

AFFINITY PURIFICATION

Profinia™ Protein Purification System

- Automated affinity-tagged protein purification and desalting
- Fast, efficient purification in as little as 30 minutes
- Easy access to preprogrammed methods
- Large, informative touch-screen display
- Optimized cartridge and buffer kits
- Simplified reagent and tube loading
- Integrated cleaning and maintenance
- Minimal training or expertise required

Automated Efficiency for Affinity-Tagged Protein Purification

Fast and Convenient

The Profinia protein purification system is an automated system that performs affinity purification and desalting of tagged proteins. Optimized methods for the most common affinity applications are preprogrammed in the instrument and are accessed through a large, informative touch-screen display. Prepared buffer and purification kits are designed to work with the preprogrammed Bio-Rad methods to provide dependable and reproducible purification. The instrument operates unattended and yields a purified sample that is ready for downstream use in as little as 30 minutes.

The Profinia system is designed to replace traditional gravity-flow column affinity purification techniques with a more convenient, consistent, time-saving, and automated technique. The instrument is compact, housing all the reagent bottles, fraction and sample tubes, and tubing within the unit. The Bio-Rad methods, easy-to-use interface, and optimized kits together constitute a system that requires very little training or expertise to use; thus, it is ideally suited for use by many members of a large laboratory or as a resource to be shared by several laboratories.

The instrument methods are self-contained and selected from the large touch-screen display. The instrument runs on the benchtop,



The Profinia protein purification system. This instrument works with kits of prepared buffers and cartridges to make affinity-tagged protein purification a simple, automated, and reproducible process.

taking up only 49 cm x 33 cm of space. It performs equally well in a cold box or a coldroom to accommodate temperature-sensitive proteins.

Up to two samples can be run in sequence; you can choose to run one or two samples using either the same cartridge or separate cartridges for each sample. System maintenance is simplified as well, with automated self-cleaning protocols that are part of each method and cleaning reagents provided in the purification kits.

BIO-RAD

Informative Touch-Screen Display

Selecting the methods and setting up the instrument are simplified through the large and informative touch screen, which leads you through the process of selecting the method, the number of samples, and the size of cartridge to be used.

Optimized Methods

The Bio-Rad methods include the most common affinity-tagged protein purifications and desalting applications. Scroll through the methods to select one, then select the number of samples to be run and the cartridge volume of the purification. Included in the method options are native IMAC, native IMAC with desalting, denaturing IMAC, GST, GST with desalting, and desalting only.

The desalting-only application uses a sample loop for the input to minimize dilution. The loop is attached to the cartridge 1 position, and the sample is injected into the loop. The instrument loads the sample and performs automated desalting and collection. The Profinia instrument is a convenient and fast alternative to dialysis. Bulletin 5539 describes the performance of the desalting-only application compared with dialysis.

Simple, Automated, and Efficient

The Profinia system is capable of automatic detection, selection, and diversion of the tagged protein from the affinity cartridge to the size exclusion (desalting) cartridge to perform buffer exchange without the need for intervention between the affinity and desalting steps. The flowthrough, column wash, and elution fractions are automatically collected in designated individual tubes, so it is easy to locate the purified protein without pooling fraction tubes.

The automatic diversion of target protein in this two-dimensional purification allows you to obtain purified and desalted protein in a completely hands-free process. The time saved can be devoted to the protein-based experiments you would like to perform instead of to the purification of the protein for those experiments.

After the protein is eluted, the automated method continues with cleaning and storage steps. The cleaning and storage solutions, which are part of the buffer set that was loaded at the start of the run, will clean the lines and the cartridges in preparation for a new purification. The Profinia system includes this process so that it can be kept in optimal working condition with minimal user maintenance.

