
Bio-Scale™ Mini
Bio-Gel® P-6 Desalting
Cartridges, 10 and 50 ml

Instruction Manual

Catalog #

732-5304, 732-5312, 732-5314

BIO-RAD

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Section 1

Introduction

Bio-Scale Mini cartridges have a patent-pending double-wall design that provides extra durability and allows easy, reliable runs with aqueous buffers commonly used for protein purification. The polypropylene luer fittings and internal sealing surfaces assure leak-free operation at pressures up to 45 psi. Bio-Scale Mini cartridges are convenient, disposable, and supplied ready for use. They are easy-to-use and prepacked for fast, reproducible chromatographic separations. Cartridges are available for a variety of chromatographic techniques, including desalting, ion exchange and affinity chromatography. The patent-pending design of Bio-Scale Mini cartridges offers:

- Supplied ready for use; simply equilibrate the cartridge in the buffer of choice

- Luer fittings for convenient connection to any chromatography system

Bio-Scale Mini Bio-Gel P-6 cartridges are packed with Bio-Gel® P-6 gel. This gel consists of hydrophilic spherical polyacrylamide beads designed for the purification of proteins, nucleic acids, viruses, plasmids, and other macromolecules. The Bio-Gel P-6 beads are designed to provide high-efficiency desalting or buffer exchange at low backpressure. Detailed product information is given in Table 1. See Ordering Information for a listing of the complete Bio-Scale Mini cartridge product line.

Table 1. Bio-Scale Mini Bio-Gel P-6 cartridge specifications.

| | |
|--|--|
| Size | 10 and 50 ml bed volume |
| Dimensions | 10 ml: 80 mm length x 12.6 mm inner diameter 50 ml: 80 mm length x 28.2 mm inner diameter |
| Maximum pressure tolerance | 10 ml: 45 psi 50 ml: 40 psi |
| Recommended flow rates: at ambient temperature (18–24°C) | 10 ml: 0.5–4.0 ml/min (24–192 cm/hr) 50 ml: 2.5–20.0 ml/min (24–192 cm/hr) |
| at cold room temperature (4–8°C) | 10 ml: 0.5–2.0 ml/min (24–96 cm/hr) 50 ml: 2.5–10.0 ml/min (24–96 cm/hr) |
| Fittings | Female luer-lock fitting inlet and male luer fitting outlet |
| Column material | Polypropylene |
| Frit material | Polyethylene (HDPE) |
| Shipping conditions | 20 mM Bis-Tris, pH 6.5 + 0.05% azide |
| Storage recommendation | 20 mM Bis-Tris, pH 6.5 + 0.05% azide |
| Autoclavability | Not autoclavable |

Section 2

Connecting to Bio-Rad's Low-Pressure Chromatography Instruments

Bio-Scale Mini cartridges are ideal for use with Bio-Rad's BioLogic™ LP chromatography system, Econo™ gradient pump, the patented* Model EP-1 Econo™ pump, and all low-pressure chromatography instruments. Bio-Scale Mini cartridges can be conveniently connected directly to the system using the luer fittings on the cartridge.

1. Install 1.6 mm inner diameter (ID) tubing in the pumphead. Adjust platen pressure screw (on pumphead) – using a screwdriver or coin, turn the screw counterclockwise as far as it will go, then turn clockwise three full turns. Assemble with fittings and lock rings as shown in Figure 1.

*US Patent 5,135,658

(Use orange lock rings and medium size barb fittings with 1.6 mm tubing.)

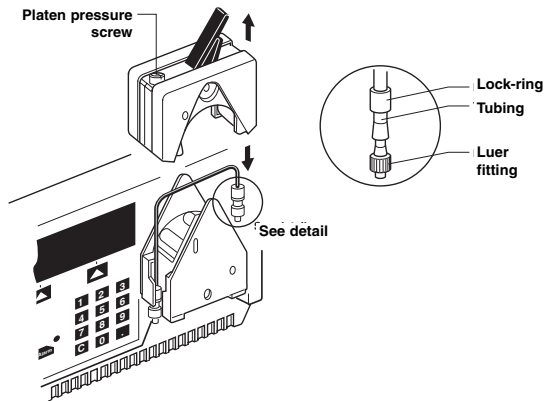


Fig. 1. BioLogic LP system setup.

2. To apply samples efficiently, install 1.6 mm ID tubing from the pump to the MV-6 sample inject valve (if available). If using the MV-6 sample inject valve, turn the knob counterclockwise as far as it will go so it will now correspond to the printed diagram on the valve (see Figure 2).

