

Ordering Information

Catalog

Number Product Description

Molecular Weight Standards

- 161-0303 **SDS-PAGE Standards**, High, 200 μ l
- 161-0304 **SDS-PAGE Standards**, Low, 200 μ l
- 161-0317 **SDS-PAGE Standards**, Broad, 200 μ l
- 161-0314 **Silver Stain SDS-PAGE Standards**, Low, 200 μ l
- 161-0315 **Silver Stain SDS-PAGE Standards**, High, 200 μ l
- 161-0306 **Biotinylated SDS-PAGE Standards**, Low, 250 μ l
- 161-0311 **Biotinylated SDS-PAGE Standards**, High, 250 μ l
- 161-0319 **Biotinylated SDS-PAGE Standards**, Broad, 250 μ l
- 161-0320 **2-D SDS-PAGE Standards**
- 161-0326 **Polypeptide SDS-PAGE Standards**, 200 μ l

Prestained Standards

- 161-0305 **Prestained SDS-PAGE Standards**, Low, 500 μ l
- 161-0309 **Prestained SDS-PAGE Standards**, High, 500 μ l
- 161-0318 **Prestained SDS-PAGE Standards**, Broad, 500 μ l
- 161-0324 **Kaleidoscope Prestained Standards**, 500 μ l
- 161-0325 **Kaleidoscope Polypeptide Standards**, 500 μ l

IEF Standards

- 161-0310 **IEF Standards**, pI range 4.45-9.6, 250 μ l



Silver Stain SDS-PAGE Standards, Low Range

Catalog Number
161-0314

Product shipped on dry ice.
Store at -20 °C upon arrival.

BIO-RAD

SDS-PAGE Molecular Weight Standards, Low Range Specifications

Low Range	
Range	14,400 to 97,400 daltons
Contents	Rabbit muscle phosphorylase b Bovine serum albumin Hen egg white ovalbumin Bovine carbonic anhydrase Soybean trypsin inhibitor Hen egg white lysozyme
Volume	200 µl concentrated solution
Storage	-20 °C
Shelf Life	1 year at -20 °C
Applications per vial	400 full size gels 800 mini gels
Recommended gel percentages	12.5%*

***Note:** The lowest recommended gel percentage for the low range standards is 10%. At gel percentages of 10% or less, one or more of the standards may migrate at the dye front, depending on running conditions and other factors. As a result, only four or five bands may be visible after staining. If this should occur, an increase in gel percentage is recommended.

Silver Stain SDS-PAGE Standards contain approximately 700 µg total protein in 50% glycerol (w/v), 300 mM NaN₃, 20 mM Tris, and 4 mM EDTA. The proteins have been blended to give bands of equal intensity on SDS polyacrylamide gel systems run according to Laemmli¹ and stained with Bio-Rad Silver Stain or Silver Stain Plus. Different results may be obtained when alternative silver staining chemistries are used.

Reference

1. Laemmli, U. K., *Nature*, **227**, 680 (1970).
2. Hames, B. D. and Rickwood, D., **Gel Electrophoresis of Proteins: A Practical Approach**, Second Edition, p. 17, Oxford University Press, New York (1990).

Protocol

Dilute standards 1:20 in SDS Reducing Sample Buffer.* Heat for 5 minutes at 95 °C. Cool and load 10 µl/well for full length gels (16-20 cm) or 5 µl/well for mini gels. These load volumes and dilutions have been optimized for development with Bio-Rad Silver Stain or Silver Stain Plus for approximately 10 minutes. If silver stain development times vary, the loading volume or dilution of the standards may need to be adjusted to optimize the band intensity.

* SDS Reducing Sample Buffer (Prepare immediately before use)

β-mercaptoethanol	25 µl
Stock sample buffer	475 µl
	500 µl

Stock Sample Buffer (Store at room temperature)

Distilled water	4.8 ml
0.5M Tris-HCl, pH 6.8	1.2 ml
Glycerol	1.0 ml
10% (w/v) SDS	2.0 ml
0.1% (w/v) bromophenol blue	0.5 ml
	9.5 ml

Use of stock sample buffer with insufficient or old β-mercaptoethanol may result in doublets at the soybean trypsin inhibitor and ovalbumin bands.

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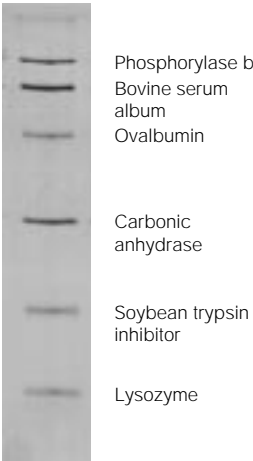


Fig. 1. Silver Stain SDS-PAGE Standards give bands of even intensities when stained with Bio-Rad's Silver Stain or Silver Stain Plus. Note that no extraneous bands are present. Low range standards run on a 12.5% SDS polyacrylamide gel and stained with Bio-Rad's Silver Stain Kit.

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Protein Molecular Weights

Protein	Molecular Weight	References
Rabbit muscle phosphorylase b	97,400	Titani, K., et. al., <i>Proc. Natl. Acad. Sci. USA</i> , 74 , 11, 4762 (1977).
Bovine serum albumin (BSA)	66,200	Brown, J. R., <i>Fed. Proc.</i> , 34 , 591 (1975).
Hen egg white ovalbumin	45,000	Warner, R. C., "Egg Proteins," in: The Proteins , Vol. IIA, p. 435 (Neurath, H. and Bailey, K., eds.), Academic Press, New York (1954).
Bovine carbonic anhydrase	31,000	Davis, R. P., "Carbonic Anhydrase," in: The Enzymes , Vol. V, p. 545, (Boyer, P. D. eds.) Academic Press, New York (1971).
Soybean trypsin inhibitor	21,500	Wu, Y. V. and Scheraga, H. A., <i>Bio-chemistry</i> , 1 , 698 (1962).
Hen egg white lysozyme	14,400	Jolles, P., <i>Angew. Chem., Intl. Edit.</i> , 8 227 (1969).

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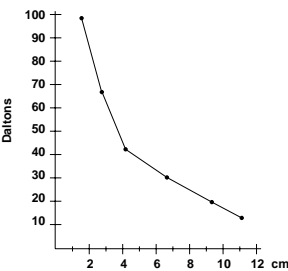


Fig. 2. Curve generated by plotting the molecular weight of the low range molecular weight standards run on a 12% SDS polyacrylamide gel vs. the distance migrated from the interface of the stacking and separating gels in centimeters. An alternative method is to plot the log₁₀ relative mobility (R_f) vs. the gel concentration, %T, (percentage total monomer, i.e. grams acrylamide plus bis acrylamide/100ml).

$$R_f = \frac{\text{distance migrated by protein}}{\text{distance migrated by dye}}$$

The curve can be used to determine molecular weights of unknown proteins.²

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