METHOD: 1 ml Native IMAC + Desalting

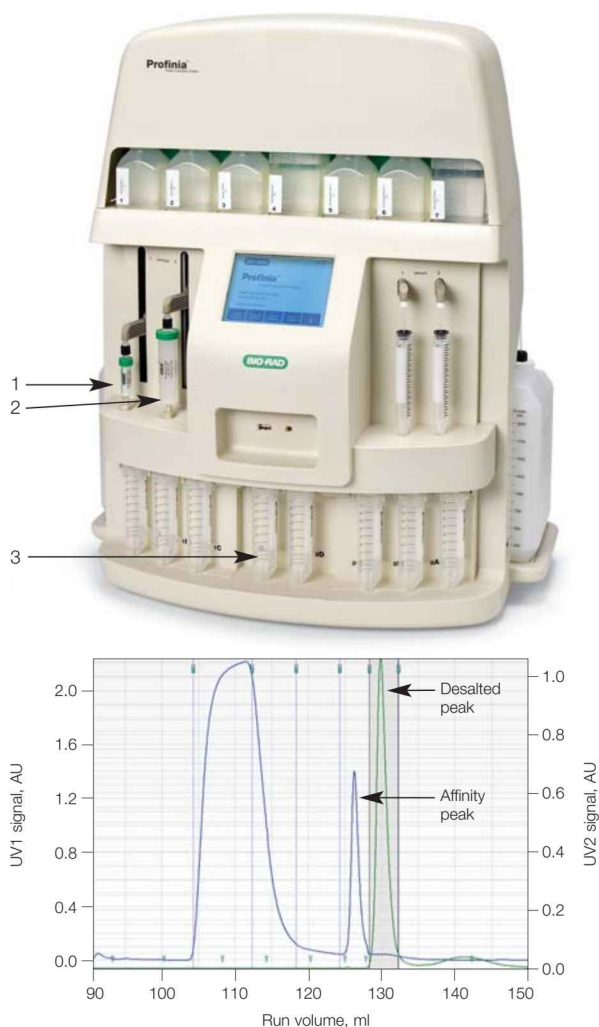
SELECT METHOD TYPE & OPTIONS

METHOD TYPE		SAMPLE	
Native IMAC	☐	1 Sample	☒
Native IMAC + Desalting	☒	2 Samples	☐
Denaturing IMAC	☐	CARTRIDGE	
GST	☐	1 ml + 10 ml	☒
GST + Desalting	☐	5 ml + 50 ml	☐
Desalting	☐		

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The touch-screen display makes it easy to select the method, sample, and cartridge options.



The Profinia instrument automatically recognizes, selects, and diverts the main affinity peak from the affinity cartridge to the size exclusion (desalting) cartridge. The affinity peak is eluted from the affinity cartridge (1) and automatically directed to the desalting cartridge (2); the same protein (now desalted) elutes as the desalted peak. The desalted protein is collected in a single fraction tube (3).

Program (Customized) Methods

The Bio-Rad (preprogrammed) methods can be modified under the program method screen, which allows editing of flow rate, buffer concentration, length of step, and column volume to create customized affinity purification methods. Since all the changes are made through the touch-screen display, it is easy to modify and save them as unique program methods.

METHOD: 1 ml Affinity + Desalting

METHOD INFORMATION SAMPLE 1 METHOD

Step	Name	Conc.	ml/min	CV	min
10	Prime B2	B2-1X	20.00	0.2	
11	Prime B1	B1-1X	20.00	0.2	
12	Water Wash	Water	20.00	0.2	
13	Equilibrate C2(DS)	Water	2.00	2.0	10.0
14	Equilibrate C2(DS)	B4-5X	1.90	3.0	15.8
15	Water Wash	Water	20.00	1.0	0.1
16	Equilibrate C1	Water	2.00	2.0	1.0
17	Equilibrate C1	B1-2X	2.00	5.0	2.5

Buttons: View Sample, Save, Edit, OK

METHOD: 1 ml Affinity + Desalting

SELECT STEP PARAMETER TO EDIT

Step "Equilibrate C2(DS)"

FLOW RATE:	1.90 ml/min
COLUMN VOLUME:	3.0
STEP TIME:	15.8 min
CONCENTRATION:	B4-5X
FRAC:	W

Buttons: Edit, OK

Customized affinity purification methods can be created using Bio-Rad methods as templates. The display provides information about the steps and parameters that can be changed. Using the Edit button accesses the parameter to be edited.