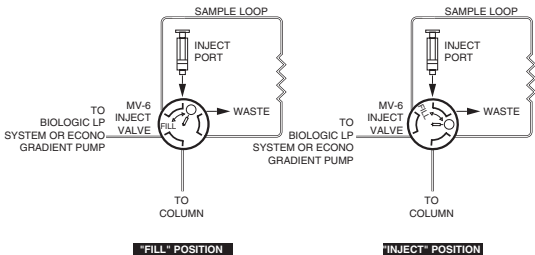


Fig. 2. Connecting to an MV-6 valve.

3. Connect the inlet of the cartridge to the male luer fitting on the MV-6 sample inject valve (see Figure 2). If not using the MV-6 sample inject valve, connect a barb to male luer fitting on the 1.6 mm ID tubing, then connect to the top of the female luer on the Bio-Scale Mini cartridge. For optimum performance, a cartridge should be mounted vertically with the arrow on the cartridge pointing downward (see Figure 3).
4. Connect the cartridge outlet to the 1.6 mm ID tubing leading to the BioLogic LP system optics module or to the Model EM-1 Econo™ UV monitor. It is recommended to use the shortest length (approximately 10 cm) of 1.6 mm ID tubing. Connect a barb to female luer to the 1.6 mm ID tubing, then connect to the bottom of the male luer on the Bio-Scale Mini cartridge.



Fig. 3. Cartridge and fittings.

Section 3

Connecting to Other Liquid Chromatography Systems

Bio-Scale Mini cartridges can be connected to any liquid chromatography system, provided that the maximum pressure limits for the 10 ml (3 bar, 45 psi, or 300 kPa) or for the 50 ml (2.6 bar, 40 psi, or 260 kPa) cartridges are not exceeded. It is recommended that the system pressure limit be set according to the cartridge pressure limit. Pressures in excess of 3 bar are usually caused by restrictions in tubing or detector cells downstream from the cartridge. Bio-Rad offers two fittings kits for easy connection of a Bio-Scale Mini cartridge to a BioLogic DuoFlow, HPLC, or FPLC-type system.

3.1 Connecting to a BioLogic DuoFlow System

The luer to BioLogic system fittings kit (catalog #732-0113) includes 1/4-28 female to male luer and 1/4-28 female to female luer to connect one Bio-Scale Mini cartridge to the BioLogic DuoFlow system, see Figure 4.



Fig. 4. Luer to 1/4-28 adaptor.

3.2 HPLC Systems

The luer to 10-32 adaptor fittings kit (catalog #732-0112), provides fittings necessary to connect the Bio-Scale Mini cartridge to nut and ferrule type fittings found on most HPLC systems. Alternatively, the cartridge can be connected to HPLC systems via a low dead-volume 1/16 inch union with a new piece of stainless steel tubing attached to the union. Simply slip a short length of the 0.8 mm ID tubing over 1/16 inch OD stainless-steel tubing to a distance of 1 cm.

3.3 FPLC Systems

The luer to M6 adaptor fittings kit (catalog #732-0111) provides fittings necessary to connect the Bio-Scale Mini cartridge to the M6 fittings found on FPLC or related systems. Alternatively, connection can be made by using one GE Healthcare Union luer lock female to M6 female fitting (GE 18-1027-12) and one female luer lock to M6 male fitting (Upchurch P-686 or GE 18-1027-62). To prevent tubing or cartridge failure, do not exceed the maximum recommended flow rate of the cartridge.

Section 4

Preparing a Cartridge For Use

Bio-Scale Mini Bio-Gel P-6 cartridges contain 20 mM Bis-Tris, pH 6.5 + 0.05% sodium azide as the storage solution. The fully hydrated support is ready to use after equilibrating the cartridge in the buffer of choice. To perform a buffer exchange, connect the cartridge to a liquid chromatography system or peristaltic pump and condition it as instructed below:

1. Set the pump flow rate for the 10 ml cartridge to 4.0 ml/min (192 cm/hr) for room temperature use or 2.0 ml/min (96 cm/hr) for cold room temperature use.
2. Set the pump flow rate for the 50 ml cartridge to 20.0 ml/min (192 cm/hr) for room temperature use or 10.0 ml/min (96 cm/hr) for cold room temperature use.

3. Equilibrate the cartridge with 2.2 column volumes of degassed equilibration buffer: 6 minutes at the room temperature flow rate setting or 12 minutes at the cold room temperature setting.
4. Reduce the flow rate to that which will be used in the buffer exchange or desalting cycle.

