GILSON

Product Guide

Gilson, Inc.

Since the 1940's, the Gilson name has been synonymous with quality and robust instruments in the laboratory environment. Through the years, Gilson's product focus has moved from specialized instruments for physiological applications to handheld pipettes, automation instrumentation, and chromatography systems for the drug discovery and biotech markets. Today, Gilson manufactures pipettes, HPLC systems, high-throughput robotic workstations, fraction collectors, SPE systems, detectors, injectors and much more. From liquid chromatography to liquid handling instruments, Gilson delivers high-quality, dependable solutions for the pharmaceutical and biotechnology industries.

Since 1957, Gilson Inc.'s world headquarters has been located at its current site in Middleton, Wisconsin. In 1963, to help meet the demand for Gilson products in Europe, Gilson opened a manufacturing facility northeast of Paris in Villiers le Bel, France – now Gilson S.A.S. In 2002, Gilson, Inc. launched Gilson International B.V. – a direct sales and service team – which has its headquarters in The Netherlands, along with local sales offices in 10 countries throughout Western Europe.

With an extensive international network of representatives and factory trained agents, Gilson is able to offer the ultimate flexibility and standard of robustness in Gilson's products as well as complete sales and technical support to customers around the globe.

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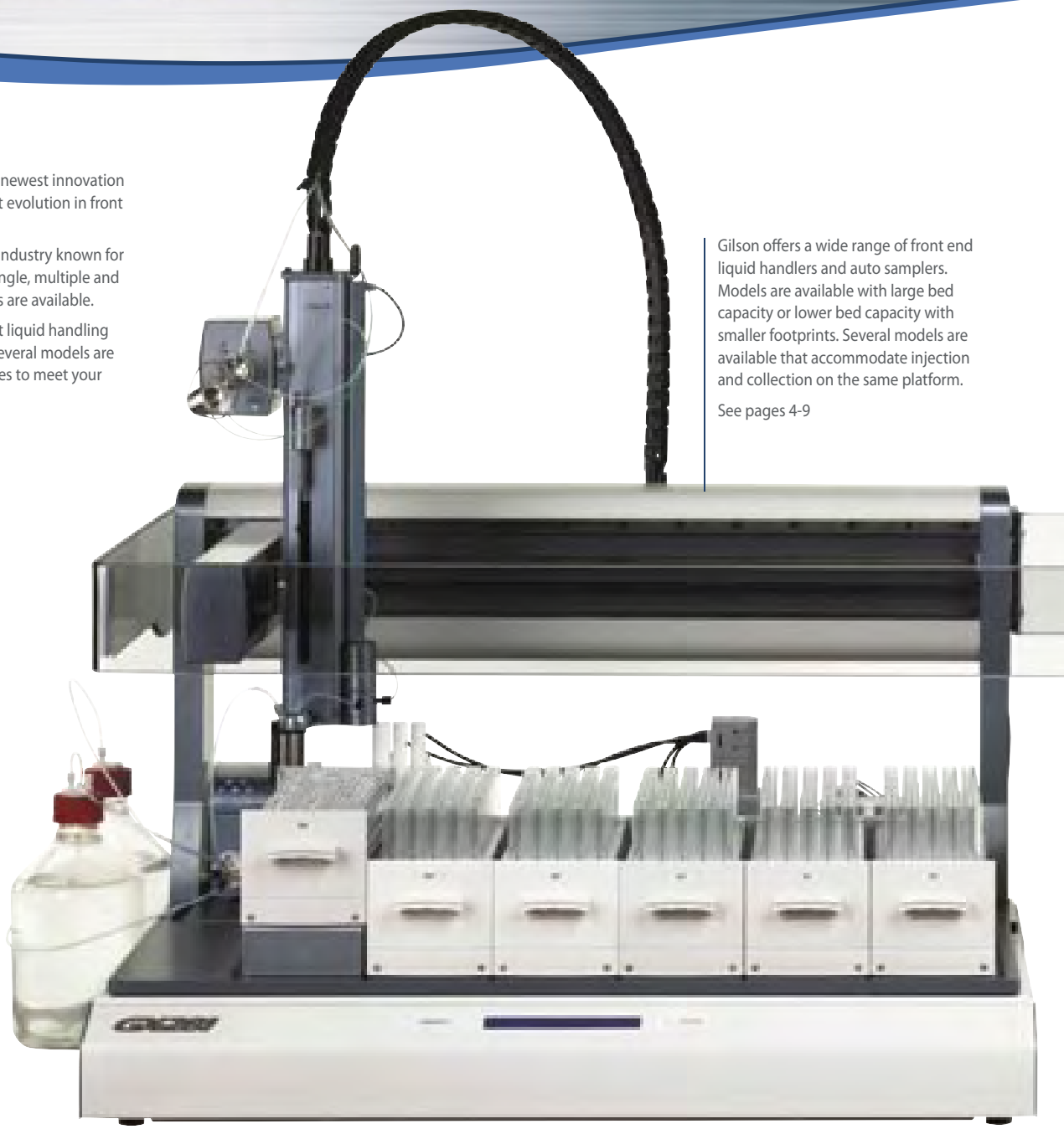
Gilson HPLC Systems

GX Series liquid handler is the newest innovation from Gilson providing the next evolution in front end liquid handling.

215 Series liquid handlers are industry known for reliability and performance. Single, multiple and variable spacing probe models are available.

XL samplers provide a low cost liquid handling solution in a small footprint. Several models are available with various capacities to meet your application needs.



Gilson offers a wide range of front end liquid handlers and auto samplers. Models are available with large bed capacity or lower bed capacity with smaller footprints. Several models are available that accommodate injection and collection on the same platform.

See pages 4-9

Gilson's GX-281 Series of HPLC Systems features the GX-281 Liquid Handler. The GX-281 has been designed to be the "Next Evolution in Front End LC Automation." With a revolutionary new syringeless pumping system, large bed capacity with only a 35" footprint, low maintenance and increased volume injection capabilities, the GX-281 is the ideal front end automation for your purification needs. All GX-281 Series HPLC Systems are fully controlled with TRILUTION™ LC software, the first software designed specifically for purification.

Increase throughput and extend column life with column switching via Gilson's VALVEMATE® Valve Actuator.

Provides automatic control of a two position or multiposition, low or high pressure valves

See pages 41-45

2 position 4, 6, and 10 port valves

6 position valves

Valves for low and high pressure applications are available

Gilson's HPLC Systems provide a wide range of detection solutions for excellent sensitivity and reproducibility including UV/VIS and Evaporative Light Scattering Detection.

15X Series Detectors available with or without keypad in single or dual variable wavelength modes.

112 Detector offers a low cost fixed wavelength UV detector

PREPELS™ Detector is an excellent primary or complimentary detector to UV for detecting compounds without chromophores.

See pages 15-17

Gilson's flexible HPLC Systems allow selection of up to 6 different size columns

Gilson's wide range of HPLC pumps provide excellent and accurate pumping solutions. Models are available with multi-solvent selection, high pressure variable mixing and interchangeable pump heads.

