced operator with proper knowledge, and to understand its principle and method. Also not only people who operate the system for the first time but also people who have ever used it after receiving professional education should keep this instruction manual at hand to make its effective use. In order to prevent electric shock or any damage to the system, please understand and follow the correct operation method shown in this manual. If you have questions or concerns related to principle of the system, maintenance or inspection, feel free to contact your distributor or our company (Please refer to the back cover).

Safety symbols

To use this system safely and maintain the safe status, the following symbols are indicated in the instruction manual and on the system' s main unit. Please note the meaning of each symbol and observe each item.

Symbol	Description
	This symbol indicates occurrence of emergent danger, such as death or heavy injury, caused by ignoring it and mishandling the system.
	This symbol indicates possibility of danger, such as death or injury, caused by ignoring it and mishandling the system.
	This symbol indicates possible occurrence of physical damage caused by ignoring it and mishandling the system.
	This symbol indicates prohibition.
	This symbol indicates an important matter.
	This symbol indicates a tip related to operation.

Precautions for use

These are precautions for preventing fire, electric shock and other accident or failure. Read to understand the information well and be sure to observe it.

⚠Danger

Power supply connection 	Do not use a deformed or corroded electrode terminal, damaged power cable, as well as lead wire whose insulation coating is peeled off. Before operating with this system, confirm there is no damage on it. If there is, it may cause ignition or electric shock. Stop using the system and contact your distributor or our company.
No wet hand 	Do not use or touch this system, electrode terminal and power cable with wet hands. If you do, it may cause electric shock or damage of the system. If power supply or power cable gets wet, do not use it because it may also cause electric shock or damage. Stop using and contact your distributor or our company.
Main unit 	Do not put a foreign material in the system. If you do, it may cause electric shock or damage of the system. Do not use the system if the surface gets wet because it may also cause electric shock and damage. When you use the system, wipe off water from the surface.
Maintenance 	Stop using this system as soon as abnormality or damage (is suspected to) occur during operation. Also do not use the system if defect is found during maintenance. If you do, it may cause electric shock or damage of the system. Check and confirm by looking periodically whether there is no extraordinary noise or smoke while the system is running. If abnormality, damage or defect is found, stop using the system and contact your distributor or our company.
Reagent 	At electrophoresis, deleterious, dangerous substance or carcinogenic material may be used for preparation of buffer solution, staining or decolorizing operation. Do not allow it direct contact to human body. If you do, fatal accident or body injury, such as burn may occur. Protect your body with mask and gloves, and understand precautions for reagent in the case of using it.

⚠Warning

Installation 	Do not install the system on an unstable table, tilted place or a heavily vibrating place. Install it on an experimental table with horizontal, stable and solid surface. Otherwise, electric shock may be caused by falling or liquid leakage. Do not put any object on this system. If you do, electric shock may be caused by falling.
Main unit 	This system is not of explosion-proof structure. Install it away from fire and combustible gas. In the case of taking the system out from a low-temperature room for use, take measures against dew condensation before moving it. If condensation is seen, dry it completely to prevent electric shock and failure.
Transfer 	While this system is running, do not touch any parts other than control panel, nor move it. Electric shock may be caused by overflow of buffer solution. Also, electric cords may get tangled and the system may fall. In the case of moving the system, be sure to turn off the power switch and disconnect AC adaptor, and then disconnect all wiring cables.
Maintenance 	Turn off the power switch of the system and disconnect all lead wire for maintenance and cleaning. To maintain good performance and safety of this product, please ask us for periodical maintenance, inspection and calibration (Please refer to the back cover).
No disassembly 	Do not disassembly or remodel this system. Adjustment and repair of the system should be done by our engineers. If you ask for it, please contact us (Please refer to the back cover). Our company will not accept any responsibility for any accident or failure caused by disassembly or modification done by user.
Sticker 	Do not peel off warning stickers. They indicates a dangerous section of this system. If it is peeled off or cannot be read due to stain, please contact us, referring to the back cover.

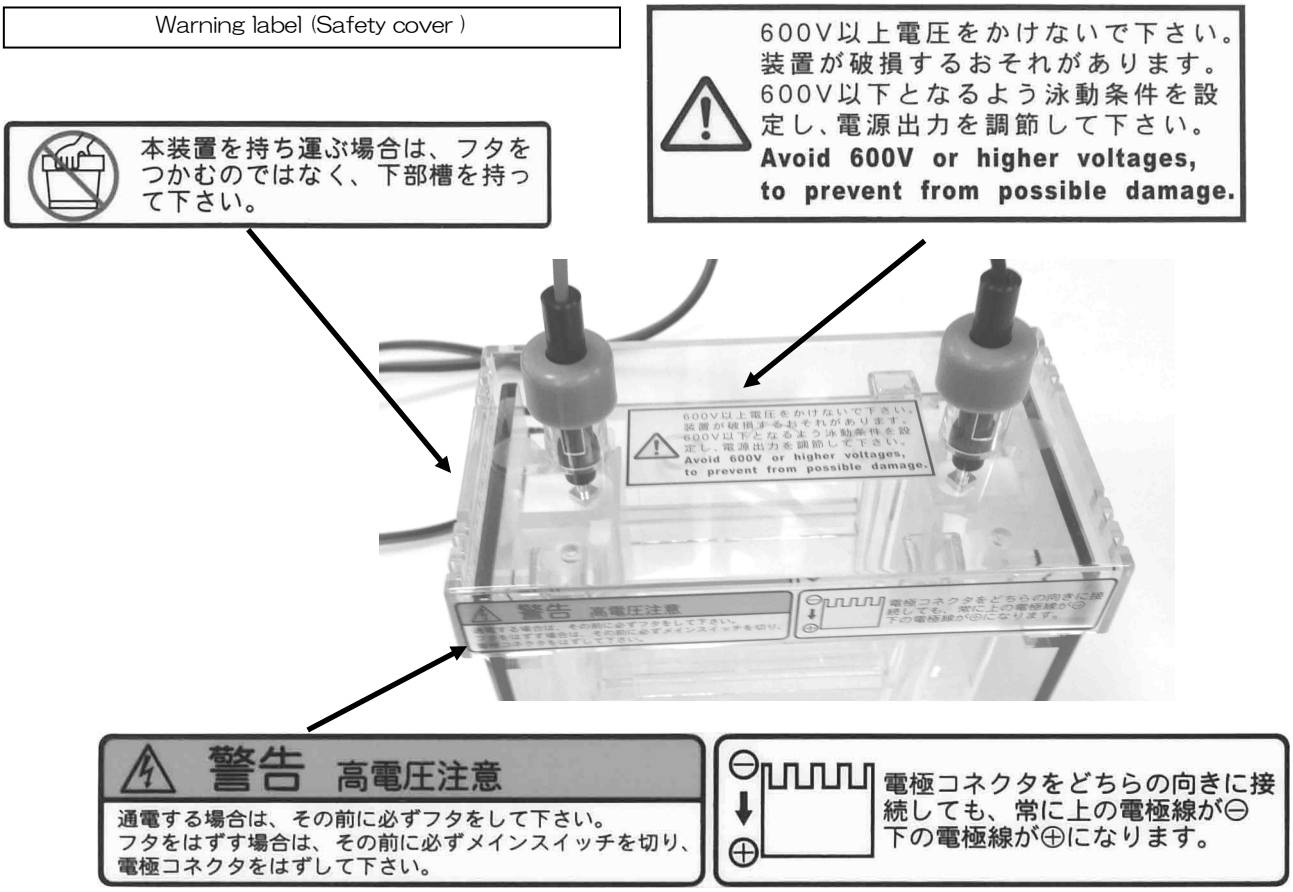
⚠Warning

Lead wire ⚠	Do not use lead wire of this system for any purpose other than electrophoresis. If you do, it may cause breaking and accident. Our company will not accept responsibility for any accident or failure caused by using it for any system other than this. If you have any inquiries, please contact your distributor or our company (Please refer to the back cover).

⚠Caution

Sticker	Name plate stickers show important information about maintenance and management of the product. Also labels are put on the surface for showing how to handle safely. Do not peel it off.

Warning label (Safety cover)



Notices

Application	This system is a physical and chemical equipment for research. It is not a medical equipment. Therefore it cannot be used for medical practices, such as judgement related to medical care or therapeutic effect confirmation.
Export	Export of certain services or cargos is controlled by the Foreign exchange law and the government decree or ministerial ordinance of foreign trade control law of Japan. The product is subject to such regulations. Even if the product doesn't apply to the government decree, it is necessary to submit the document to the customs office to that effect. If the product applies to, it is necessary to obtain the export license from the Ministry of Economy, Trade and Industry, and submit the license to the customs office. When you export our company's product, please contact your distributor or our company in advance (Please refer to the back cover).
Trademarks/ Copyright	Reprint or copy of a part/whole of the instruction manual would require the permission of the copyright. The specification of the product and the contents of the instruction manual may be changed without prior notices.

1 Overview

1.1 Purpose

WSE-1165 Mini Slab is a chamber for protein and nucleic acid electrophoresis used with 2 polyacrylamide gels of mini gel size (80 x 90 x 1.0 mm).

2 Unpacking and Inspection

2.1 Unpacking and Inspection

When you receive the product, check if the main unit and the accessories are properly packed and there is no damage.
If you find any defect or damage, please contact your distributor or our company immediately (Please refer to the back cover). Carry out the inspection at the time of unpacking within one week after you receive the product. After one week passes, damage or parts shortage may not be recovered.

2.2 Equipment configuration

The product consists of a main unit and accessories.