Run Information

The Profinia instrument calculates and displays information about the run in progress and the eluted protein. During the run, the display shows a run progress bar and provides the real clock time when the purified protein will be ready. This feature allows you to work elsewhere and return to the instrument when the protein is ready. Information about the eluted protein, including yield and concentration, is calculated and displayed at the end of each run, which provides the information you need for your protein experiments.

Run data are exported through the USB drive on the front of the instrument or by a direct connection to a PC loaded with Profinia software for real-time capture and monitoring of data. Profinia software is an optional part of the system and is used for displaying and analyzing the run data.

METHOD: 1 ml Native IMAC + Desalting

RUN IN PROGRESS...

Elapsed / Total Run Time: 00:02 / 01:07 HRS

Run Progress: 3%

Current Step: Equilibrate C2(DS)

Step Time Remaining: 238 SEC

Sample 1 Expected to Elute at 11:48 AM

REAL TIME DATA AT 11:14:10 AM

Flow Rate:	4.00 ml/min
Collection:	W
UV-Cartridge 2:	0.31 AU
Conductivity:	0.03 mS

Buttons: Cancel Run, Pause, View Steps, i

The Run in Progress screen displays a run progress bar as well as the time when the purified protein will be ready.

METHOD: 1 ml GST + Desalting

RUN "PPE_1" COMPLETED

	SAMPLE 1	SAMPLE 2
Sample Name:	51kd	51kd
A280 of 1 mg/ml:	1.33	1.00
Fraction Tube:	1D	2D
Fraction Volume:	4.0 ml	4.0 ml
Total Protein:	3.49 mg	5.01 mg
Protein Conc:	0.87 mg/ml	1.25 mg/ml

Insert memory stick to export run.

Buttons: Long-Term Wash, Short-Term Wash, Run New Method, Re-Run Method, i, Export Data

The yield and concentration of the eluted protein is calculated and displayed at the end of each run.

Quick and Easy Setup for Purification

All components of the instrument and the purification kits are designed to help you set up and run purifications quickly and easily. The connections for the buffers, samples, cartridges, and fraction tubes are all designed for simple plug-in installation. (The instrument touch screen instructs you how to set up the instrument quickly and easily, making it widely accessible to all groups in the laboratory.)

Buffer Setup

The buffer compartment of the instrument has inlet tubing in each buffer position to facilitate simplified bottle loading. The bottles for the buffers and reagents are quickly and easily set in position. Each position on the instrument is numbered to match the touch-screen installation diagram and the labels on the buffer bottles. Using text and graphics, the touch screen shows all the components needed for the method run and their locations on the instrument. The minimum volume of each reagent needed for the method is also shown and can be quickly checked when loading by looking at the graduated marks on the bottles. The instrument even provides a place to store the bottle caps while the run is in progress.

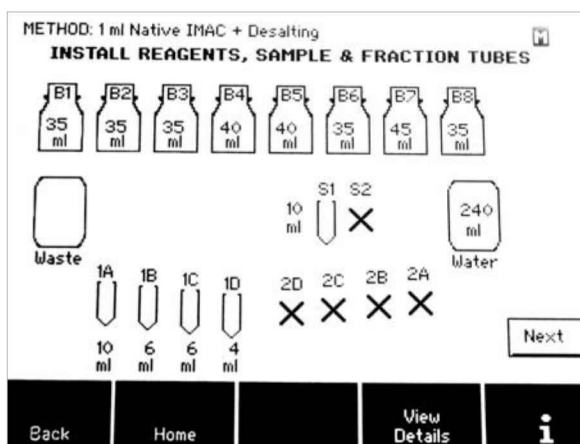
Sample Setup

Standard sample volumes are accommodated in conical tubes (15 ml or 50 ml), but large-volume samples can be accessed from external bottles. The sample tubes are inserted onto the prepared inlet tubing in the same way as the buffer bottles. The Profinia instrument automatically draws the sample at the appropriate stage of the process. The sample is loaded until the input volume is met or until end-of-sample detection is triggered; this feature stops the sample load automatically. In either case, the method run will automatically proceed after the sample is completely loaded.