See pages 10-14

Pumping solutions from nanoliters to 100's of mL's.

33X models provide flow rates from 1 to 200 mL/min with a reciprocating dual pump head design.

32X pump heads offer flow rates from 150 µL/min up to 30 mL/min in a compact design.

30X provide rugged time tested pumping solutions from 10 µl/min up to 200 mL/min with an interchangeable pump head design.

350 micro pumps offer splitless flow rates from 300 nL/min up to 50 µL/min for capillary and microbore HPLC.

HPLC: Liquid Handlers/Injectors

	Type			Injection Volume Range (total loop)	Liquid Handling Accuracy (water)	Injection Carryover	Page Number
	Liquid Handler	Fraction Collection	Keypad Control				
GX-281	✓	✓		250 µL up to 25 mL	±2% (100 µL - 25 mL)	<0.005%	5
215	✓	✓	✓	5 µL - 10 mL	99.7% (50 µL)	<0.1%	6
Multiple Probe 215	✓			5 µL - 5 mL	99.2% (500 µL)	<0.05%	7
215 Direct-Inject	✓	✓		500 nL - 5 mL	99.7% (50 µL)	<0.05%	8
235/235P	✓			500 nL - 5 mL	—	<0.0035%	8
234	✓		✓	5 µL - 5 mL	—	<0.005%	9
231 XL/ 232 XL/ 233 XL	✓	✓ 233 Only	✓	2 µL - 5 mL	—	—	9

Gilson's liquid handlers/injectors offer one of the broadest ranges of liquid handlers/injectors in the market. From small footprint injectors to the larger footprint liquid handler/injector/fraction collector, Gilson provides the ultimate front end automation solution for your system.

GX-281 Liquid Handler/Injector

Zero contamination of fractions from the injection process with two unique and separate injection and fraction collection liquid pathways.

Space saving at only 35" of linear bench space.

Aspirate the sample directly into the valve without a separate injection port, eliminating a source of potential carryover with the GX Z-Injection Module.

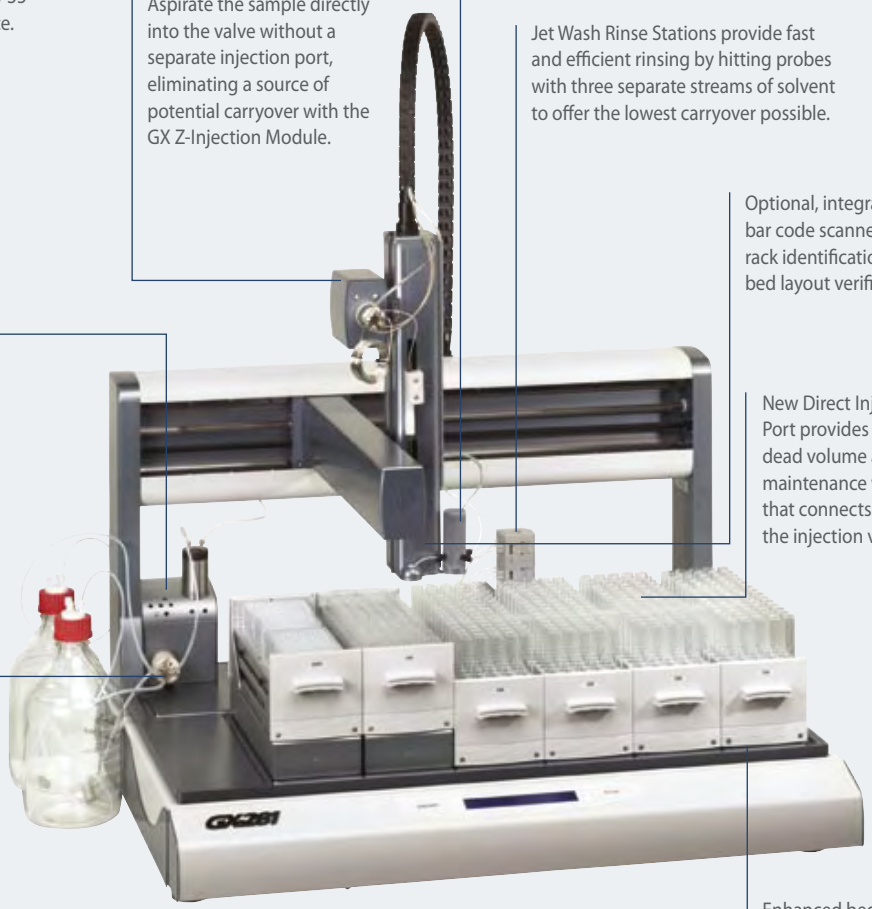
Jet Wash Rinse Stations provide fast and efficient rinsing by hitting probes with three separate streams of solvent to offer the lowest carryover possible.

Direct request aspirating and dispensing...no need to wait for valves to switch or syringes to fill.

Optional, integrated bar code scanner for rack identification and bed layout verification

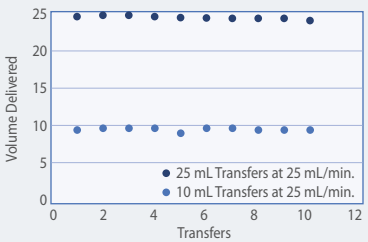
Gilson's GX-281 Prep Solvent System features a large dynamic range in volumes and flow rates and the ability to select from up to 5 off- bed solvents.

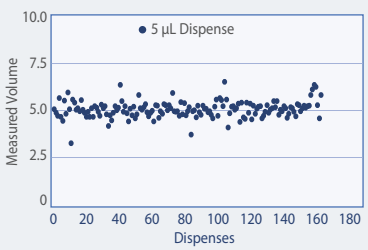
New Direct Injection Port provides decreased dead volume and maintenance with a port that connects directly to the injection valve.



Enhanced bed capacity, holding up to six Code 200-Series racks

Product No.: 261031 (GX-281 Liquid Handler with barcode)
261030 (GX-281 Liquid Handler, no barcode)





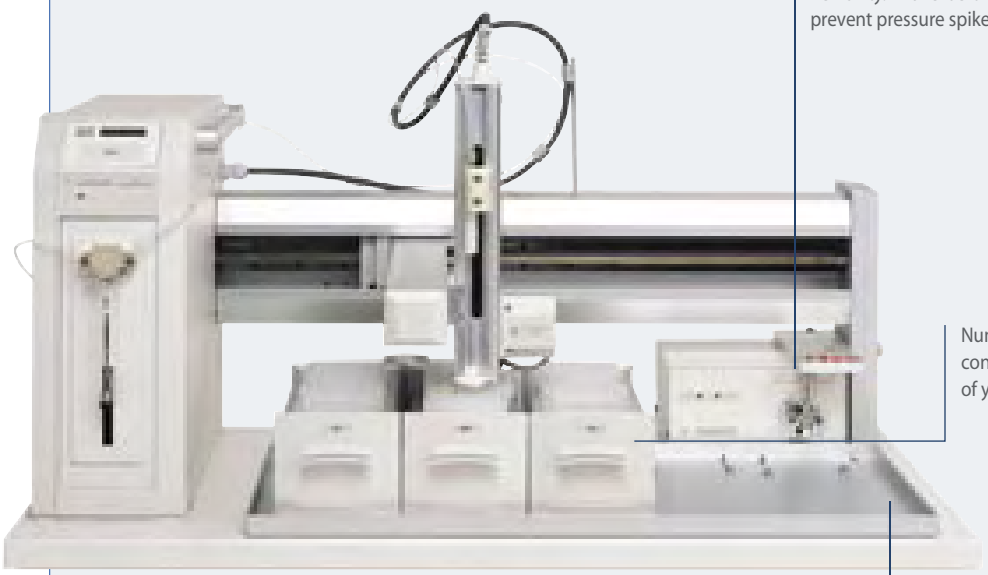
Specifically engineered for your semipreparative-to-preparative HPLC requirements, the GX-281 offers unmatched versatility and performance for front-end LC automation, including a revolutionary new syringe-less injection system; no more syringes to replace or change to accommodate a wide range of volumes and flow rates with access to up to 5 off bed solvent reservoirs.