Main unit

Product name: Mini Slab, Model: WSE-1165

Model	WSE-1165	WSE-1165W
Product No.	2322197	2322198
Main unit	Electrophoresis chamber	
	Plate holder	
	Safety cover (with lead wire)	

Materials

Electrophoresis chamber	Acrylic, Silicon
Plate holder	Polycarbonate
Safety cover	Polycarbonate
Dummy plate	Acrylic

Accessories

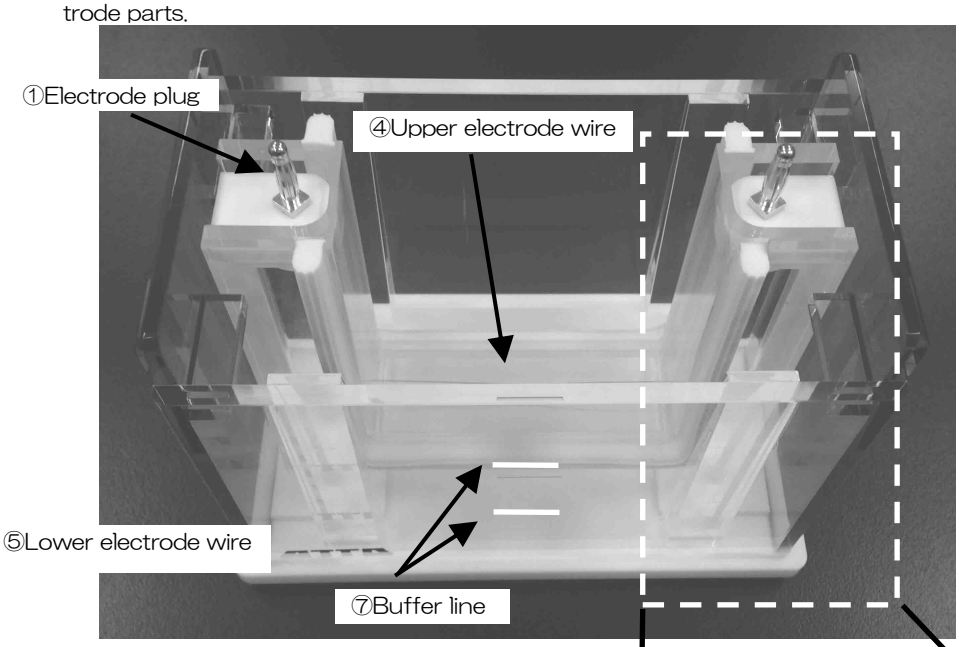
Model	WSE-1165	WSE-1165W
Dummy plate	DP-5 Dummy plate	
Instruction manual	1	
Gel Cast Kit	-	AE-6401 1mm Dual Mini Gel Cast

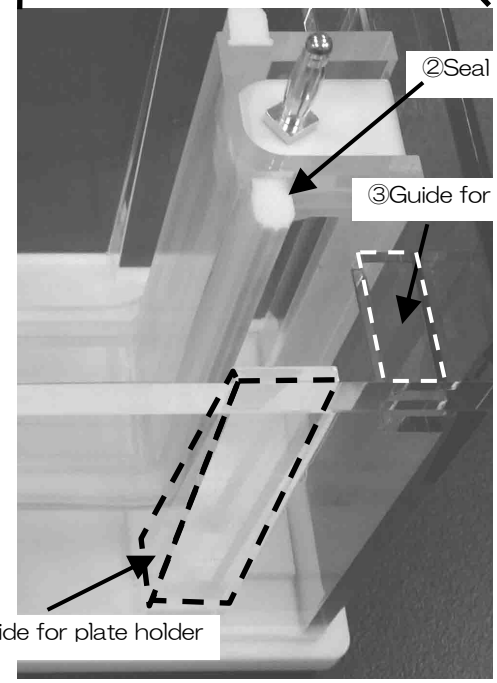
3 Part name and function

3.1 Main unit

（1）Electrophoresis chamber

Fix plates inside the chamber by plate holders to keep upper buffer. Also the chamber includes electrode parts.





① Electrode plug

This part connects to lead wire. There is no difference between + (anode) and -(cathode) because polarity is automatically changed as a function.

② Seal packing

This part holds electrophoresis glass plates with plate holders, and then becomes a upper chamber to keep upper buffer.

③Guide for setting gel

This part on the right and left side is a guide to set gel plates.

④Upper electrode wire

This part corresponds to - (cathode).

⑤ Lower electrode wire

This part corresponds to + (anode).

⑥Guide for plate holder

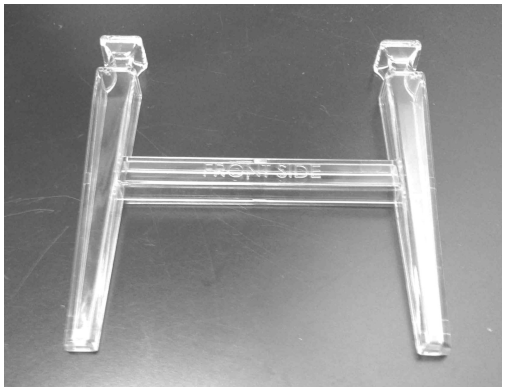
This part is a guide to set a plate holder.

⑦Buffer line

This line indicates amount of buffer in lower chamber. Upper line shows maximum amount; on the contrary lower line shows minimum.
Maximum amount is required for reducing heat of gel.
*Heat of gel causes smiling and disturbance of pattern.

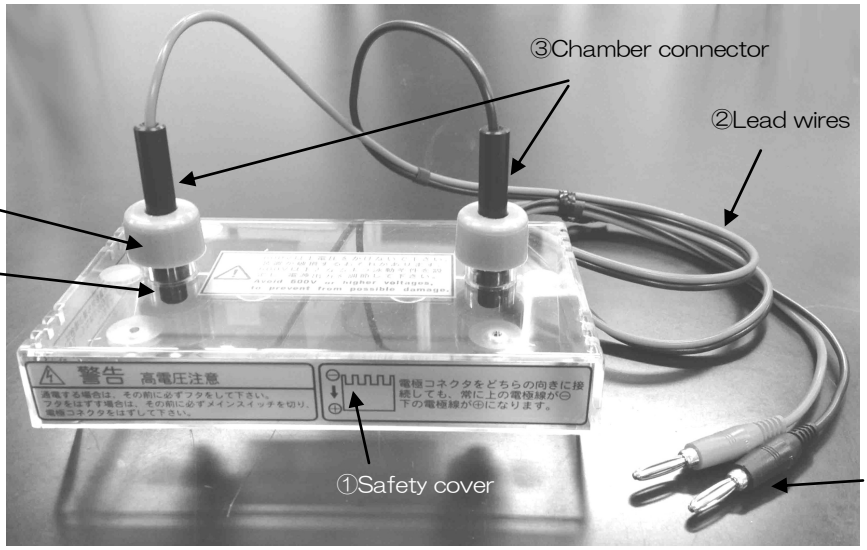
(2) Plate holder

This holder fixes gel plates to keep upper buffer.



(3) Safety cover (with lead wire)

This part is set on the upper part of the chamber to prevent the electrode plug and solution touching and dust putting in. Lead wire is attached.



① Safety cover

This cover prevents from electric shock caused by touching buffer in the chamber while electric current flows.

② Lead wires

These lead wires connect power supply and the chamber.

③ Chamber connector

This part connects to electrode plug of the upper chamber and provides electric current from power supply.

④ Connecting terminal

This part connects to power supply and provides electric current to the chamber.

⑤ Cylinder projection

This part is an opening of the safety cover which connects chamber connector and electrode plug.

⑥ Fixing cap

This part fixes lead wire to safety cover.

3.2 Accessories

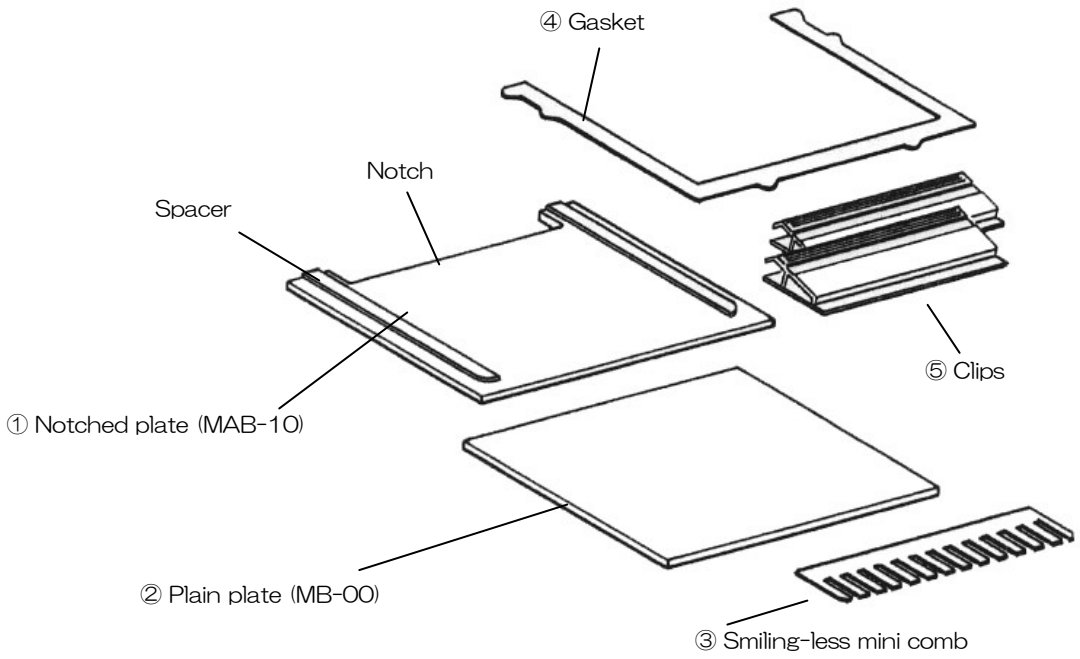
Dummy plate

This plate is used for electrophoresis with 1 gel. For keeping upper buffer, insert the plate instead of a gel.

DP-5 Dummy plate

1mm Dual Mini Gel Cast (AE-6401)

This gel cast is attached to WSE-1165W only.



① Notched plate MAB-10

This plate and a plain plate are superimposed to make a gel. When these plates are set to the chamber, this plate should be faced to seal packing.

This plate has "spacer" and "notch".

② Plain plate MB-00

This plate and a notched plate are superposed to make a gel.

③ Smiling-less mini comb

This comb is used for making wells to apply sample.

④ Gasket

This gasket is inserted between 2 plates for preventing liquid leakage during gel casting.

⑤ Clips

These parts fix 2 plates and a gasket.

4 Preparation

4.1 Installation environment

Please use this system under the following condition.

Location	Inside a room only
Ambient temperature/ Relative humidity	4～40℃ • 5～70%RH（No dew condensation）

⚠Warning

Do not install the product in combustible gas atmosphere. It is not of explosion-proof structure, so the product may cause explosion or fire. Install it in an environment without combustible gas.
Do not install the product in corrosive gas atmosphere. This is because it can cause corrosion of conductor inside this product or contact failure of connecter, which may lead to malfunction or failure.
Do not install the product in an environment with much dust or dirt. Dust or dirt may stick to the product, and can cause electric shock, fire or failure.