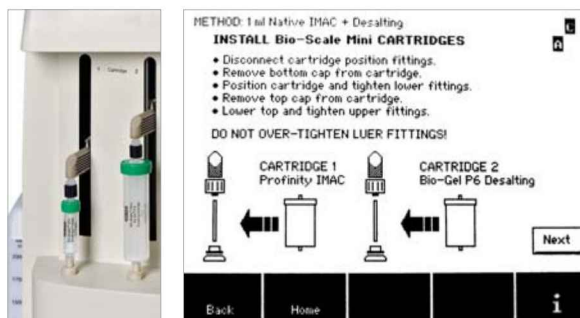
Cartridge Setup

Various setup configurations for the cartridges are based on the method chosen and whether one- or two-step purification will be done. The touch screen guides you through the setup with instructions on how to prepare for the automatic priming of the lines and connection of the cartridges. The cartridge connection area is easy to access and uses simple luer fittings so the cartridge can easily be installed for a leakproof connection.

The Profinia purification kits include Bio-Scale™ Mini cartridges, which are designed with luer lock fittings and matched with the buffers and methods to optimize affinity and desalting purifications.



The touch screen provides information on the correct buffer and position on the instrument. The labeled buffer bottles have the position number printed on them to match the position on the instrument, which is also referenced in the setup screen.



The touch screen and instrument design make cartridge installation fast, simple, and reliable.

Fraction Tube Setup

The instrument automatically collects up to four fractions for each sample run. The flow-through is collected in tube A, and washes are collected in tube B or tubes B and C (depending on the method selected). These fractions are collected for evaluation of the effectiveness of the purification. The most important fraction is the eluted target protein, which is collected in tube D. This tube is centered in the front of the instrument so it is easy to locate the target protein. Unlike other purification methods, the Profinia instrument collects the entire target protein peak in a single tube, which eliminates the need to decide which tubes contain the target protein and to then pool those tubes.

Cooling Option

A cooling accessory (sold separately) is available for the Profinia system to cool the sample when it is set up for loading and the eluted target protein fraction after elution. This is useful when a temperature-sensitive protein is being purified and it is desirable to work at the laboratory bench instead of in a coldroom. The cooling accessory is packed with ice or filled with water and frozen to create a cooling chamber for the sample and fraction tubes. It can maintain a precooled sample and fraction at 2–8°C for 4–6 hours at 20°C ambient temperature while the instrument is operating. Two chambers may be used to cool sample tubes and fraction collection tubes simultaneously.



Fraction tube positions are clearly labeled and easily accessible.



Cooling accessories are shown in place for the sample and fraction collection tubes.

Specifications

Operating Limits

Flow rate range	0.2–20 ml/min
Maximum backpressure	45 psi (3.4 bar)

Detection

UV detection	280 nm
Conductivity monitor range	0–500 mS/cm
pH monitor*	pH range 1–14

Sample and fraction collection containers	15 ml or 50 ml conical tubes and ability to use external reservoirs connected by tubes
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Buffer selection	Rotary selector valve for up to 8 buffers
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Solvent compatibility	All commonly used chromatographic solvents**
Operating temperature	4–30°C; coldroom compatible
Data output	USB mass storage device Direct USB cable to PC
Dimensions (W x D x H)	49 x 33 x 67 cm (19.3 x 13 x 26.4")
Weight	28 kg (62 lb)

Optional Accessories*

Cooling accessory
Profinia PC software
Desalting sample loops
pH monitor

* Sold separately.