Revolutionary new syringe-less injection system with access to 5 solvent reservoirs. Large dynamic range in flow rates and volumes with increased speed.

Specifications

Reproducibility <1.0% CV (total loop injection), <3.5% (partial loop injection)		
Injection Volume Range 250 µL up to 25 mL (Total Loop Injections)		**Maximum Injection Pressure** 5,000 psi (345 bar)
Accuracy +2% for (100 µL - 25 mL) water	**Injection Carryover** <0.005%	**Dimensions (w x d x h)** 88.9 x 76.2 x 96.5 cm (35 x 30 x 38 in)

215 Liquid Handler/Injector



Injection capabilities with 819 Injection Module; configure with two 819 Injection Modules for increased throughput and flexibility. "Make-before-break" stator and large-bore rotor seal prevent pressure spikes from injection at high flows.

Numerous custom software and rack configurations to meet the demands of your applications

Product No.: 2510121 (215 Liquid Handler with syringe pump)
2510191 (215 Liquid Handler without syringe pump)

Versatile, large-bed liquid handler accommodates more than 3,000 different variety of racks to hold virtually any type of sample vessel:
– 17 standard or deep-well microplates
– 480 12 x 32 mm or 13 x 100 mm vials
– 350 18 x 15 mm test tubes
– 135 40 mL scintillation vials
– 32 funnel positions
– and many more

The laboratory tested and trusted liquid handler for years, the 215 has built the reputation of being a true workhorse in the laboratory.

Versatile bed accommodates a wide variety of more than 3,000 standard and custom racks (see page 45).

The 215 Liquid Handler/Injector uses a wide range of injection probes, sample loops and syringes. Ideal for low- and sub-microliter liquid handling applications, the spring-loaded probe configuration allows "touch off" deposition without damaging the substrate or degrading the sample.

Perform injection, fraction collection and re-injection of collected fractions on one platform. Or, connect to stand-alone fraction collectors or other instruments for increased flexibility.

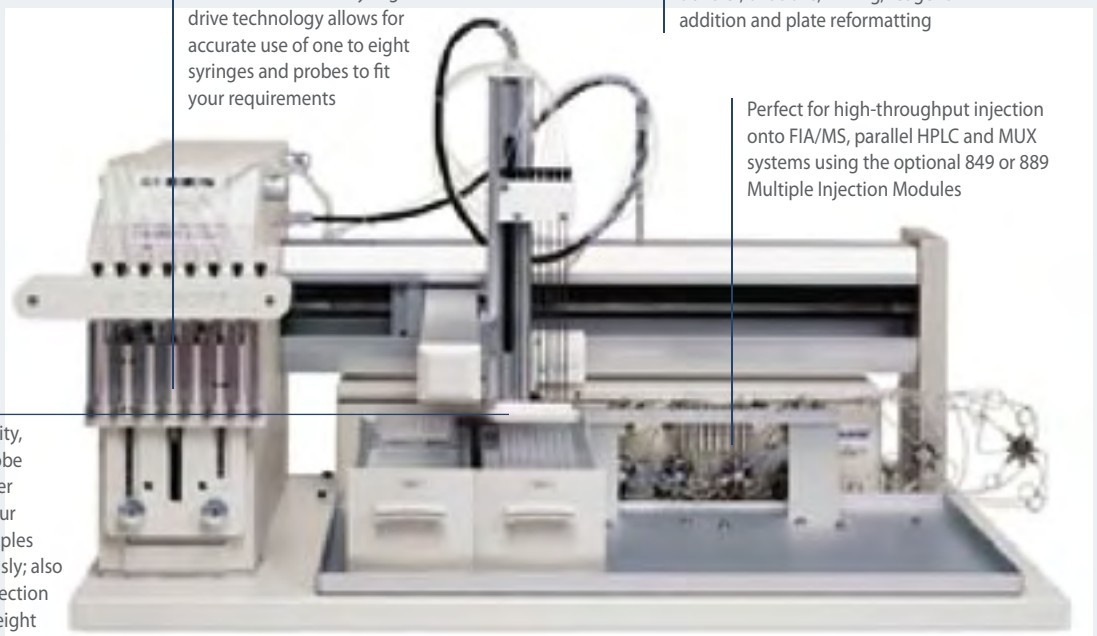
Specifications

Reproducibility Liquid Handling: 1.37% CV with 50 µL of water Injection: <0.9% CV with 1 mL syringe and total loop filling method	
Accuracy Liquid Handling: 99.7% with 50 µL of water	**Injection Carryover** <0.1%
Injection Volume Range 5 µL-10 mL	**Dimensions (w x d x h)** 91 x 61 x 56 cm (36 x 24 x 22 in)

Multiple Probe 215 Liquid Handler/Injector

Patented Dual Rail™ syringe drive technology allows for accurate use of one to eight syringes and probes to fit your requirements

High-throughput automation of all basic liquid handling tasks such as: sample transfer, dilutions, mixing, reagent addition and plate reformatting



Perfect for high-throughput injection onto FIA/MS, parallel HPLC and MUX systems using the optional 849 or 889 Multiple Injection Modules

Large-capacity, multiple-probe liquid handler processes four or eight samples simultaneously; also performs injection into four or eight parallel systems simultaneously

Product No.: 25101311 (Multiple Probe 215 Liquid Handler with 125 mm arm)

Flexible liquid handler and injector engineered to improve throughput for drug discovery and drug metabolism laboratories. High-throughput capacity is ideal for parallel injection onto HPLC or LC/MS systems.