⚠Caution

Do not use the product at a place where there is strong magnetic or electric field around, or a place where there is much waveform strain of input power supply or noise. It may cause malfunction.
Do not install the product at a place where it is exposed to direct sunlight, where temperature suddenly changes, or where humidity is high. If dew condensation occurs, do not use this product. This system cannot be used outdoors. It is designed to ensure safety and performance under the following environmental conditions: ambient temperature 4℃～40℃, relative humidity 5%～70% (No dew condensation).

4.2 Preparation of peripheral apparatus and consumables

Power supply

AE-8155 myPower II 500

AE-8135 myPower II 300

WSE-3200 PowerStation III

e-PAGEL HR series

*Polyacrylamide precast gel of mini gel size.

Gel cast kit

AE-6401 1mm Dual Mini Gel Cast
WSE-1190 Multi Mini-Slab Gel Cast

Shaker

*For coloring or decoloring gel.
WSC-2400 Seesaw Shaker atto

Blotting device

WSE-4020 HorizeBLOT 2M-R
WSE-4040 HorizeBLOT 4M-R
WSE-4115 PoweredBlot Ace
WSE-4051 P plus membranes（85×90mm）
CB-09A Filter paper（85×90mm）

4.3 Preparation and pretreatment of reagent

1. Required reagent

Prepare the following reagent.

In the case of using this system for 2D electrophoresis, please refer to instruction manual of our product "WSE-1500 discRun-R" for preparing reagent.

1) Electrophoresis and detection of Proteins

1. Polyacrylamide gel electrophoresis

Acrylamide (for electrophoresis)*
N,N'-methylene bisacrylamide (for electrophoresis)*
Tris (Tris hydroxymethyl aminomethane) (for biochemistry)
SDS (Sodium dodecyl sulfate) (for biochemistry)**
Hydrochloric acid (special grade)
Ammonium persulfate*
TEMED(N,N,N',N'-tetramethyl ethylene diamine) (for electrophoresis)*
Glycine (special grade)
Glycerin (special grade)
DTT (Dithiothreitol)**
BPB (Bromophenol Blue)

* not required in the case of using e-PAGEL HR.
**not required for native PAGE.

2. Coomassie Brilliant Blue (CBB) staining

AE-1340 EzStain AQua

Or,

Acetic acid (special grade)
Methanol (special grade)
CBB (Coomassie Brilliant Blue) R-250 or G-250 (for electrophoresis)

2) Electrophoresis and detection of DNA

1. Electrophoresis

Acrylamide (for electrophoresis)*
N,N'-methylene bisacrylamide (for electrophoresis)*
Tris (Tris aminomethane) (for biochemistry)
Ammonium persulfate (for electrophoresis) *
TEMED(N,N,N',N'-tetramethyl ethylene diamine) (for electrophoresis) *
Boric acid (special grade)
EDTA • 2NA(Disodium edetate)
BPB (Bromphenol Blue)
Saccharose (special grade)

*not required in the case of using e-PAGEL HR.

2. Ethidium bromide stain

Ethidium bromide

We can provide products described in the next page. These are available for each application.
Please contact us and ask about the details.

	Purpose and Application	Model	Product name	Product code
Gel Buffer for PAGE	Gel buffer for (SDS-) PAGE	WSE-7310	EzGelAce	2332327
	Stacking gel buffer for (SDS-) PAGE	WSE-7155	EzGel Stack	2332329
	Separating gel buffer for (SDS-) PAGE	WSE-7150	EzGel Sep	2332328
Sample Prepa-ration	RIPA lysis buffer for protein extraction	WSE-7420	EzRIPA Lysis kit	2332336
	Subcellular fraction/extraction kit (for organelle)	WSE-7421	EzSubcell Extract	2332337
	Subcellular fraction/extraction kit (for nucleus/mitochondria)	WSE-7422	EzSubcell Fraction	2332338
	Extracting solution for colibacillus/yeast protein	WSE-7423	EzBactYeastCrusher	2332339
	Phosphate buffered saline	WSE-7430	EzPBS(-)	2332380
	DNA loading dye	WSE-7040	EzApply DNA	2332394
	Sample preparation/Fluorescent labeling kit	WSE-7010	EzLabel FluoroNeo	2332333
	Sample preparing solution for SDS-PAGE	AE-1430	EzApply	2332330
	Protein (water-soluble/hydrophobic) sample extraction kit	AE-1435	EzApply 2D kit	2332335
Molecu-lar Weight Marker	DNA molecular weight marker for electro-phoresis	WSE-7030	EzDNA Ladder	2332342
	Prestained protein ladder marker for SDS -PAGE/Western blotting	WSE-7020	EzProtein Ladder	2332346
	Protein molecular weight marker for SDS-PAGE	AE-1440	EzStandard	2332340
	Protein prestained marker for SDS-PAGE/Western blotting	AE-1450	EzStandardPrestainBlue	2332347
Elec-trode Buffer	Electrode buffer for SDS-PAGE	AE-1410	EzRun	2332310
	Electrode buffer for SDS-PAGE with high isolation performance	AE-1412	EzRunC+	2332320
	Tris-Glycine electrode buffer for PAGE	AE-1415	EzRunT	2332325
	MOPS electrode buffer for PAGE	WSE-7065	EzRunMOPS	2332326
	Tris-Glycine electrode buffer	WSE-7055	EzRunTG	2332323
	Tris-Boric acid electrode buffer	WSE-7051	EzRunTBE	2332392
Gel Staining Reagent	Fluorescent dye for DNA detection	WSE-7130	EzFluoroStainDNA	2332395
	CBB staining reagent for protein detec-tion (acetic acid and alcohol free)	AE-1340	EzStainAQua	2332370
	Reverse staining kit for protein detection	AE-1310	EzStainReverse	2332350
	Silver staining kit for protein and DNA detection	AE-1360	EzStainSilver	2332360
	Spin column for extraction and recovery of proteins and nucleic acid	AB-1171	ATTOPREP MF	3521370

2. Preparation of various solution

1）Protein electrophoresis

Prepare the following solution beforehand.

In general, Acrylamide/Bis mixed solution whose crosslinking rate is 19:1, 29:1, 29.2:0.8 or 37.5:1 is used depending on the area of molecular cutoff. Low molecular side of the area of molecular cutoff spreads if the cross linking rate is high. On the other hand, high molecular side of the area spreads if the crosslinking rate is low. Prepare the solution depending on intended fractionation range. An example of 29.2:0.8 solution is described in the below.

When separation with keeping high-order structure of proteins (native PAGE) is performed, remove SDS and DTT from all reagents (reagents with * mark).

⚠Warning Monomer of acrylamide includes neurotoxicity. Protect your body with gloves and so on when you use it.

Solution	Reagent	Capacity, ( ) indicates final concentration
Solution A (30% Acrylamide/Bis solution(29.2 : 0.8) (Storable at 4℃ for 1 month) [Not necessary when ePAGEL HR is used]	Acrylamide N,N'-methylene bisacrylamide Dissolve the above materials with distilled water and dilute in measuring cylinder to 100ml total.	29.2g 0.8g (30%)
Solution B (Storable at 4℃ for 1 month) [Not necessary when ePAGEL HR is used]	Tris SDS(*) Dissolve the above materials with distilled water, adjust it to pH8.8 with hydrochloric acid and dilute in measuring cylinder to 100mL total. Otherwise, use WSE-7150 EzGelSep.	18.2g (1.5M) 0.4g (0.4%)
Solution C (Storable at 4℃ for 1 month) [Not necessary when ePAGEL HR is used]	Tris SDS(*) Dissolve the above materials with distilled water, adjust it to pH6.8 with hydrochloric acid and dilute in measuring cylinder to 100mL total. Otherwise, use WSE-7155 EzGelStack.	6.1g (0.5M) 0.4g (0.4%)
Solution D (Storable at 4℃ for 1 week) [Not necessary when ePAGEL HR is used]	Ammonium persulfate Dissolve the above material with 1.0mL distilled water.	0.1g (10%)
SDS-PAGE electrode buffer (Laemmli method) (Storable at room temperature for 2 months) [Not necessary when AE-1410 EzRun is used.]	Tris Glycine SDS(*) Dissolve the above materials with distilled water and dilute in measuring cylinder to 500mL total.	1.5g (25mM) 7.2g (192mM) 0.5g (0.1%)
Sample processing fluid (example) (Storable at 4℃ for 2 weeks) [Not necessary when AE-1430 EzApply is used.]	Solution C (0.5M Tris—Hydrochloric acid buffer pH6.8) SDS(*) DTT(*) Glycerin 1% BPB solution Dissolve the above materials with distilled water and dilute in measuring cylinder to 10 mL total.	1.0mL (50mM) 0.1g (1%) 0.15g (100mM) 2.0mL (20%) 10μL (0.001%)
CBB staining fluid (Storable at room temperature for 1 month) [Not necessary when AE-1340 EzStainAQua is used.]	Methanol Acetic acid CBB R-250 or G-250 Dissolve the above materials with distilled water and dilute in measuring cylinder to 1L total.	300mL (30%) 100mL (10%) 1.0g (0.1%)
Decoloring fluid (Storable at room temperature for 1 month) [Not necessary when AE-1340 EzStainAQua is used.]	Methanol Acetic acid Dissolve the above materials with distilled water and dilute in measuring cylinder to 1L total.	300mL (30%) 100mL (10%)

2）Electrophoresis of DNAs

Prepare the following solution beforehand.

＊ When ePAGEL HR is used, Solution E,F and D are not necessary to prepare.

＊ When ePAGEL HR is used, use WSE-7055 EzRun TG or electrode buffer of native-PAGE of proteins, not TBE.

