

## Product Information

### Rapid Silver Staining Kit

Product Code **RSK-1**

Store at Room Temperature

### TECHNICAL BULLETIN

#### Product Description

The Rapid Silver Staining Kit provides a highly sensitive and fast technique (~1.5 hours) for detecting nucleic acids and proteins in polyacrylamide slab gels after electrophoresis. The detection limit of single and double-stranded DNA is more sensitive than ethidium bromide staining. The detection limit for proteins, using the Rapid Silver Staining Kit, is  $<1 \text{ ng/mm}^2$  band cross section compared to  $50 \text{ ng/mm}^2$  using Coomassie<sup>®</sup> staining.

#### Components

The kit contains reagents sufficient to stain 20 mini gels (10 x 8 cm) or 7 large gels (18 x 16 cm).

<u>Item</u>	<u>Product Code</u>
Component 1A - Silver Nitrate	S 8149
Component 1B - Ammonium Nitrate	A 7649
Component 2 - Tungstosilicic Acid	T 4791
Component 3 - Formaldehyde Solution	F 5775
Component 4 - Sodium Carbonate	S 5903
Silver Fixing Solution	G 6153
One Empty Bottle	----

#### Reagents Required but Not Provided

Ultrapure Water (18 M $\Omega$ .cm or equivalent)

Methanol (Product Code M 3641)

Acetic Acid (Product Code A 6283)

#### Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

#### Preparation Instructions

##### Preparation of Stock Solutions:

Prepare all stock solutions using ultrapure water.

1. Component 1A (Product Code S 8149) - Add 49 ml of water to the bottle labeled Component 1A. Stir with a clean, PTFE-coated stirring bar for ~15 minutes or until powder is completely dissolved.
2. Component 1B (Product code A 7649) - Add 49 ml of water to the bottle labeled Component 1B. Stir with a clean, PTFE-coated stirring bar for ~15 minutes or until powder is completely dissolved.
3. Component 2 (Product Code T 4791) - Add 85 ml of water to the bottle labeled Component 2. Stir with a clean, PTFE-coated stirring bar for ~15 minutes or until material is completely dissolved. Remove the stirring bar, bring the final volume to 100 ml with water, and invert bottle several times to obtain a homogeneous solution.
4. Component 3 (Product code F 5775) - Dilute the contents of the bottle labeled Component 3 by adding 97.2 ml of water and invert bottle several times to obtain a homogeneous solution.
5. Component 4 (Product Code S 5903) - Add 900 ml of water to the empty bottle provided. Place a clean, PTFE-coated stirring bar into the bottle. While stirring, slowly add the contents of the bottle labeled Component 4. The material will quickly dissolve. Remove the stirring bar, bring the final volume to 1,000 ml with water, and invert the bottle several times. Store at 2–8 °C.  
Note: If water is added to the powder, a longer period of time is required for the material to dissolve.
6. Silver Fixing Solution (Product Code G 6153) - Add 500 ml of water to the bottle labeled Silver Fixing Solution. Invert the bottle several times to obtain a homogeneous solution.

### Preparation of Reagents:

Prepare all reagents using ultrapure water.

#### 1. Fixing Solution

Mix the following together:

Prepared Silver Fixing Solution (Stock Solution)	10 ml
Methanol (Product Code M 3641)	100 ml
Acetic Acid (Product Code A 6283)	20 ml

Bring the final volume to 200 ml with water.

Note: For large gels prepare twice the volume (400 ml total volume).

#### 2. Staining and Development Solution

Prepare immediately before use. Add the following components sequentially with stirring to a 150 ml beaker:

Water	35 ml
Component 1A Stock Solution	2.5 ml
Component 1B Stock Solution	2.5 ml
Component 2 Stock Solution	5.0 ml
Component 3 Stock Solution	5.0 ml
Component 4 Stock Solution	50 ml

Note: The Component 4 Stock Solution must be added quickly. For large gels prepare 3 times the volume (300 ml total volume).

#### 3. Stop Solution – [5% (v/v) Acetic Acid]

Prepare the Stop Solution by combining:

Water	95 ml
Acetic Acid (Product Code A 6283)	5 ml

Note: Always add the acid to the water. For large gels prepare 4 times the amount (400 ml total volume).

### Procedure

Procedure for room temperature Rapid Silver Staining of polyacrylamide gels after electrophoresis. All containers should be cleaned with 50% (v/v) nitric acid and rinsed thoroughly with ultrapure water. Wear gloves during each step. COMPLETELY submerge the gel in each solution. Refer to Table 1. for the volume and time required for each step for various gel size and thickness.

1. Fixing - Fix the gel by immersing completely in Fixing Solution. Gently agitate.
2. Washing - Replace Fixing Solution with ultrapure water and agitate gently. Repeat this washing step once.
3. Silver Staining and Development - Transfer the gel into the Staining and Development Solution and incubate with gentle shaking until the desired band intensity is obtained.
4. Stopping - After the desired intensity is obtained, stop the gel staining reaction by transferring the gel into the Stop Solution. Incubate with gentle agitation. Transfer the gel into water. After this step the gel may be dried for storage.  
Note: Negative staining may result if samples (proteins or nucleic acids) are overloaded. If this occurs, the staining procedure should be repeated.

**Table 1.**

Recommended Solution Volumes and Time for each Step

Steps	Volume		Time	
	Mini Gel (10 x 8 cm)	Large gel (18 x 16 cm)	Thickness (0.5-1.0 mm)	Thickness (1.5-3.0 mm)
Fixing	200 ml	400 ml	20 minutes	30 minutes
Washing	100 ml	400 ml	2 x 10 minutes	2 x 20 minutes
Staining & Developing	100 ml	300 ml	~30 minutes	~40 minutes
Stopping	100 ml	400 ml	10 minutes	20 minutes

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