Specifications	
Reproducibility Liquid Handling: 0.57% CV with 500 µL of water Injection: <5.0% CV w/500 µL syringe and partial loop filling method; <2.0% CV w/500 µL syringe and total loop filling method	
Accuracy Liquid Handling: 99.2% with 500 µL of water	**Injection Carryover** <0.05%
Injection Volume Range 5 µL-5 mL	**Dimensions (w x d x h)** 97.8 x 61 x 55.8 cm (38.5 x 24 x 22 in)

849/889 Multiple Injection Modules

Allows four or eight simultaneous injections – ideal for parallel HPLC and MUX systems

Product No.: 2515154 (849 with Multiple Injection Module)

Configure with analytical valve with 0.015″ ID valve or preparative valve with 0.040″ ID valve passages

Accommodate injection loop sizes as small as 5 µL up to 5 mL for analytical to preparative LC applications

Product Nos.: 251515 (889 with Multiple Injection Module)

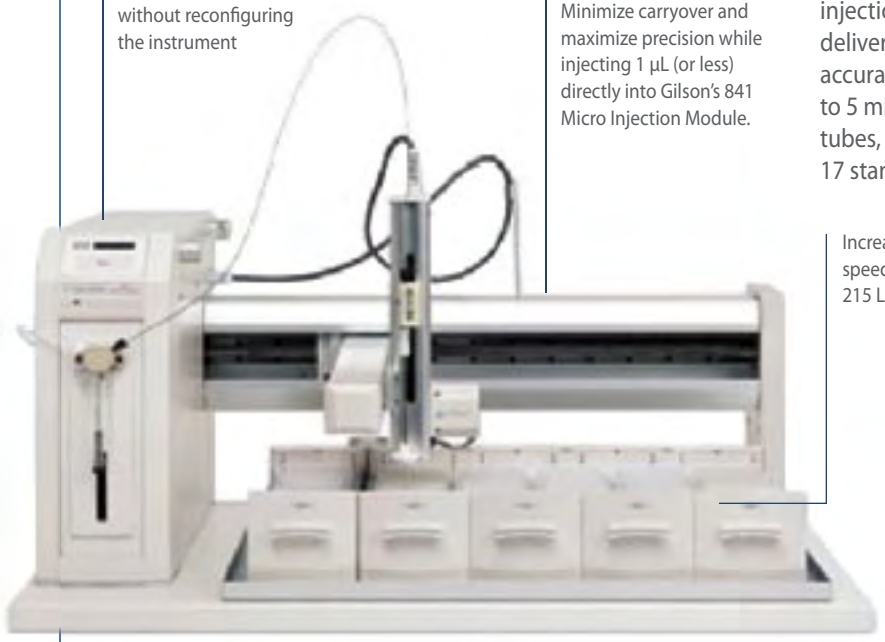
Designed for parallel injection onto an HPLC or LC/MS system. Deliver high-throughput capacity with outstanding speed and performance. Modules are the ideal choice for high-throughput injection onto FIA/MS.

Specifications	
Valve Switching Speed (mS) RV700-100: <135 RV700-112: <370	**Dimensions (w x d x h)** 61 x 18 x 13 cm (24 x 7 x 5 in)

215 Direct-Inject Liquid Handler/Injector (Micro 215)

Large range of injection volumes possible without reconfiguring the instrument

Minimize carryover and maximize precision while injecting 1 µL (or less) directly into Gilson's 841 Micro Injection Module.



Designed to handle the demands of smaller injection volumes – Gilson's 215 Direct-Inject delivers microliter volumes with precision and accuracy. Capable of injecting volumes of 500 nL to 5 mL from 384- or 96-well microplates, vials or tubes, the 215 Direct-Inject accommodates up to 17 standard or deep-well microplates.

Increase throughput with valve switching speeds five times faster than the standard 215 Liquid Handler/Injector

Specifications

Reproducibility Liquid Handling: 1.37% CV with 50 µL of water Injection: <0.9% CV with 1 mL syringe and total loop filling method	
Accuracy Liquid Handling: 99.7% with 50 µL of water	**Injection Volume Range** 500 nL-5 mL
Injection Carryover <0.05% with 100 µL syringe and total loop filling method	
Dimensions (w x d x h) 91.4 x 61 x 55.8 cm (38.5 x 24 x 22 in)	

Product No.: 25101233 (Micro 215 Liquid Handler with 125 mm arm)

235/235P Autoinjectors

Perfect for overnight operations, the 235/235P Autoinjectors include a large capacity bed that handles up to 1,536 samples.

Accommodate a variety of sample vessels from 384-well plates to 2 mL vials

Reduce carryover to <0.003% with rinsing protocols for above and below injection port seals.

Peltier cooling capability reduces evaporation, enabling smaller sample sizes and improved sample integrity

Software includes protocols for ISTD (internal standard addition)

Features/Benefits of Septum-Piercing Models (SP 235 and SP 235P)

- Septum-piercing probe has a grooved surface that vents sealed vials to ensure injection precision
- Spring-loaded, septum-piercing probe design allows samples to be kept sealed to prevent evaporation or contamination
- The smaller 0.7 mm tip width helps reduce carryover; easily pierces most common septa, including "sheet" and "bubble" microplate covers and Teflon® sheet-style, 2 mL vial septa

Product Nos.: 241021 (235 Autoinjector)
241022 (235P Autoinjector with Peltier Control capabilities)
241023 (235 Autoinjector with septum-piercing capability)
241024 (235P Autoinjector with Peltier Control and septum-piercing capability)

High-throughout, small-footprint injectors accurately deliver microliter samples onto your HPLC, LC/MS or FIA/MS system with precise reproducibility. Peltier (P) heating/cooling and septum-piercing (SP) models are also available.

Specifications

Reproducibility <0.5% CV with 20 µL loop and 100 µL syringe	
Injection Volume Range 500 nL-5 mL	**Injection Carryover** <0.0035%
Dimensions (w x d x h) 25.9 x 61.2 x 35.1 cm (10.2 x 24.1 x 13.8 in)	

234 Autoinjector

Quick and easy set-up with five built-in injection methods.

User-selectable method parameters give you the flexibility to automate a wide range of routine sample handling procedures

Stores up to 20 protocols for future retrieval

Fast, easy setup and operation with menu-driven software

Basic injection internal and external standard protocols available

Three loop-filling options – total, partial and centered

Product No.: 2710451 (234 Autoinjector)

Low-cost automated injector combines excellent reproducibility, versatility and performance for routine applications at a reasonable price.

Specifications	
Reproducibility <0.8% with 500 µL syringe and total loop filling method	**Injection Carryover** <0.005%
Injection Volume Range 5 µL-5 mL	**Dimensions (w x d x h)** 38 x 38 x 38.5 cm (15 x 15 x 15.1 in)

231 XL/232 XL/233 XL Sample Injectors

Accurate injection volumes with Gilson's precision 402 Syringe Pump

Compact XYZ robot with the ability to accommodate up to 175 mm test tubes and a wide range of vials and vessels

402 Syringe Pump delivers volumes from µLs to mLs, allowing selection of flow rates to compensate for different sample viscosities. (See page 14 for more information.)

233 XL

Product Nos.: 271041 (231 XL)
271081 (232 XL)
271091 (233 XL)

Built for unattended operation, the 231 XL, 232 XL and 233 XL automate virtually any sample preparation and HPLC injection procedure. The 231 XL holds a single rack with up to 120 vials, the 232 XL and 233 XL accept up to five different racks with a capacity of up to 540 vials.