Solution	Reagent	Capacity, ( ) indicates final concentration
Solution E (Storable at 4℃ for 1month) [Not necessary when ePAGEL is used]	Acrylamide N,N'-methylene bisacrylamide Dissolve the above materials with distilled water and dilute in measuring cylinder to 100mL total.	29.2g 0.8g (30%)
Solution F (5xTBE buffer) (Storable at 4℃ for 1 month) [Not necessary when ePAGEL HR is used]	Tris Boric acid EDTA・2NA Dissolve the above materials with distilled water and dilute in measuring cylinder to 1L total Otherwise, dilute WSE-7051 ExRun TBE 2 times.	53.9g (445mM) 27.5g (445mM) 3.7g (10mM)
Solution D (Storable at 4℃ for 1 week) [Not necessary when ePAGEL HR is used.]	Ammonium persulfate Dissolve the above material with 1.0mL distilled water.	0.1g (10%)
TBE electrode buffer (1xTBE buffer) (Storable at room temperature for 2 months) [Not necessary when ePAGEL HR is used]	Tris Boric acid EDTA・2NA Dissolve the above materials with distilled water and dilute in measuring cylinder to 1L total. Otherwise, dilute WSE-7051 EzRun TBE	10.8g (89mM) 5.5g (89mM) 0.74g (2mM)
Marker pigment solution (Storable at 4℃ for 2 months)	BPB Sucrose Dissolve the above materials with distilled water and dilute in measuring cylinder to 10mL total.	0.04g (0.4%) 6.0g (60%)
Ethidium bromide preservative solution (Storable at 4℃ for 2 months)	Ethidium bromide Dissolve the above materials with 100mL of 1xTBE buffer.	50mg (0.05%)
Ethidium bromide staining fluid (Storable at 4℃ for 2 months)	Dilute the ethidium bromide preservative solution 100 times with 1xTBE buffer.	(0.0005%)

3. Sample preparation of electrophoresis

This chapter describes the most popular preparation method. Refer to articles and try to find the best way because there are various methods for sample preparation depending on type or purpose of separation.

1) Protein

Sample dissolution

Prepare sample with "sample processing fluid" described previously (Page 11) or AE-1430 EzApply.
If dry sample is used, dissolve it with sample processing fluid and make total amount be 1-2mg/mL. In the case of sample with low water content such as tissue, add sample processing fluid to it for homogenizing.

If sample is liquid state, especially whose concentration is low, there are some methods to add directly various reagents as table in the below for preventing from diluting more.

(Ex.) Case of blood serum

Sample, Reagent	Capacity
Blood serum	10μL
Distilled water	490μL
10% SDS solution*	100μL
1M DTT solution*	100μL
Solution C	100μL
Glycerin	200μL
Total	1mL

*In the case of native-PAGE, add distilled water instead of the reagent marked *.

If AE-1430 EzApply is used, follw the instruction below.

In the case of liquid sample, mix it with EzApply in the ratio of 1:1.
In the case of solid sample , add proper quantity of EzApply diluted 2 times to it for homogenizing.
If EzApply us used under the condition of the above example, take 490μL diluted water in tube, and add 500μL EzApply and 10500μL blood serum to it.

Heat process

Seal the lid of tube and warm it at 95 degree for 5-10 minutes.

Centrifugal separation

Do the centrifugal separation (15,000rpm, 10min). Use supernatant removed fat layer from the surface as sample.

If sample is used to electrophorese without removing insoluble matter or fat, vertical stripes appear in the electrophoresis image.

2) DNA

Keep salt concentrations of sample as consistent as possible. In the case of high salt concentration, carry out the ethanol precipitation to dissolve it in buffer so that the salt concentration becomes same as that of other samples.

If salt concentrations are not same among samples, migration pattern is disturbed. High salt concentration sample (e.g. H buffer of restriction enzyme.) in particular, affects the band pattern of neighboring lane or speed of migration.

Mix sample solution with the 1/10 amount of marker pigment (BPB) solution to make electrophoresis sample.

4.4 Gel casting

Set a gel cast and make a gel with the solution prepared in the described method.

If ePAGEL HR is used, operation indicated in the below is not necessary.

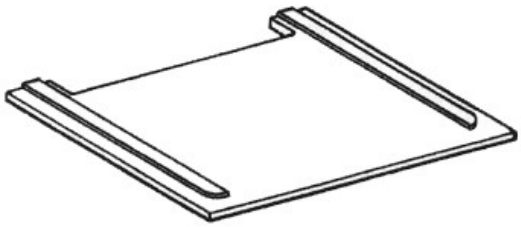
1. Setting up a gel cast

This chapter explains how to assemble AE-6401 1mm Dual Mini Gel Cast. If WSE-1190 Multi Mini Slab Gel Cast is used, refer to the instruction manual of WSE-1190.

Be sure to have clean gloves for experiments on your hands during operations.

If you operate without wearing clean gloves, the equipment, solution etc. may be contaminated and it may cause incorrect test result.
If plate is dirty, air bubbles are generated easily during applying gel solution. Wash and keep it clean.

Place 1 notched plate so that the spacers face up.

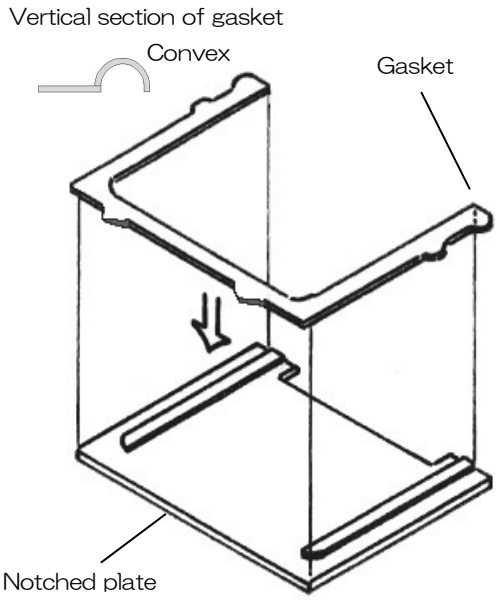


Stack a gasket on the notched plate so that convex of gasket faces up.

Match the outline of gasket to the edge of plate.

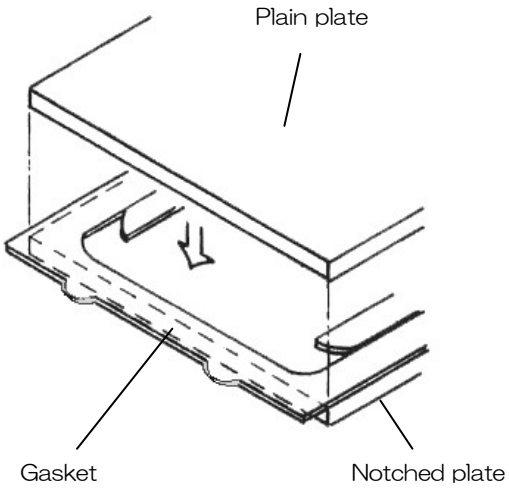
Match the upper end of gasket to the upper end of plate.

Don’t stack a gasket on the spacer.



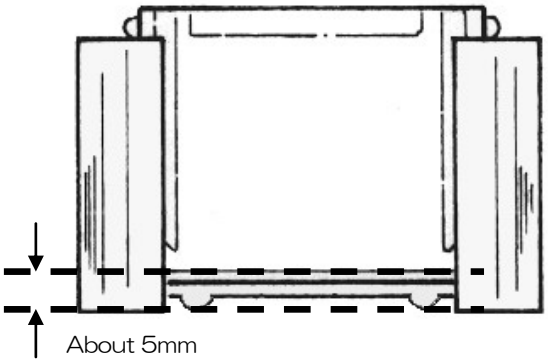
Stack a plain plate on the notched plate to match it.

Be sure the gasket is not out of position at this time.



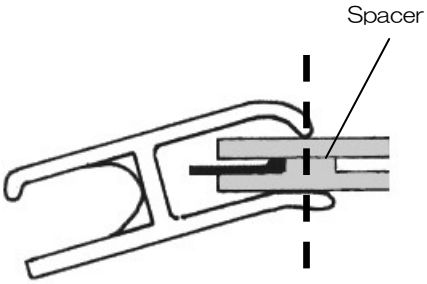
Fix the 2 plates with clips.

The position to bind is about 5mm upper than the low edge of plates.



At this time, clips must bind the plain plate and the spacer of notched plate.

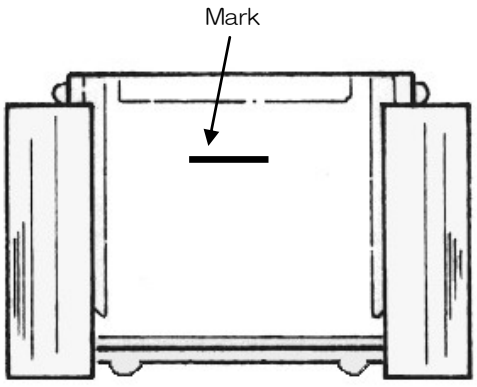
Be sure the 2 plates are not out of position.



Stand the plates set upright on a working table.

Check if the plates don't tilt to right or left side.

To pour separating gel solution, mark with an oil-based pen, The position to mark is 5-6mm lower than the edge of comb which is inserted to the 2 plates. After marking, remove a comb.



A position of border between separating gel and stacking gel affects run time and pattern. To enhance reproducibility, make the positions of each gel be same as that of others.

If a spring of clip is weak, the clip may not fix 2 plates properly and gel film may be generated between the spacer and the plain plate. This gel film causes smiling of gel. Also a clip which is run out may cause liquid leakage during making gel. In these cases, replace it with new one.

2. Gel casting

The below table describes gel concentration and fractional molecular weight range of proteins and nucleic acids.

A gel is made with AE-6401 (how to assemble: Chapter 4.4.1) or WSE-1190 Multi Mini Slab Gel Cast.

This chapter explains how to make a gel with AE-6401.

Gel concentration & Fractional molecular weight range

Gel Concen-tration	Fractional Molecular weight range		
	(Protein)	(Nucleic acid)	(Nucleic acid)
5%	80~400 KDa		80~500bp
7.5%	40~200 KDa	200~3,000 bp	
10%	20~130 KDa	100~2,000 bp	50~300bp
12.5%	14~80 KDa	70~1,800 bp	40~200bp
15%	10~60 KDa	50~1,500 bp	25~150bp

(1)ePAGEL or Tris-Glycine gel
(2)1 x TBE gel

1) Protein

Select gel concentration depending on molecular weight of sample. In the case of native PAGE, charge state of sample considerably affects the mobility. So, it is not possible to select gel concentration based on the molecular weight of sample only. Select it based on preliminary experiment.

