

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).

Ordering Information

Catalog

Number	Product Description
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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
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Bio-Rad Laboratories, 2000 Alfred Nobel Drive, Hercules CA 94547

4006033 Rev C



SDS-PAGE Molecular Weight Standards, Low Range

Catalog Number
161-0304

Product shipped at room temperature.
Store at -20 °C upon arrival.

BIO-RAD

Specifications

Contents	Approximately 400 µg of each protein blended to give bands of equal intensity on SDS polyacrylamide gels run according to Laemmli ¹ and stained with Coomassie Blue R-250	
Storage buffer	50% glycerol, 300 mM NaCl, 10 mM Tris, 2 mM EDTA, 3 mM NaN ₃	
Volume	200 µl concentrated solution	
Storage	-20 °C	
Shipping conditions	Room temperature	
Shelf life	1 year at -20 °C	
Applications per vial	400 with Coomassie R-250	
Recommended gel percentage*	Low range	12.5%
	High range	7.5%
	Broad range	4-20 % gradient gels

***Note:** These standards can be run on other percentage gels, but all proteins may not be visible. Lower percentage gels may cause the low molecular weight proteins to migrate with or in front of the dye front. Higher percentage gels may prevent the high molecular weight proteins from separating.

Protein Molecular Weights (daltons)

Protein	Molecular Weight	Broad Range	Low Range	High Range
Myosin	200,000	X		X
β-galactosidase	116,250	X		X
Phosphorylase b	97,400	X	X	X
Serum albumin	66,200	X	X	X
Ovalbumin	45,000	X	X	X
Carbonic anhydrase	31,000	X	X	
Trypsin inhibitor	21,500	X	X	
Lysozyme	14,400	X	X	
Aprotinin	6,500	X		

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.

* **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 Sample Buffer with insufficient or old β-mercaptoethanol may result in doublets at the soybean trypsin inhibitor and ovalbumin bands.

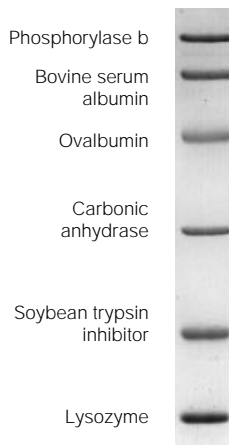


Fig. 1. SDS polyacrylamide gels run in the Mini-PROTEAN® II cell according to the method of Laemmli.¹ Low molecular weight standards run on a 12% gel, stained with Coomassie R-250.

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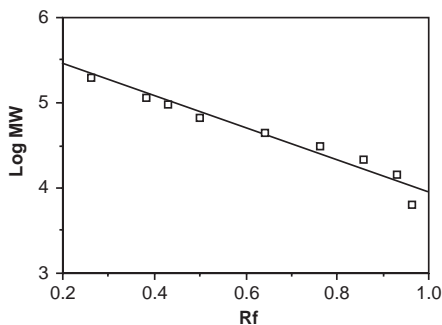


Fig. 3. Curve generated by plotting the log of the molecular weight of the broad range standards vs. the relative mobility (Rf).

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

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

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Protein References

Protein	Reference
Rabbit skeletal muscle myosin	Woods, E. F., Himmelfarb, S. and Harrington, W. F., <i>J. Biol. Chem.</i> , 238 , 2374 (1963).
<i>E. coli</i> β-galactosidase	Fowler, A. V. and Zabin, I., <i>Proc. Natl. Acad. Sci. USA</i> , 74 , 1507 (1977).
Rabbit muscle phosphorylase b	Titani, K., et al., <i>Proc. Natl. Acad. Sci. USA</i> , Vol. 74 , 4762 (1977).
Bovine serum albumin (BSA)	Brown, J. R., <i>Fed. Proc.</i> , 34 , 591 (1975).
Hen egg white ovalbumin	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	Davis, R. P., "Carbonic Anhydrase," in: The Enzymes , Vol V, p. 545, (Boyer, P. D., ed.) Academic Press, New York (1971)
Soybean trypsin inhibitor	Wu, Y. V. and Scheraga, H. A., <i>Biochemistry</i> , 1 , 698 (1962).
Hen egg white lysozyme	Jolles, P., <i>Angew. Chem Intl. Edit.</i> , 8 , 227 (1969).
Bovine pancreatic trypsin inhibitor (Aprotinin)	Kassell, B. and Laskowski, M., <i>Biochem. Biophys. Res. Comm.</i> , 20 , 463 (1965).

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