Specifications	
Injection Carryover 231 XL/232 XL/233 XL: <0.01%	**Capacity** 231 XL: 120 (6 x 32 mm or 7 x 40 mm) tubes or 2 microplates 232 XL/233 XL: 540 (7 x 40 mm or 10 x 75 mm) tubes or 9 microplates
Injection Reproducibility 231 XL/232 XL/233 XL: <0.5% with 500 µL syringe and total loop filling method	**Dimensions (w x d x h)** 231 XL: 33 x 46.5 x 23 cm (13 x 18.3 x 14.5 in) 232 XL/233 XL: 51.5 x 62 x 23 cm (20.3 x 24.4 x 14.5 in)
Injection Volume Range 231 XL: 1-5,000 µL with partial loop filling of Rheodyne 7010 valve and from 0.5 to 3 µL Rheodyne 7413 valve 232 XL/233 XL: 2-5,000 µL with the Rheodyne 7010 valve and from 0.5 to 2 µL with Rheodyne 7413 valve	

HPLC: Pumps

	Flow Rate	Pressure	Column Internal Diameter								Page Number
			75 µm	300 µm	1 mm	2 mm	4 mm	10 mm	20 mm	>40mm	
 **333/334**	1 mL/min - 200 mL/min	3,040 psi (210 bar)									11
 **331/332**	500 µL/min - 50 mL/min	8,700 psi (600 bar)									12
 **321/322**	H1: 150 µL/min - 15 mL/min H2: 300 µL/min - 30 mL/min	H1: 8,700 psi (600 bar) H2: 4,350 psi (300 bar)									12
 **305/ 306/307**	10 µL/min - 200 mL/min	up to 8,700 psi (600 bar)									13
 **350**	300 nL/min - 50 µL/min	4,350 psi (300 bar)									13
 **402**	1 µL/min - 240 mL/min	(8 bar, 110 psi) for 0.1 to 10 mL syringe (3 bar, 40 psi) for 25 mL syringe									14
 **Minipuls 3**	Standard flow rate (1, 2, 4 or 8 channels: 0.3µL/min - 30mL/min High flow rate (2 or 4 channels): 1mL/min - 220mL/min	72 psi (5 bar)									14

Gilson offers unsurpassed flexibility in HPLC pumping systems with an extensive product offer ranging from nL/min flows up to 200 mL/min. Gilson pumping systems can accommodate a wide range of operating pressures from 200 psi to 8,700 psi.

333/334 Prep-Scale HPLC Pumps

Milligram-to-gram-level mass throughput per injection; up to 15 g depending on column size and loading capacity

Integrated keypad control for stand alone operation

Composition gradient with high-pressure mixing: 333-334 Binary System (third pump for ternary).

Double the flow rate up to 400 mL/min with additional parallel pumps.

Quiet operation, durable design

Stackable to conserve bench space

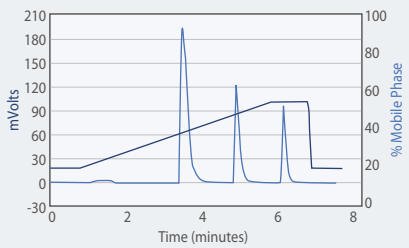
Control 33X Pumps and an entire preparative HPLC system via TRILUTION™ LC Software

Solvent selection of up to 4 solvents per pump for a total of 8 solvents in a binary pumping system

Product Nos.: 38103331 (333-H3 primary solvent, dual-piston, reciprocating Master Pump)
38103341 (334-H3 secondary solvent, dual-piston, reciprocating Remote-Controlled Pump)

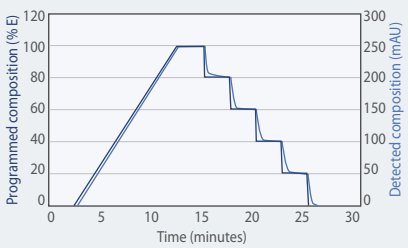
Capable of fast separations with high-efficiency columns in normal- and reverse-phase modes, Gilson's 333/334 Prep-Scale HPLC pumps are the premier solvent delivery solutions for preparative chromatography. Choose the 333 Master Pump for isocratic applications or a 333/334 combination for binary gradient applications.

Retention Time Repeatability



Series of 10 Injections			
	Methyl PB	Ethyl PB	Propyl PB
AVG RT	3.44	4.85	6.08
STD	0.02	0.02	0.02
%CV	0.72	0.34	0.29

Gradient Linearity and Accuracy



Specifications		
Flow Rate 1-200 mL/min (3,040 psi)	**Accuracy** ±1% or 5.3 µL/min	**Reproducibility** <0.5% or 2.7 µL/min RSD
Dimensions (w x d x h) 333: 26 x 41 x 51 cm (10 x 16 x 20 in), 334: 26 x 41 x 39 cm (10 x 16 x 15 in)		

331/332 HPLC Pumps

Gilson's dual-piston pumps for semipreparative and preparative chromatography. Feature a variable-volume, dynamic mixer for optimized gradient performance.

Milligram-level sample mass-throughput per injection: 150 mg with a 20 mm bore column

Solvent selection on each pump with optional four-solvent valve (up to eight solvents)

TRILUTION™ LC Software provides control within a complete semiprep system; includes data processing and results reporting

Easy linear transposition from analytical to preparative HPLC methods on 4 to 20 mm ID columns packed with high efficiency stationary phases

Product Nos.: 38103312 (331-H2 primary solvent, dual-piston, reciprocating Master Pump)
38103322 (332-H2 secondary solvent, dual-piston, reciprocating Remote-Controlled Pump)

Specifications

Flow Rate 0.5-50 mL/min (8,700 psi)	**Accuracy** ±2% or 13 µL/min
Reproducibility H1: <0.7% or 2 µL/min H2: 4 µL/min	
Dimensions (w x d x h) 331: 26 x 41 x 51 cm (10 x 16 x 20 in) 332: 26 x 41 x 39 cm (10 x 16 x 15 in)	

321/322 HPLC Pumps

TRILUTION™ LC Software provides control within a complete semiprep system; includes data processing and results reporting

High-pressure Adjustable Volume Dynamic Mixer (AVDM™) enables fast gradient response times and homogeneous mixtures for analytical to semipreparative applications

H1 pump heads are ideal for 2-10 mm ID columns with flows up to 15 mL/min and pressures up to 8,700 psi

H2 pump heads are ideal for 3-20 mm ID columns with flows up to 30 mL/min and pressures up to 4,300 psi

Multisolvent pumps designed for use in Gilson's HPLC systems for analytical and semipreparative chromatography. The 321/322 HPLC pump heads are easy to access, simple to maintain.

321 functions as a controller with integrated keypad; 322 is remotely controlled via TRILUTION™ LC Software.