4.1 Sample Preparation

If the sample contains insoluble material, filter it with a 0.45 μm filter before applying it to the cartridge.

Section 5

Desalting and Buffer Exchange

Samples can be desalted or the sample buffer exchanged by connecting the cartridge to a liquid chromatography system. The void volume for the 10 ml Bio-Scale Mini Bio-Gel P-6 Desalting cartridge is 3.6 ml and for the 50 ml Bio-Scale Mini Bio-Gel P-6 Desalting cartridge is 18 ml. With the 10 ml cartridge the desalted sample, the sample, or the sample in its new buffer is contained within the fraction between 3 ml and 9 ml with the highest concentration of sample in the 3.6 to 6.0 ml fraction. With the 50 ml cartridge the desalted sample or the sample or the sample in its new buffer is contained within the fraction between 15 ml and 45 ml with the highest concentration of sample in the 18 to 30 ml fraction.

5.1 With a Liquid Chromatography System

1. Set the flow rate to the desired flow.
 - a. 10 ml cartridge: 0.5–4.0 ml/min at room temperature, 0.5–2.0 ml/min at cold room temperature.
 - b. 50 ml cartridge: 2.5–20 ml/min at room temperature, 2.5–10 ml/min at cold room temperature.
2. Wash the prepared cartridge with degassed buffer as indicated below.
 - a. 10 ml cartridge: 10 ml
 - b. 50 ml cartridge: 50 ml
3. Inject up to the amount of sample indicated below, discarding the first amount of effluent indicated below.
 - a. 10 ml cartridge: 6 ml of sample, discarding the first 3 ml of effluent
 - b. 50 ml cartridge: 30 ml of sample, discarding first 15 ml of effluent
4. Monitor the cartridge effluent with a UV monitor or conductivity monitor.

Section 6

Technical Assistance

For additional information and technical assistance, contact your local Bio-Rad representative as listed on the back cover of our catalog, or in the US, call Technical Support at 1-800-4BIORAD.

Section 7

Ordering Information

Bio-Scale Mini Cartridges*

| Description | Catalog #s | | |
|------------------------------|------------|-----------|-----------|
| | 5 x 1 ml | 1 x 5 ml | 5 x 5 ml |
| UNOsphere™ Q Support | 732-4100 | 731-4102 | 731-4104 |
| UNOsphere S Support | 732-4110 | 731-4112 | 731-4114 |
| Macro-Prep™ High Q Support | 732-4120 | 732-4122 | 732-4124 |
| Macro-Prep High S Support | 732-4130 | 732-4132 | 732-4134 |
| Macro-Prep DEAE Support | 732-4140 | 732-4142 | 732-4144 |
| Bio-Gel P-6 Support | — | 732-4502 | 732-4504 |
| Affi-Prep® Protein A Support | 732-4600 | 732-4602 | — |
| Profinity™ IMAC Support | 732-4610 | 732-4612 | 732-4614 |
| Profinity GST Support | 732-4620 | 732-4622 | 732-4624 |
| Affi-Gel® DEAE Blue Support | — | 732-4632 | 732-4634 |
| Affi-Gel Blue Support | — | 732-4642 | 732-4644 |
| | | 1x | 5x |
| Bio-Gel P-6 Desalting, 10 ml | — | — | 732-5304 |
| Bio-Gel P-6 Desalting, 50 ml | — | 732-5312 | 732-5314 |

* Visit www.bio-rad.com/cartridges/ for current information on prepacked cartridges.

- Larger package sizes of media are available for process-scale chromatography. Inquire with your local Bio-Rad representative.

Fittings Kits

| Catalog # | Description |
|------------------|---|
| 732-0111 | Luer to M6 Adaptor Fittings Kit, includes luer to M6 fitting to connect to an FPLC system |
| 732-0112 | Luer to 10-32 Adaptor Fittings Kit, includes luer to polypropylene/PTFE 10-32 fittings to connect 1 cartridge to an HPLC system |
| 732-0113 | Luer BioLogic System Fittings Kit, includes 1/4-28 female to male luer and 1/4-28 female to female luer to connect 1 cartridge to the BioLogic DuoFlow system |

Section 8

References

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FPLC is trademark of GE Healthcare. Luer-Lok is trademark of Becton, Dickinson and Co. Triton is a trademark of Union Carbide.

Bio-Rad Laboratories, Inc.
2000 Alfred Nobel Dr.
Hercules, CA 94547 USA
510-741-1000
1-800-424-6723