** Compatible with 8 M urea, 6 M guanidine hydrochloride, 30% ethanol, 100% methanol, 5 M sodium chloride, 2 M sodium citrate, 30% (v/v) glycerol, 2 M sodium hydroxide, 3 M sodium acetate, 1 M hydrochloric acid, 3 M ammonium sulfate (or saturated solution), 30 mM β -mercaptoethanol, 10% SDS in PBS, 5% Triton X-100 in PBS, other aqueous buffers (pH 2–12).

Ordering Information

Catalog # Description

Profinia Instruments

- 620-1004 **Profinia Instrument With Accessory Kit**, 100–240 V, includes cleaning tray, inline filter pack, 2 x 50 ml sample lids, 2 x 15 ml sample lids, bottle starter pack, waste/diluent bottle set
- 620-1005 **Profinia Instrument With Accessory Kit and Native IMAC Starter Kit**, 100–240 V, includes cleaning tray, inline filter pack, 2 x 50 ml sample lids, 2 x 15 ml sample lids, bottle starter pack, waste/diluent bottle set, Profinia native IMAC buffer kit, 1 x 1 ml IMAC and 1 x 10 ml desalting cartridge, *E. coli* lysate
- 620-1006 **Profinia Instrument With Accessory Kit and GST Starter Kit**, 100–240 V, includes cleaning tray, inline filter pack, 2 x 50 ml sample lids, 2 x 15 ml sample lids, bottle starter pack, waste/diluent bottle set, Profinia GST buffer kit, 1 x 1 ml GST and 1 x 10 ml desalting cartridge, *E. coli* lysate, glutathione reagent

Profinia Systems

- 620-1009 **Profinia Protein Purification System**, 100–240 V, includes same as 620-1004 with Profinia software
- 620-1010 **Profinia Protein Purification System With Native IMAC Starter Kit**, 100–240 V, includes same as 620-1005 with Profinia software
- 620-1011 **Profinia Protein Purification System With GST Starter Kit**, 100–240 V, includes same as 620-1006 with Profinia software

Profinia Systems With Computers

- 620-1014 **Profinia Protein Purification System With Computer**, 100–240 V, includes same as 620-1009 with computer
- 620-1015 **Profinia Protein Purification System With Computer and Native IMAC Starter Kit**, 100–240 V, includes same as 620-1010 with computer
- 620-1016 **Profinia Protein Purification System With Computer and GST Starter Kit**, 100–240 V, includes same as 620-1011 with computer

Profinia Accessories

- 620-0010 **Profinia Software**, includes USB cable
- 620-0401 **Profinia Instrument Cooling Accessory**, includes 2 cooling units
- 620-0402 **Profinia Desalting Sample Loop**, 2 ml
- 620-0403 **Profinia Desalting Sample Loop**, 10 ml
- 620-0405 **Profinia Sipper Tube Replacement Kit**, includes 10 pieces of precut tubing
- 620-0410 **Profinia Instrument Accessory Kit**, includes cleaning tray, inline filter pack, 2 x 50 ml sample lids, 2 x 15 ml sample lids, bottle starter pack, waste/diluent bottle set
- 620-0231 **Bottle Starter Pack**, includes 4 x 125 ml buffer bottles, 4 x 250 ml buffer bottles, 8 buffer bottle lids
- 620-0411 **Profinia pH Monitor Kit**, includes pH electrode, flow cell, mounting accessories

Profinia Purification Kits

- 620-0225 **Profinia Native IMAC Purification Kit**, 1 ml, includes Profinia native IMAC buffer kit, 2 x 1 ml IMAC and 2 x 10 ml desalting cartridges
- 620-0235 **Profinia Native IMAC Purification Kit**, 5 ml, includes 2 Profinia native IMAC buffer kits, 1 x 5 ml IMAC and 1 x 50 ml desalting cartridge