Product Nos.: 38103211 (321-H1 Pump with 0.15-15 mL/min flow)
381032211 (322-H1 Pump with 0.15-15 mL/min flow)

Specifications

Flow Rate 0.15-30 mL/min (8,700 psi) Dependant on pump head installed	**Accuracy** ± 4 µL/min
Reproducibility H1: <0.7% or 2 µL/min H2: 4 µL/min	
Dimensions (w x d x h) 321: 26 x 41 x 51 cm (10 x 16 x 20 in) 322: 26 x 41 x 39 cm (10 x 16 x 15 in)	

305/306/307 HPLC Pumps

305 and 307 models are fully programmable through a front panel keypad to provide system control capabilities; 306 model functions as a slave unit and is controlled by either a 305 Pump or by Gilson TRILUTION™ LC System Software

Pump heads are designed for quick and easy maintenance and can be removed without any required tools – piston seals, check valves and other parts can be replaced in a matter of minutes

306 Pump

307 Pump

Product Nos.: 360261 (305 Drive Module)
3602661 (306 Drive Module)
3602671 (307 Drive Module)

305/306 Pumps are designed for use in either isocratic or gradient HPLC, and offer a wide range of flow rates from 10 µL/min to 200 mL/min

307 Pump is designed primarily for research and QC/QA in the isocratic mode, and offers flow rates from 10 µL/min to 10 mL/min

Three Manometric Modules with different flow rate ranges are available for use with the 305 and 306 Pumps to minimize pressure fluctuations and dampen pulsations; the 307 includes a built-in Manometric Module

Dynamic Mixers ensure efficient, problem-free mobile phase mixing

Together with Gilson Manometric Modules and Dynamic Mixers, these pumps offer a cost-effective, robust solution for isocratic to gradient, analytical to preparative HPLC.

Specifications

Flow Rate 305/306: 10 µL/min-200 mL/min 307: 10 µL/min-10 mL/min	**Accuracy** <±1%
Reproducibility <1%	
Dimensions (w x d x h) 33 x 33 x 15 cm (13 x 13 x 6 in)	

350 Micro Pump

Splitless flow delivery eliminates the inaccuracy of flow splitters, while dramatically reducing solvent consumption

Pump head seal wash permits the use of buffered solvents with increased confidence and decreased maintenance

Dual-piston pump with patented magnetic coupling ensures precise, accurate flow rates from 300 nL/min to 50 µL/min

Product No.: 38103931 (350 Micro Pump w/o degasser)
38103932 (350 Micro Pump with degasser)

Modular, binary pumping micro or nano mixer system with independent micro mixer optimizes separation with nano, capillary and micro columns for 1-D, 2-D and LC/MS/MS applications

60 nL mixer for fast gradient response times

Gilson's 350 Micro Pump provides precise splitless solvent delivery for nano to micro LC that delivers accurate and reproducible gradients from 300 nL/min to 50 µL/min. The 350 is capable of delivering true nano flow rates without requiring a flow splitter.

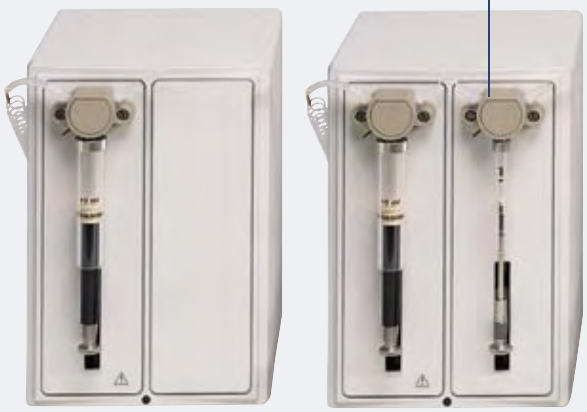
Specifications

Flow Rate gradient: 0.3-50 µL/min (4,350 psi) isocratic: 0.15-50 µL/min (4,350 psi)	**Accuracy** ± 1%
Reproducibility <1% RSD	
Dimensions (w x d x h) 26 x 34 x 30 cm (10 x 13 x 12 in)	

402 Syringe Pump

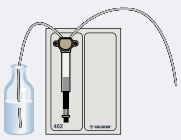
- Ideal add-on for Gilson liquid handlers and injectors including the 215 Series and XL Series
- Delivers volumes from 1.0 µL to 25 mL with excellent precision
- Adjustable flow rates to compensate for different sample viscosities
- Single, dual and dual with tee design allows you to customize your instrument to best fit your application

Single, dual syringe and dual-syringe with tee junction modules available

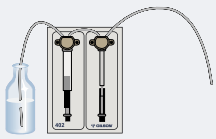


Product Nos.: F410511 (402, single-module with tee junction)
F410512 (402, dual-module with tee junction)
F410513 (402, dual-module with two valves)

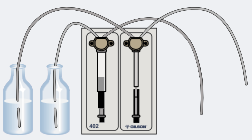
Available in three upgradable configurations:



402 Single-Syringe, ideal for sampling injectors.



402 Dual-Syringe with T-junction for rapid dilutions and both small and large volumes.



402 Dual; two-in-one for simultaneous dispensing of multiple reagents and solvents.

Assures accuracy in sample transfer, dilution, reagent addition, mixing and more. Offers speed and reliability for repetitive liquid handling tasks.

Specifications	
Reproducibility 0.8% at 10 µL	**Flow Rate** 1 µL/min – 240 mL/min
Accuracy 98.2% at 10 µL	**Dimensions (w x d x h)** 17 x 20 x 24 cm (6.7 x 7.9 x 9.4 in)

Minipuls 3 Peristaltic Pump

- Ideal for biological profusion applications* from 0-40˚C
- **Note: Not intended for direct connection to human subjects.*

Driven by multiple stainless steel rollers to produce smoother, low-pulse flows

Offers enhanced reliability and ease of operation. The pump's speed stability is maintained independent of normal temperature variations from 0-40˚C

Accommodates a wide range of flow rates. Choose from four interchangeable standard pump heads with one, two, four or eight channels for flow rates from 0.3 µL/min to 30 mL/min, or from two high-flow pump heads with two or four channels for flow rates from 1 mL/min to 220 mL/min

Product No.: F155004 (Minipuls 3 Pump, single-channel)

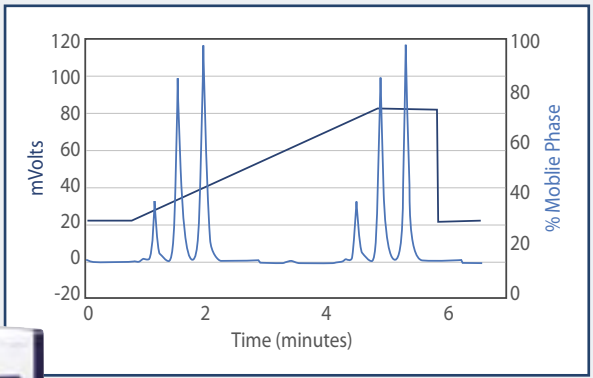
Multichannel peristaltic pump provides smooth, low-pulse flow. Easy to integrate into your existing system – control through a built-in digital keypad or remotely through another device.