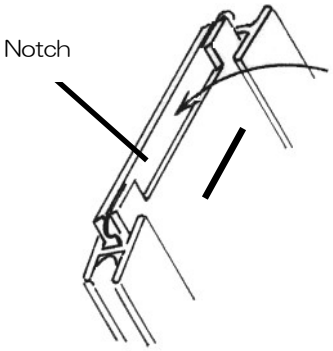
Take specified amount of distilled water, Solution A and B described in the below composition table, and mix it gently. Just before polymerization reaction, add TEMED and Solution D to the mixed solution lastly and mix it softly to prepare separating gel solution.

*As Solution B includes SDS, it bubbles. Do not mix the solution vigorously.
*Polymerization starts after TEMED is added, Mix it evenly, and then pour the solution quickly.

	Separating gel						Stacking gel
	5%	7.5%	10%	12.5%	15%	20%	4.5%
Distilled water	5.8	5.0	4.2	3.3	2.5	0.8	3
Solution A	1.7	2.5	3.3	4.2	5.0	6.7	0.75
Solution B	2.5	2.5	2.5	2.5	2.5	2.5	-
Solution C	-	-	-	-	-	-	1.25
Solution D	0.075	0.075	0.05	0.05	0.05	0.05	0.05
TEMED	0.005	0.005	0.005	0.005	0.005	0.005	0.0025

※For 1 sheet of mini gel. Unit: mL

Tilt the assembled plates and pour separating gel solution from notch gently without putting air bubbles. If the solution is poured vigorously, it may cause uneven polymerization. Pour the solution up to a mark on the plate.



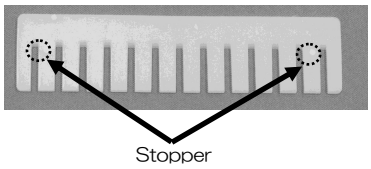
Stack distilled water on the separating gel solution with 2-3mm height. Do not disturb the interface. Leave it calmly for more than 30 minutes.

Pour same amount of distilled water into each plates. If poured amount is not same, distances of separating gel is not even.

At lower temperature (20℃ or less), polymerization is difficult to occur. Polymerization speed changes depending on temperature. To keep reproducibility of electrophoretic pattern, always polymerize gels at constant temperature.

In the case of making a gel for 2D electrophoresis, pour distilled water up to the level which is 3mm lower than notch.

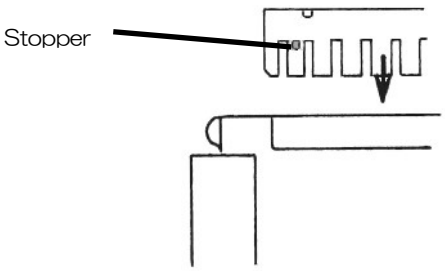
After polymerization is completed, interface of gel becomes visible. Discard stacked distilled water.



Prepare stacking gel solution with referring to the described composition table (Page 16). Pour a small amount of the stacking gel solution on the separating gel to clean the upper end of gel. And then discard it.

Pour stacking gel solution up to the level which is 2mm lower than notch.

Insert a sample comb into the gel solution until a stopper touches to the notch of plate. Polymerization is completed in about 30minutes.



Pay attention not to attach air bubbles to wells of comb. It may cause disorder of the shape.

In the case of using a 2D flat comb, put it on the notch of plate.

2D mini flat comb

There is a cut on upper end of the comb.

Check if a gel polymerizes, and remove the clips and gasket.

Wash away gel solution attached to the plates with distilled water, soon. If there is unnecessary gel on the comb, remove it with a tool such as a spatula

If the gel is not used for electrophoresis soon, wrap it not to be dry.

2) DNA

Select gel concentration depending on molecular weight of sample (Refer to Page 16).
In the case of DNA electrophoresis, stacking gel is not necessary.

Mix specified amounts which are described in the below of distill water, Solution E and F calmly at first. And then add TEMED and Solution D to it and mix calmly to make separating gel solution.

If a gel doesn't polymerize easily, increase amounts of Solution D and TEMED each by 10%.

	5%	6%	7.5%	8%	10%	12.5%	15%
Distilled water	6.33	6.0	5.5	5.33	4.67	3.83	3.0
Solution E	1.67	2.0	2.5	2.67	3.33	4.17	5.0
Solution F	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Solution D	0.075	0.075	0.075	0.075	0.075	0.075	0.075
TEMED	0 .00375	0 .00375	0 .00375	0 .00375	0 .00375	0 .00375	0 .00375

※ For 1 sheet of mini gel Unit: mL

As same as previous chapter "1) Protein", pour gel solution into the assembled plates from the notch gently without putting air bubbles. If the solution is poured vigorously, it may cause uneven polymerization, Pour the solution up to upper end of the notch.

Insert a sample comb into the gel solution until a stopper touches to the notch of plate. Polymerization is completed in about 30 minutes.

Pay attention not to attach air bubbles to wells of comb.
It may cause disorder of the shape.

Check if a gel polymerizes, and remove the clips and gasket.

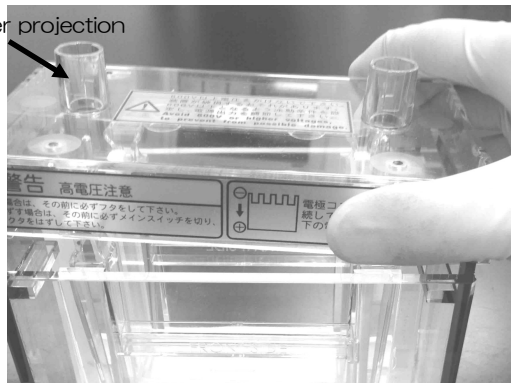
Wash away gel solution attached to the plates with distilled water, soon. If there is unnecessary gel on the comb, remove it with a tool such as a spatula.

If the gel is not used for electrophoresis soon, wrap it not to be dry.

5 Operation

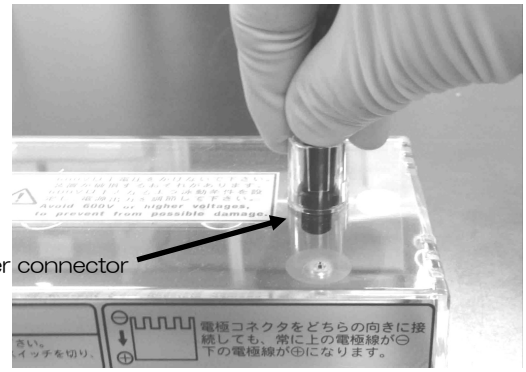
5.1 Preparation of chamber

Prepare a safety cover and lead wires.

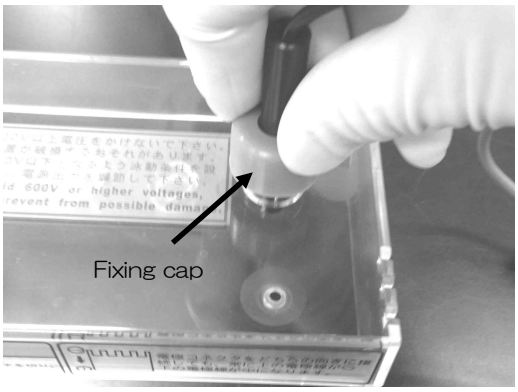


Set the lead wires to the safety cover.

Insert chamber connectors into cylinder projections of safety cover.

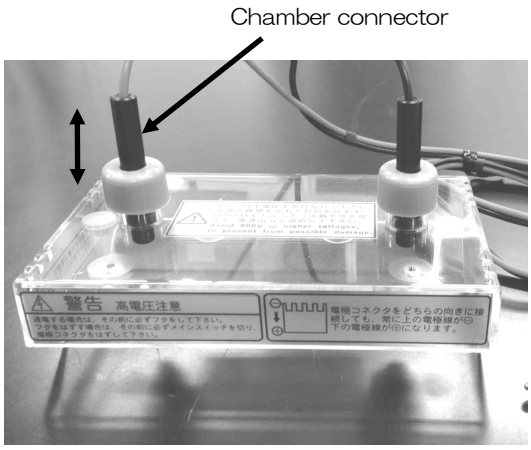


Cover the cylinder projections with fixing caps for fixing the lead wires to the safety cover.



Slide the chamber connectors up and down, and check if these parts move from upper end to lower end smoothly.

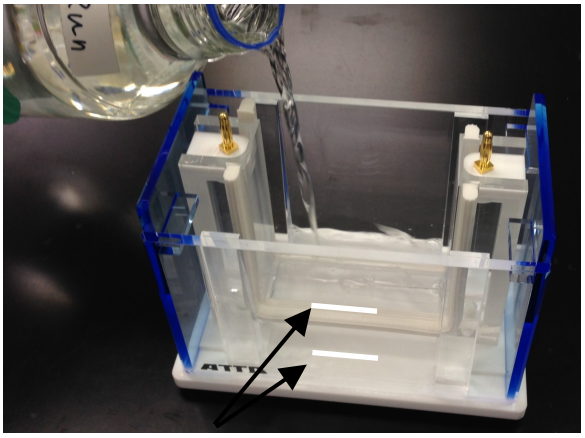
Also, check if chamber connectors cannot be removed when it moves by upper end of the cylinder projection and touches to the fixing caps.



5.2 Setting of lower buffer

Pour electrode buffer into electrophoresis chamber with referring buffer lines. Pour it calmly not to make bubbles.

Buffer lines indicate,
Upper line : 500mL (Max. amount)
Lower line : 170mL (Min. amount)



Buffer line

If amount of lower buffer is poured more than maximum amount, buffer spills from the chamber when a gel is put out.

5.3 Setting of gel

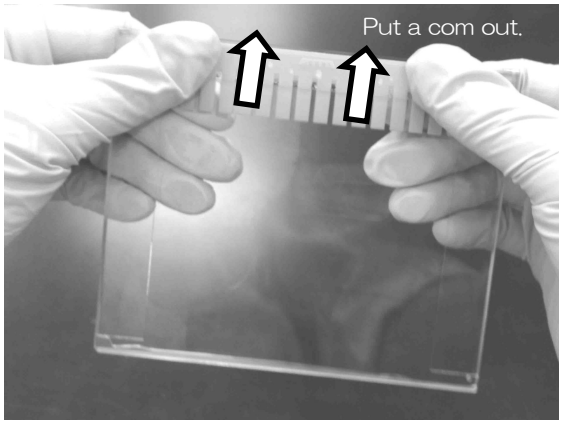
Prepare a gel.