Catalog # Description

- 620-0227 **Profinia Denaturing IMAC Purification Kit**, 1 ml, includes Profinia denaturing IMAC buffer kit, 2 x 1 ml IMAC cartridges
- 620-0237 **Profinia Denaturing IMAC Purification Kit**, 5 ml, includes 2 Profinia denaturing IMAC buffer kits, 2 x 1 ml IMAC cartridges
- 620-0226 **Profinia GST Purification Kit**, 1 ml, includes Profinia GST buffer kit, 2 x 1 ml GST and 2 x 10 ml desalting cartridges
- 620-0236 **Profinia GST Purification Kit**, 5 ml, includes 2 Profinia GST buffer kits, 1 x 5 ml GST and 1 x 50 ml desalting cartridge
- 620-0228 **Profinia Desalting Purification Kit**, 10 ml, includes Profinia desalting buffer kit, 2 x 10 ml desalting cartridges
- 620-0238 **Profinia Desalting Purification Kit**, 50 ml, includes 2 Profinia desalting buffer kits, 1 x 50 ml desalting cartridge

Profinia Buffer Kits

- 620-0221 **Profinia Native IMAC Buffer Kit**, includes purification buffers, cleaning and storage solutions; sufficient for 10 applications
- 620-0222 **Profinia Denaturing IMAC Buffer Kit**, includes purification buffers, cleaning and storage solutions, urea reagent; sufficient for 10 applications
- 620-0223 **Profinia GST Buffer Kit**, includes purification buffers, cleaning and storage solutions, glutathione reagent; sufficient for 10 applications
- 620-0224 **Profinia Desalting Buffer Kit**, includes purification buffers, cleaning and storage solutions; sufficient for 10 applications

Profinia Starter Kits

- 620-0229 **Profinia Native IMAC Starter Kit**, includes Profinia native IMAC buffer kit, 1 x 1 ml IMAC and 1 x 10 ml desalting cartridge, *E. coli* lysate
- 620-0230 **Profinia GST Starter Kit**, includes Profinia GST buffer kit, 1 x 1 ml GST and 1 x 10 ml desalting cartridge, *E. coli* lysate, glutathione reagent

Profinia Reagents

- 620-0220 **Profinia Bacterial Lysis/Extraction Reagent**
- 620-0203 **Profinia His Antibody**
- 620-0204 **Profinia GST Antibody**
- 620-0233 **Profinia Control Lysate**
- 620-0200 **Profinia Small Urea Pack**, 2 x 45 g
- 620-0201 **Profinia Large Urea Pack**, 2 x 90 g
- 620-0202 **Profinia Glutathione Pack**, 1.23 g

Triton is a trademark of Union Carbide.

Purification and preparation of fusion proteins and affinity peptides containing at least two adjacent histidine residues may require a license under US patent 5,284,933 and US patent 5,310,663, including foreign patents (assignee: Hoffmann-La Roche).

Expression and purification of GST fusion proteins may require a license under US patent 5,654,176 (assignee: Chemicon International).

BIO-RAD

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Web site www.bio-rad.com **USA** 800 4BIORAD **Australia** 61 02 9914 2800 **Austria** 01 877 89 01 **Belgium** 09 385 55 11 **Brazil** 55 21 3237 9400 **Canada** 905 712 2771 **China** 86 21 6426 0808 **Czech Republic** 420 241 430 532 **Denmark** 44 52 10 00 **Finland** 09 804 22 00 **France** 01 47 95 69 65 **Germany** 089 318 84 0 **Greece** 30 210 777 4396 **Hong Kong** 852 2789 3300 **Hungary** 36 1 455 8800 **India** 91 124 4029300 **Israel** 03 963 6050 **Italy** 39 02 216091 **Japan** 03 5811 6270 **Korea** 82 2 3473 4460 **Mexico** 52 555 488 7670 **The Netherlands** 0318 540666 **New Zealand** 0508 805 500 **Norway** 23 38 41 30 **Poland** 48 22 331 99 99 **Portugal** 351 21 472 7700 **Russia** 7 495 721 14 04 **Singapore** 65 6415 3188 **South Africa** 27 861 246 723 **Spain** 34 91 590 5200 **Sweden** 08 555 12700 **Switzerland** 061 717 95 55 **Taiwan** 886 2 2578 7189 **United Kingdom** 020 8328 2000