Specifications	
Flow Rate standard head: 0.3 µL/min-30 mL/min (72 psi, 5 bar) high-flow head: 1.0-220 mL/min (42 psi, 3 bar)	**Head Speed** continuous adjustment from 0-48 rpm by 0.01 rpm increments up to 9.99 rpm, 0.1 rpm increments above 10 rpm
Tubing Diameter standard: 0.25-4 mm (ID); high-flow: 2-8 mm (ID)	**Dimensions (w x d x h)** 15 x 17.5 x 18 cm (5.9 x 6.9 x 7.1 in)

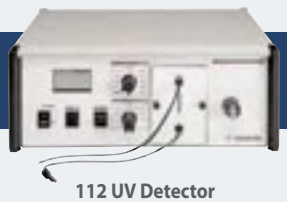
HPLC: Detectors

	Type			Wavelength	Spectral Band Width	Channels	Page Number
	UV/VIS	UV	ELSD				
15X Series	✔			190-700 nm	9 nm	Dual and Single	16
112		✔		254 or 280 nm	0.2 nm at 214, 12 nm at 280 nm	Single	16
PREPELS™			✔	—	—	Single	17

Gilson offers a complete line of HPLC detector solutions from UV/VIS to ELS detectors. These rugged detectors are ideal for your analytical, semipreparative and preparative HPLC applications.



15X UV/VIS Detectors
Single or Dual Wavelength
190 to 700 nm Variable Wavelength



112 UV Detector
Single Wavelength
Fixed Wavelength 254 or 280 nm

PREPELS™ Detector
Light Scattering Detector
Detect Compounds Lacking Chromophores

15X Series UV/VIS Detectors

Interchangeable flow cell design accommodates capillary to preparative HPLC applications

Controlled via Gilson's TRILUTION™ LC System Software or choose stand-alone, keypad control with the 151 and 155 models

Stores up to 10 detection methods

Choose from the following modes to specify detection conditions and basic operating parameters:

– Single wavelength

– Dual wavelength (155 and 156)

– Scan wavelength (155 and 156)

Product Nos.: 10105311 (151 with flow cell/accessory kit)
10105411 (152 with flow cell/accessory kit)
10105511 (155 with flow cell/accessory kit)
10105611 (156 with flow cell/accessory kit)

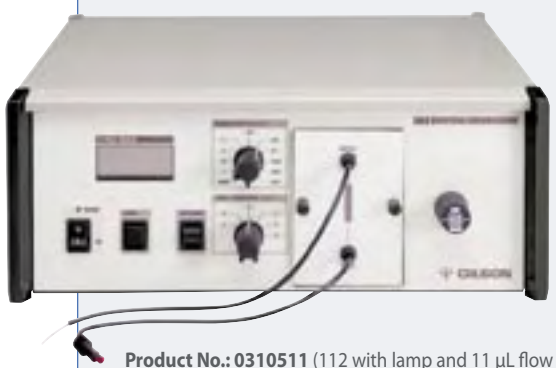
Gilson's 15X Series UV/VIS Detectors deliver versatile, rugged detection for your HPLC. The optical design lets you optimize the detection of your sample at any wavelength from 190 to 700 nm.

See page 54 for Flow Cell Selection Chart.

Specifications

Lamps UV: Deuterium; 750 hrs. Visible: Tungsten/Halogen, 500 hrs.		**Setting Accuracy/Precision** Accuracy: ±2 nm Precision: ±0.2 nm
Wavelength 190-700 nm	**Sensitivity Range** 0.001 to 2.0 AU	
Drift 3.0 x 10-4 AU/hr	**Spectral Band Width** 9 nm	**Dimensions (w x d x h)** 26.5 x 43.5 x 15.6 cm (10.4 x 17.1 x 6.2 in)

112 UV Detector



Product No.: 0310511 (112 with lamp and 11 µL flow cell/accessory kit)

Rugged, economical, fixed-wavelength detector for analytical or preparative HPLC. A front panel knob allows selection of wavelength to monitor the absorbency of a sample.

Provides detection at the following wavelengths: 254 and 280

Easy-to-change lamp/filter assemblies for selecting wavelengths

Fixed-wavelength design provides increased sensitivity and durability

10 mm pathlength analytical flow cell offers excellent sensitivity ranging from 0.001-1 AUFS (Absorbance Units, Full Scale)

Reduce operating and setup time with easy, one-step baseline function

Event-marking function allows convenient marking of the point of injection or advance of a fraction collector on the recorder or data system

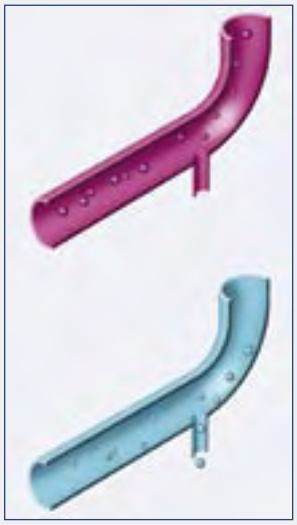
Specifications

Lamps Standard: Mercury (254 nm), 2,000 hrs. Phosphor-coated Mercury (280 nm), 500 hrs.		
Spectral Band Width 0.2 nm at 254 nm; 12 nm at 280 nm		**Flow Cell Sensitivity** <4 x 10-4 AU for flow step of 0.5-2 mL/min with methanol
Drift 3.0 x 10-4 AU/hr	**Wavelength** 254 or 280 nm	**Dimensions (w x d x h)** 32 x 32 x 13 cm (12.6 x 12.6 x 5.2 in)

PREPELS™ Detector

Reliable signal strength up to 10,000 hours with laser light source.

Easy-to-use, low-maintenance splitting packages for flow rates up to 75 mL/min.



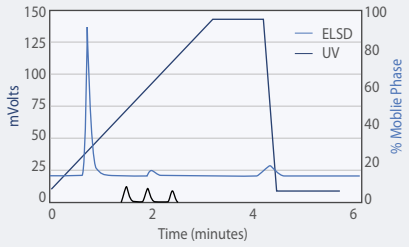
Precisely controlled spray chamber and drift tube temperature with patented Thermo-Split Technology. Controlling the spray chamber temperature is an exclusive feature to the PREPELS™ detector.

A large detection range includes a low-gain setting for detecting preparative scale samples up to 5 mg depending upon analyte; whereas, the normal-gain setting allows for optimal sensitivity for detecting sample amounts as low as 25 ng. This large detection range is unique to Gilson's PREPELS™ detector.

Product No.: 181023 (PREPELS Detector, 110V)
1810231 (PREPELS Detector, 220V)
1810232 (PREPELS Detector, 110V International)

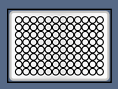
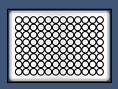
With simplistic, robust splitting packages, the PREPELS™ detector accommodates flow rates up to 75 mL/min while being added as the primary or additional detector to any Gilson preparative or analytical system. No other evaporative light scatting detector (ELSD) accommodates sample masses up to 5 mg without off-scaling the detector signal. Gilson's PREPELS™ detector has capabilities on the analytical scale with the ability to detect as low as nanograms of analyte while a unique filtering technology removes baseline noise without distressing peak height or shape. Featuring Thermo-Split Technology, the PREPELS™ detector is optimized for any mobile phase or flow rate by precisely controlling temperatures and providing a gentle vapor split.