In the case of using ePAGEL HR, cut a package along a dotted line as described in the right image, and put gel plates out. If it is difficult to cut it by hand, use scissors. Do not put gel plates out by force.

In the case of using a hand-made gel, remove clips and a gasket from plates.

Put a comb out slowly in the direction of arrow. If the comb is put out quickly, wells of comb may be broken.

Pour small amount of electrode buffer to remove non-polymerized acrylamide and wash wells.

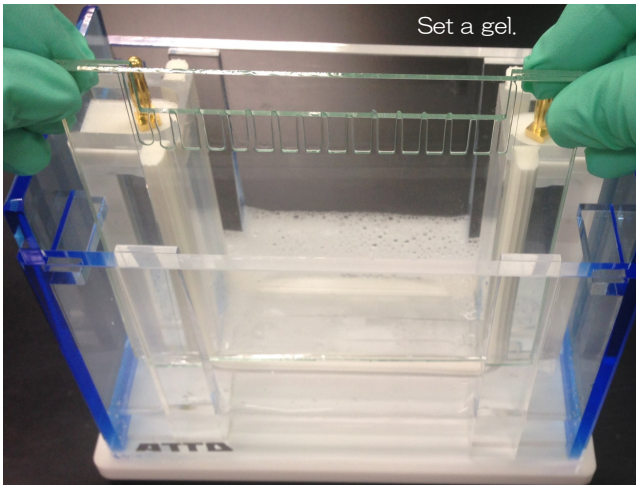


If there are bits or salt on the surface of plates, wipe it away.

If connecting part to a seal packing of the chamber is dirty, it may cause buffer leakage.

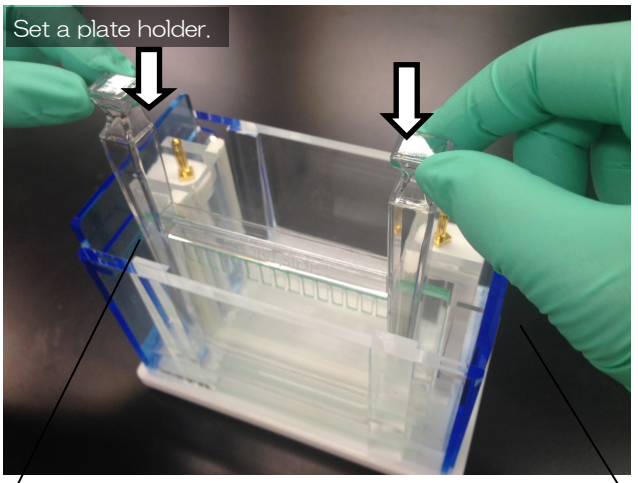
Set a gel so that a notch faces to the inside of electrophoresis chamber. At this time, tilt it not to put air bubbles in the lower end of gel and set it.

In the case of electrophoresing 1 gel, set a dummy plate, in the case of electrophoresing 2 gels, set another gel, to opposite side in the same way as 1st gel.

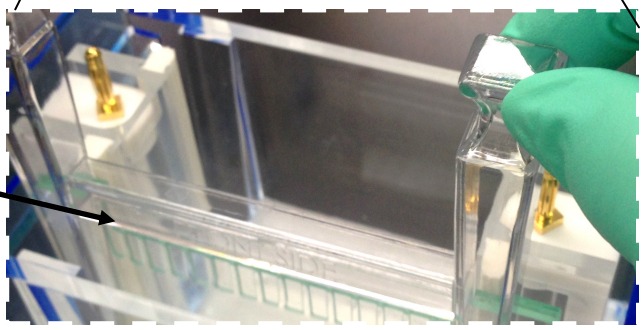


Set a plate holder so that "FRONT SIDE" on the holder faces to outside, and then fix the gels (or dummy plate) with the holder.

Push the holder in the vertical direction by equal force until it touches to the bottom of chamber. If it is no the set in the vertical direction, it may cause buffer leakage.

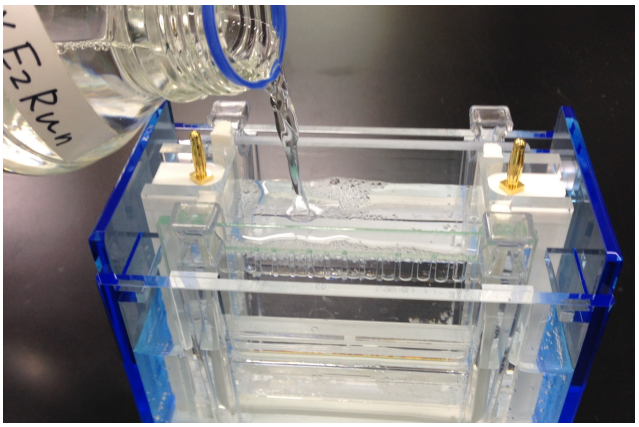


"FRONT SIDE"

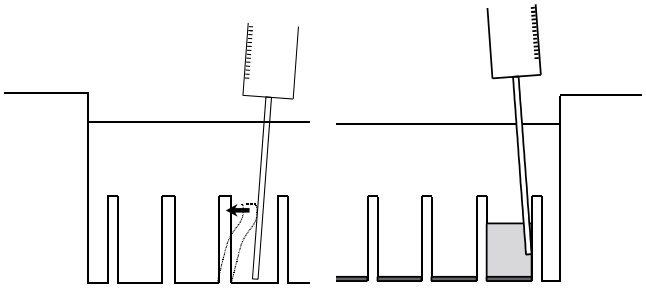


Pour electrode buffer into the upper chamber.

Surface of buffer should be 2-3mm lower than upper end of plates.



5.4 Applying sample



Check the inside of wells and remove air bubbles with a needle of syringe if there are the bubbles. Also, push the side of wells with a needle of syringe to let wells upright, if the wells are not standing straight.

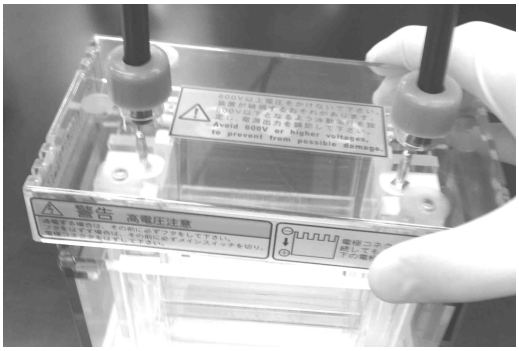
Apply protein samples to wells with a tool whose point is sharp such as syringe or micropipette. Required amount to each well is 2 -8μ L. Maximum amount is; about 30μ L for 12-well comb (RM10-12), about 25μL for 14-well comb (RM10-14), about 18μL for 18-well comb (RM10-18).

To get ideal pattern, do not drop samples from the upper part of well, but insert a needle or tip into the bottom of well and apply it slowly.

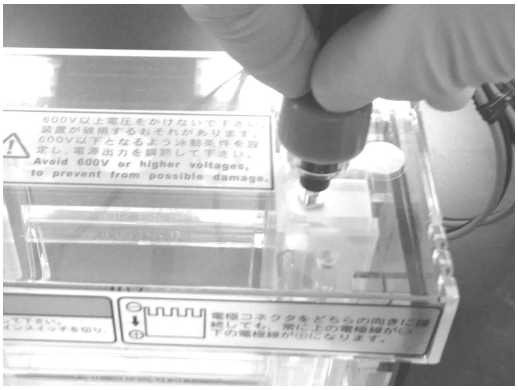
Start to distribute electric current soon after applying samples.

5.5 Starting of migration

After applying samples, put a safety cover on electrophoresis chamber soon.



Check if chamber connectors are inserted into electrode plugs visually, and push the 2 connectors below.



There is no difference between + and— because of automatic polarity changing function.

Check if a main switch of power supply is turned off before connecting to it.

Connect the chamber to a power supply with lead wires.

Do not use a connector of power supply or electrode plug if it is wet. It may cause electric shock or damage to the system. Stop using it and contact your distributor or our company.

Set a output condition of power supply and start an electrophoresis.

⚠Warning

Do not apply voltage more than 600V. It may cause damage to the system.

Set a voltage condition less than 600V and adjust output from a power supply.

Reference

A general condition to distribute power is required 20mA/gel, constant current. If 2 gels are electrophoresed at the same time, the condition is required 40mL/chamber, constant current. Run time in this case is 70-90 minutes*. The voltage rises from 80V (at the beginning of distributing) to 200V (at the end). Hence, set 250V as a voltage condition (in the case of native PAGE, set 300V). It is necessary to change current value depending on the number of gels under constant current condition , but voltage value does not have to be changed.

In the case of high-speed protein electrophoresis with our product, EzRun, it should set 300V as constant voltage. Run time is 30-40 minutes. Current value changes from 80mA to 30mA for 1 gel, or from 160mA to 60mA for 2 gels . In the case of high-speed electrophoresis with EzMOPS, it should set 250V as constant voltage. Run time is 20-30 minutes. Current value changes from 80mA to 40mA for 1 gel, or from 160mA to 80mA for 2 gels .

*Run time is affected by casting method, polymerization degree (which changes depending on amount of ammonium persulfate and TEMED, and temperature) of gel, composition and concentration of buffer, gel or sample solution and temperature of buffer or circumstance.

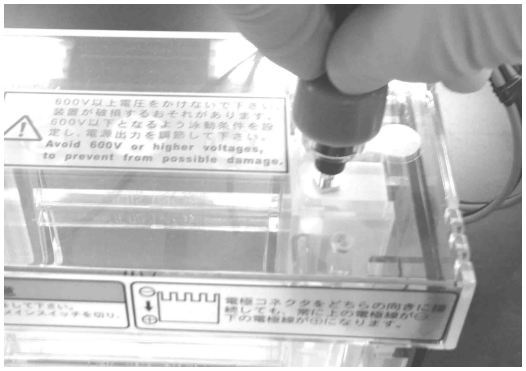
5.6 Stopping & Termination of migration

Stop migration when color marker (BPB) reaches to the 5mm upper position from the lower end of gel.

