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
Molecular Weight Standards	
161-0303	**SDS-PAGE Standards,** High, 200 µl
161-0304	**SDS-PAGE Standards,** Low, 200 µl
161-0317	**SDS-PAGE Standards,** Broad, 200 µl
161-0314	**Silver Stain SDS-PAGE Standards,** Low, 200 µl
161-0315	**Silver Stain SDS-PAGE Standards,** High, 200 µl
161-0306	**Biotinylated SDS-PAGE Standards,** Low, 250 µl
161-0311	**Biotinylated SDS-PAGE Standards,** High, 250 µl
161-0319	**Biotinylated SDS-PAGE Standards,** Broad, 250 µl
161-0320	**2-D SDS-PAGE Standards**
161-0326	**Polypeptide SDS-PAGE Standards,** 200 µl
Prestained Standards	
161-0305	**Prestained SDS-PAGE Standards,** Low, 500 µl
161-0309	**Prestained SDS-PAGE Standards,** High, 500 µl
161-0318	**Prestained SDS-PAGE Standards,** Broad, 500 µl
161-0324	**Kaleidoscope Prestained Standards,** 500 µl
161-0325	**Kaleidoscope Polypeptide Standards,** 500 µl
IEF Standards	
161-0310	**IEF Standards,** pI range 4.45-9.6, 250 µl

Bio-Rad Laboratories, 2000 Alfred Nobel Drive, Hercules CA 94547
4006034 Rev C

SDS-PAGE Molecular Weight Standards, High Range

Catalog Number 161-0303

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	High Range	Low Range	Broad Range
Myosin	200,000	X		X
ß-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)

ß-mercaptoethanol	25 µl
Stock Sample Buffer	475 µl
	500 µl

Stock Sample Buffer (store at room temperature)

Distilled water	4.8 ml
0.5 M 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 ß-mercaptoethanol may result in doublets at the soybean trypsin inhibitor and ovalbumin bands.

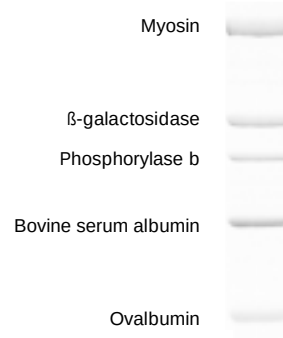

Fig. 1. SDS polyacrylamide gels run in the Mini-PROTEAN® II cell according to the method of Laemmli.[1] High molecular weight standards run on a 7.5% SDS polyacrylamide gel, stained with Coomassie R-250.

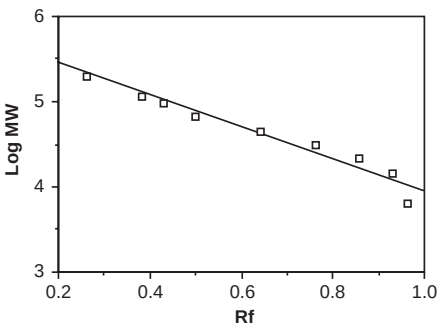

Fig. 3. Curve generated by plotting the log of the molecular weight of the broad range standards vs. the relative mobility (Rf).

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

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

Protein References

Protein	Reference
Rabbit skeletal muscle myosin	Woods, E. F., Himmelfarb, S. and Harrington, W. F., *J. Biol. Chem.*, **238,** 2374 (1963).
***E. coli* ß-galactosidase**	Fowler, A. V. and Zabin, I., *Proc. Natl. Acad. Sci. USA*, **74,** 1507 (1977).
Rabbit muscle phosphorylase b	Titani, K., *et al., Proc. Natl. Acad. Sci. USA*, Vol. **74**, 4762 (1977).
Bovine serum albumin (BSA)	Brown, J. R., *Fed. Proc.*, **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 Scherage, H. A., *Biochemistry*, **1,** 698 (1962).
Hen egg white lysozyme	Jolles, P., *Angew. Chem Intl. Edit.*, **8,** 227 (1969).
Bovine pancreatic trypsin inhibitor (Aprotinin)	Kassell, B. and Laskowski, M., *Biochem. Biophys. Res. Comm.*, **20,** 463 (1965).