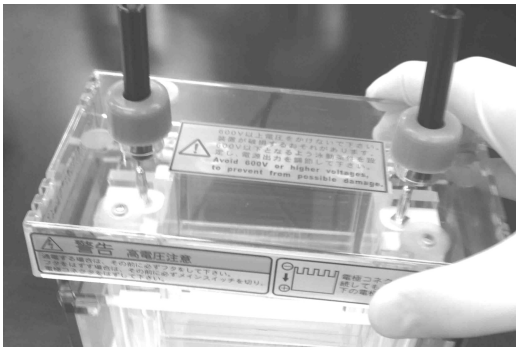
Stop output of power supply and turn off the main switch.

Hold chamber connectors and put lead wires from terminals.

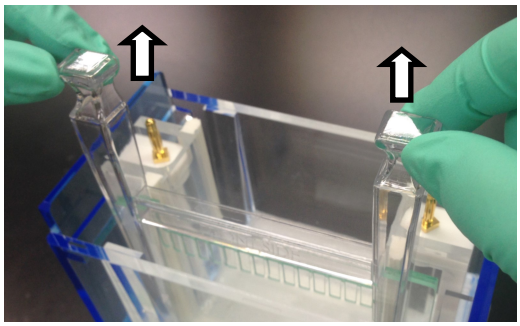
Hold a safety cover from the above and put lead connectors from electrode plugs of upper chamber.



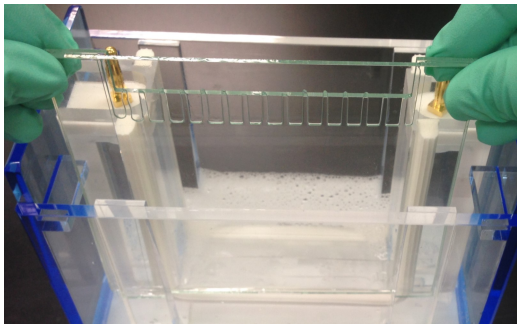
Remove the safety cover.



Pull up a plate holder.



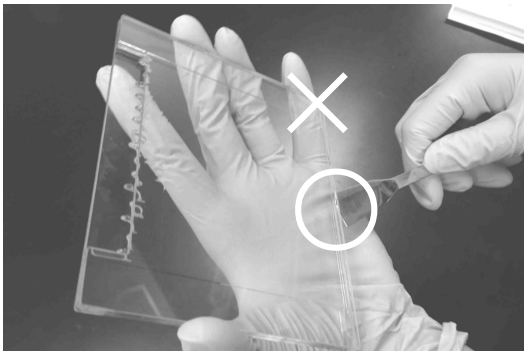
Take a gel out from lower chamber.



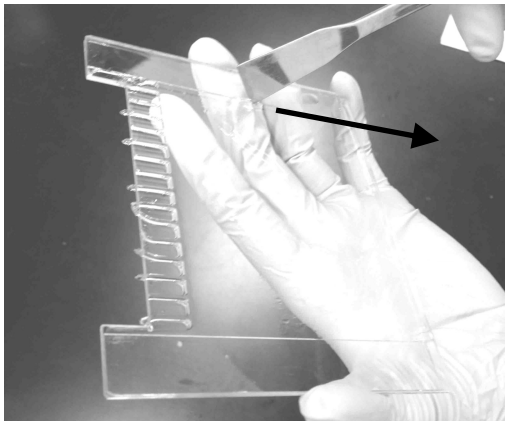
5.7 Detection

Hold plates and turn a plain plate (MB-00) upward.

Insert a flat tool such as a spatula into 2 plates and move it up and down calmly to remove a notched plate from the plain plate. A spatula should be inserted into the center of lower end.



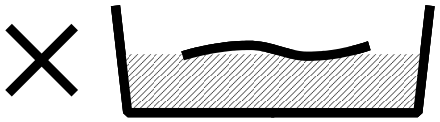
If a spatula is inserted into the corner, the plates may be broken.

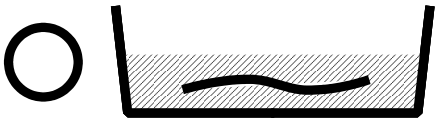


A gel sticks to spacers. Wet a spatula or scalpel with staining reagent, and then make a cut slowly between the gel and spacer. Pay attention not to break the gel.

Turn the side sticking to the gel downward on a vat with staining reagent. Insert a spatula between the gel and plate to peel it off.

A wet spatula doesn't stick to gel and it prevents from breakage.





1) Stain for protein

●EzStainAQua (CBB stain solution) or any other stain

Follow a protocol of each reagent or solution such as EzStainAQua (CBB stain solution), silver stain, negative stain, fluorescent stain and so on.

●CBB stain

Put a gel into a vat with CBB stain and shake it for 60 min to 1 evening. Discard the stain, and shake the gel with decoloring solution for 60min to 1 evening.

2) Stain for DNA

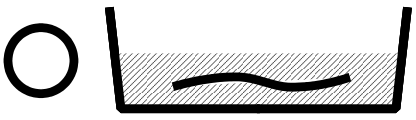
●Ethidium bromide stain

⚠Warning

Put on gloves and a white coat surely not to touch ethidium bromide directly because it is a carcinogenic substance. Follow a protocol provided by your facilities to dispose waste fluid.

Do not use black light until you read a manual and understand it well. If you do, it may cause disorder affecting eyes and skin. If you use UV rays, protect your body with protective glasses, face shield and gloves from it.

After electrophoresis, immerse a gel in ethidium bromide stain and shake it for 20-30minutes.



Dispose the stain. Pour 1xTBE buffer and shake it for 5-20 minutes.

Irradiate it with UV rays to detect.

●Other stain

Follow a protocol of each manual of silver stain, fluorescent stain and others.

5.8 Cleaning & Safekeeping the system

1. Cleaning the equipment

Before an electrophoresis chamber, a plate holder, glass plates and a comb (for hand-made only) are dried, wash it with soft sponge and neutral detergent as well as remove bits of gel. After cleaning, dry it naturally. Do not let it touch with organic solvent such as acetone and alcohol, nor dry it at high temperature. It may cause crack, deformation or decoloring.

Pay attention to a platinum wire of the chamber so as not to cut it during cleaning. Do not use a metal sponge or test tube brush for washing. The chamber may be damaged and visibility during migration is reduced.

Dispose glass plates of ePAGEL HR. We cannot guarantee the performance of reuse products.

Do not remove a part of upper chamber from the whole of chamber.
It may cause cutting platinum wires or damage to the chamber.

2. Safekeeping the system

Store the system in an area out of direct sunlight, high temperature or corrosive gas. Do not leave glass plates set in the chamber when it is stored.

Do not fix a gel cast by clips except when a gel is made. The elasticity of springs is reduced and it may cause leakage when a gel is made.

Do not leave glass plates set in the chamber when it is stored.
The seal packing is deteriorated and it may cause leakage when a gel is made.

6 Trouble shooting

Symptom	Cause	Solution
A gel does not polymerize.	Preparative procedure of gel solution is not correct.	Try to make each solution again. If retry results in failure, remake each solution for preparing gel.
	Ammonium persulfate (Solution D) is old.	Ammonium persulfate should be used as soon as it is prepared. When it is stored, keep temperature at 4℃ and use it up within 1 week.
	Room temperature or temperature of gel solution is low.	It is difficult to undergo polymerization if room temperature is below 20℃. Try it at the higher temperature (till about 25℃).
	Others	Increase ammonium persulfate and TEMED by 10%.
There are air bubbles in gel.	Plates or a comb is dirty.	Clean used glass plates and comb before it is dried, and store it so as not to attach dust etc. Also, do not touch gel contact surface of plates and comb with bare hands.
A gel is marked with a line.	Polymerization speed is uneven.	Uneven polymerization affects migration pattern. If plates and a comb is dirty, or there is a big temperature difference between plates & comb and gel solution, uneven polymerization occurs easily. Take out each solution for gel casting from a refrigerator and bring it back to room temperature. Then, use it.
Shape of a well is odd.	Non-polymerized acrylamide in a well polymerizes after a comb is removed.	Remove comb just before use a gel. After removing, wash wells with electrode buffer or pure water.
A well is broken off when comb is removed.	A comb sticks on a gel too much.	For a gel polymerizing easily, gel solution may be removed air. In this case, it tends to break off wells easily. So, omit this step.
Gel solution leaks from glass plates.	Assembling method of a gel cast is not correct.	Refer to Chapter 4.4.1 “Setting up a gel cast” and try to assemble it again.
	A gasket or plates is damaged.	Replace it with new one.

Symptom	Cause	Solution
Gel solution leaks from glass plates.	A clip runs out (The elasticity of springs is reduced).	Replace it with new one.
Buffer leaks from upper chamber.	A plate holder is not set sufficiently.	Check which side of a plate holder faces to and thrust it down in accordance with a guide for plate holder.
	Plates are dirty.	Clean used plates and remove bits of gel before it is dried. After gel casting, wipe off gel solution, dusts and so on with wet waste cloth if it adheres to surface of plates.
	Electrode buffer is poured into upper chamber too much.	Buffer may flow from between upper end of plates and seal packing to lower chamber as capillary reaction. Pour buffer up to a position 2-3mm lower than the upper end of plates.
	There is gel film between spacers and a plain plate.	There is a gap between spacers and a plain plate because seal packing of gel cast kit or springs of a clip run out. Stop using a clip and contact your distributor or our company (Please refer to the back cover).
	A small amount may leak.	In the case of buffer including SDS, 1-2mL of buffer may leak for 1 evening to 24 hours. However, it doesn't affect electrophoresis.
	A seal packing is torn.	If a seal packing is torn or peeled off from the chamber, the system should be repaired. Stop using it immediately and contact your distributor or our company (Please refer to the back cover).
Sample solution doesn't sink in wells.	Wells are dirty or attached to gel.	Wash wells with electrode buffer and a micropipette or syringe. If bits of gel and dust remain, use a needle of syringe to remove.
	Sample solution is light with a density.	Concentration of glycerin or saccharose in sample solution may be weak. Add an adequate amount to it.
Run time or a position of bands is different from the usual one.	Output setting is not correct.	In the case of an operation under constant current condition, check the current value. If 2 gels are electrophoresed under the same condition of 1 gel, increase a current value by twice. On the contrary, if 1 gel is electrophoresed under the same condition of 2 gels, decrease it in half.
	Component or concentration of buffer or gel is not correct.	If it may be incorrect, make buffer or a gel again.
	pH value of Solution B or C in gel solution is not correct. (In the case of protein electrophoresis)	pH value should be adjusted to the below. Solution B : pH8.8 Solution C : pH6.8
	Electrode buffer is reused.	Do not reuse electrode buffer.
	A gel is old.	In the case of ePAGEL HR, use it within the expiration date for use. In the case of a hand made gel, use it before the day is over. If the gel is not used on the day, store it at 4℃ and use on the next day. A gel is deteriorated little by little and the reproducibility is reduced.
	Polymerization degree is different from the usual one.	A amount of TEMED or ammonium persulfate to add affects polymerization degree of gel. We recommend you to make a gel always in accordance with the amount and method described in this manual. Also a difference of temperature of room and solution affects it. If there is not a big difference, the temperature doesn't affect it too much, however, making a gel be polymerized at about 25℃ enhances reproducibility more.
	Others.	Speed of migration is affected by salt concentration of sample solution and temperature of electrode buffer or surrounding, other than the above. To enhance reproducibility to the utmost limit, each condition should be adjusted to the same.
When a gel is stained, there is unnatural straight lines in the lane.	Sample solution or wells includes dust and insoluble element.	Centrifuge sample solution to remove insoluble element. Clean wells with electrode buffer.
Migration pattern is disturbed among lanes (Smiling etc.).	An amount of buffer is not sufficient.	It is required to immerse electrophoresis plates in buffer of the lower chamber for improving homeothremy of gel. So, put the amount described in this manual in the lower chamber.

Symptom	Cause	Solution
Migration pattern is disturbed among lanes (Smiling etc.).	A quality of electrode buffer is not enough.	Make electrode buffer again.
	Salt concentration of sample solution is different among lanes.	Salt concentration of sample solution affects migration speed. Adjust the concentration as much as possible with desalting, concentrating, diluting (ethanol precipitation in the case of nucleic acid) etc. Especially, please take note of restriction enzyme buffer [salt concentration is different among kinds] and dilution series.
	There are air bubbles at the lower end of gel.	If there are small and not many air bubbles, it rarely affects migration pattern. However, big and many bubbles may affect it.
Migration pattern widens toward the end.	The side of gel is supplied too much electricity.	If a clip used for gel casting runs out, gel film is generated easily between spacers and a plain plate. Electricity is supplied to the side of gel via this film. Replace it with new one.
		If a gel is peeled off from plates, this trouble may be generated easily. Don't make plates dislocate and separate. Also an old hand made gel and precast gel whose expiration date for use is over are peeled off easily, so that don't use it.
		If high voltage electrophoresis is executed with a small amount of lower buffer (liquid surface is below buffer line), this trouble may be generated easily. In the case of electrophoresis with a small amount of buffer, set output as a half value.

7 Maintenance

7.1 Cleaning

Electrophoresis chamber

Refer to Page 26 (" Cleaning & safekeeping the system") to clean an upper and lower chamber, plate holder and glass plates and a comb.

7.2 Inspection

Before using a stored system, read this manual and inspect it simultaneously. If you find an abnormality at the inspection, don't use it, and then contact our company.

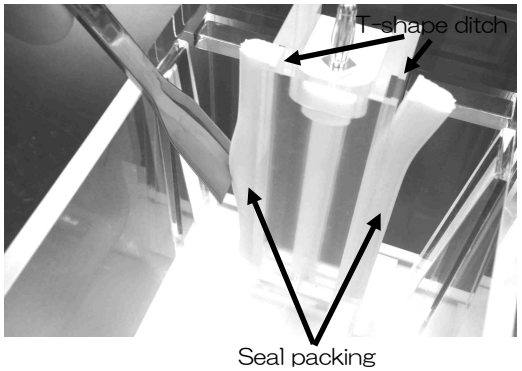
Electrophoresis chamber

Set a plain plate (MB-00) in the chamber so as to face to seal packing side. Pour pure water into the upper chamber to check if there is no leakage.

Check if there is no deformation, wobble or corrosion on electrode plugs of upper chamber visually and with connecting to lead wires.

⚠Warning Do not connect to a power supply while an inspection of upper chamber with lead wires.

If a seal packing is partly out of position, insert it into a T-shape ditch with fingers or a spatula.

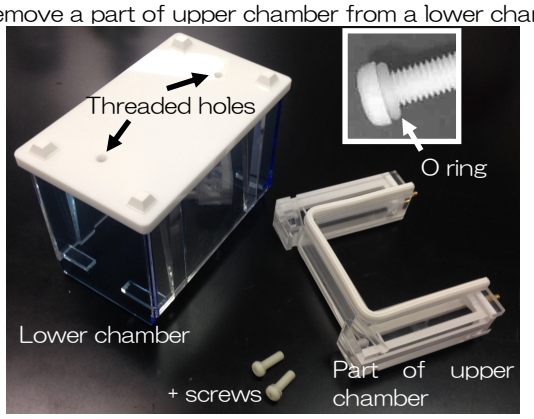


If it is not easy to insert into or the seal packing is out of position greatly, remove a part of the upper chamber from a lower chamber once.

⚠Warning

Do not remove an upper chamber except when an seal packing is attached. If you do, it may cause cutting platinum wires, damage to the system or leakage.

Remove a part of upper chamber from a lower chamber



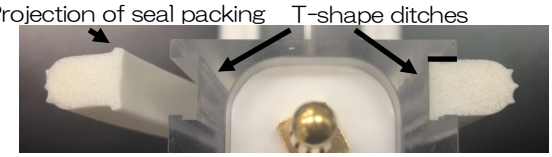
Remove an upper chamber

Remove 2 +screws from the bottom of a lower chamber. Then, Take out an upper chamber from the lower chamber.

Attach a seal packing

Push projections of seal packing into a T-shape ditch so as to settle into the inside. If it is twisted or protrudes from T-shape ditch, retry to attach it.

Projection of seal packing　T-shape ditches

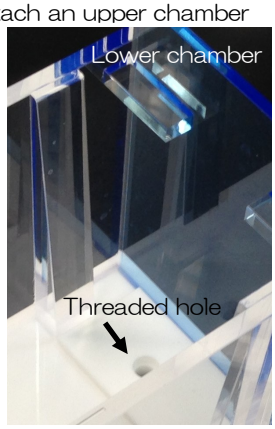


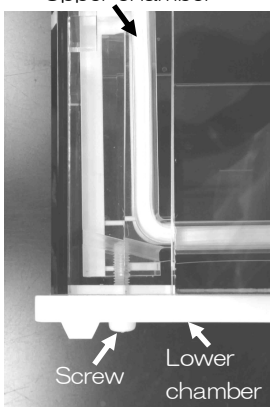
Attach an upper chamber

Place an upper chamber so as to align with threaded holes on the inside bottom of lower chamber. Fix the upper chamber with 2 screws. To fix tightly, screw it until O rings are crushed.

Check if the upper chamber doesn't wobble. Also, confirm if there is no leakage from lower chamber as same as upper chamber described in the former page.

Attach an upper chamber　　Upper chamber





Hand made gel cast kit

Assemble a gel cast kit (Refer to Page 14 "Setting up a gel cast"). Pour pure water up to the position 0.5-1cm lower than the upper edge of notch and leave it for 1 hour to check if there is no leakage.

7.3 Consumables

Products in the below are consumables for WSE-1165. Replace an old item with a new one as required. If you need another item not described in the below, please contact your distributor or our company.

Model	Product name	Product code
	Plate holders for WSE-1165, 2/pk	2322199
MAB-10	1mm Glass Plates, 2/pk (Notch plates)	2398230
MB-00	Plain Glass Plates, 2/pk	2398232
RM-10	1mm Plate Set (a pair of plates (Notch and Plain) and a gasket)	2398214
RMS-01	1mm Gaskets 3/pk	2398237
RM10-12	1mm 12-well Combs, 2/pk	2398269
	Clips, 4/pk	2398239

7.4 Warranty

ATTO Corporation warrants all its products subject to the terms and conditions set forth below.

1. This warranty covers all new products that are sold by ATTO Corporation (hereinafter called ATTO).
2. Expendable items are not covered by this agreement.
3. Claims under this warranty are limited to defects in material and workmanship of the products.
4. Malfunction and/or damage due to neglect, abuse, operation or repair contrary to specifications and/or instructions presented by ATTO are not warranted.
5. ATTO shall not be liable to consequential damage, labor, loss or expense directly or indirectly arising from use of the products.
6. Damage due to transit is not covered by this warranty.
7. The warranty period is one (1) calendar year from a date when the products are shipped from ATTO to an original purchaser.
8. This warranty period is not applied to any defect that is reported to ATTO later than one (1) calendar month from a date od warranty termination.
9. ATTO shall supply parts to replace faulty parts of defective products under this warranty, free of charge.
10. ATTO shall repair defective products under this warranty, which cannot be repaired at field, free of charge.
11. ATTO shall replace defective products under warranty, which cannot be repaired, free of charge.
12. Freight charges for return and replacement shipments under this warranty are shared by ATTO and a purchaser, that is one way by either party and another way by another party.
13. Warranty period of repaired products and replacement products or parts is three (3) calendar months from a date when the said products or parts are shipped from ATTO, or a remaining them of an original warranty period of the defective products, whichever lasts longer.
14. Return of the products for credit or refund is not accepted unless otherwise agreed in writing by ATTO.

8 Specification

Product name	Mini-Slab
Model	WSE-1165
Size of Plate (W x H x D , mm)	100～120 x 100 x 5 or 7
Size of Gel (W x H x D , mm)	90 x 80 x 1.0
Thickness of all glass plates (mm)	5～7mm
Amount of buffer	450～650mL
Available number of sheets for simultaneous electrophoresis	2 sheets
Electrophoresis gel isothermal method	Two-sided constant temperature by using upper and lower buffer solution
Electrode	Upper chamber: negative, Lower chamber: positive
Safety method	Safety cover
Location of use	Only use in a room. Operation ambient temperature 5～40℃ Operation ambient humidity 5～70%RH No dew condensation
Equipment	Transportable equipment
Dimension/Weight Main unit	165mm（W）× 99mm（D）× 134mm（H） 0.9Kg
Standard components	Main unit Electrophoresis chamber, Safety cover with lead wires Instruction manual

MEMO

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