Gilson's PREPELS™ detector is the ideal choice in purification for obtaining the purest fractions with the ability to detect virtually any analytes with or without a chromophore.



Specifications	
Light Source 670 nM laser diode, <5 mW	**Evaporative Zone Temperature** Ambient – 120˚C
Gas Requirement 45-55 psi Nitrogen or Argon	**Liquid Flow Rate** 0.2 to 5 mL/min
Nebulization Temperature 0˚-80˚C	

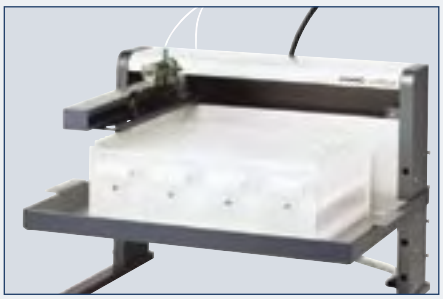
HPLC: Fraction Collectors

	Capacity		Flow Rate	Microplate Compatible	Test Tubes	1 Liter Bottles	Page Number
	Large	Small					
 PREPFC™	✔		up to 200 ml/min				19
 FC 204	✔	✔	up to 25 ml/min or up to 200 ml/min				20
 FC 203B		✔	up to 25 ml/min				20

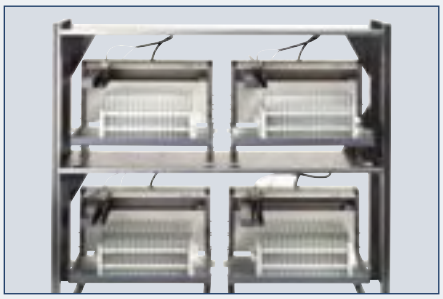
Gilson offers exceptional solutions for fraction collection with a complete line of fraction collectors – ranging from small footprint to large-vessel capacity models – and everything in between.

prepFC™ Fraction Collector

Up to 1 liter bottles can be used with Gilson's code 92 rack



Versatile tray adjusts to four height settings for various vessel heights

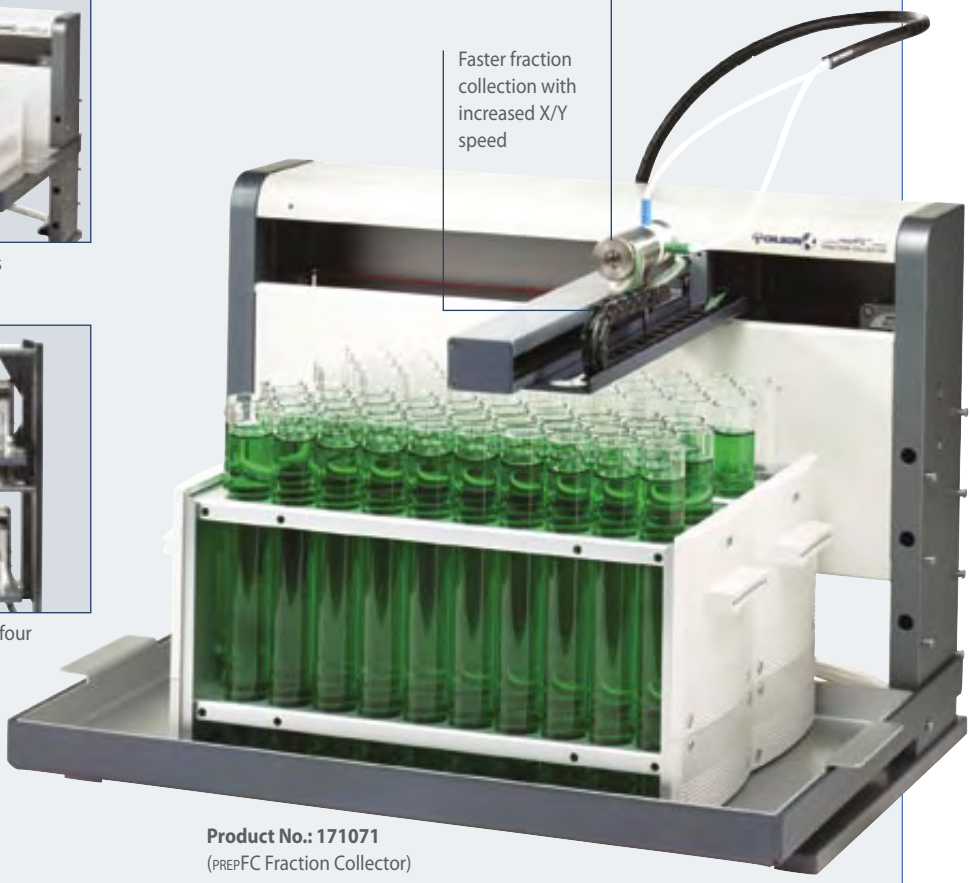


Increase bed capacity by configuring up to four fraction collectors in a single system

Vessel capacity per prepFC
- (240) 13 x 100 mm (10 mL) test tubes
- (192) 16 x 100 mm tubes
- (176) 18 x 150 mm test tubes
- (80) 25 x 200 mm test tubes
- (27) 28 x 57 mm (25 mL) Scintillation vials
- (54) 30 x 115 (50 mL) conical bottom tubes
- (18) 48 x 113 mm (125 mL) bottles
- (11) 500 mL bottles
- (8) 1 Liter bottles

Accommodates flow rates up to 200 mL/min with high flow fraction collection value

Faster fraction collection with increased X/Y speed



Product No.: 171071
(prepFC Fraction Collector)

Gilson's prepFC is the ideal preparative HPLC fraction collection solution that accommodates flow rates up to 200 mL/min. The narrow footprint and innovative, easy-to-use method for elevating the tray accommodates vessels of various sizes including the new Code 90-Series racks which hold bottles up to one liter. Gilson's prepFC is able to perform repetitive collection loops and can configure up to four fraction collectors for added vessel capacity.

Specifications	
Dimensions (w x d x h) 50 x 36.3 x 32.3 cm (19.7 x 14.3 x 12.7 in)	**Valve Dead Volume** 114 µL internal volume; 6 µL dead volume from common port to normally closed port
Liquid Contact Material PTFE and 316 stainless steel	**Flow Rate** Up to 200 mL/min
Valve Switching speed <200 ms	**Operating Modes** (Trilution™ LC) Slope, Level, Slope & Level, Time, or Volume

FC 203B/FC 204 Fraction Collectors

In peak mode, collectors monitor a detector signal and identify peaks using either an adaptive-slope algorithm or a specified millivolt threshold

Multicolumn adapters for collecting up to 18 separate channels

Compact size fits in most fume hoods

3-way diverter valve prevents contamination of collected fractions (standard on FC 204, optional on FC 203B)

Up to 10 programmable time windows can be added for collecting only what you want, while discarding the column's void volume, peaks of no interest and equilibration volumes

Stand-alone instruments with an easy-to-use keypad, or can be controlled through your PC via TRILUTION™ LC Software

Contact closure inputs are available to remotely start/ advance or stop – compatible with most HPLC systems

FC 203B

FC 204

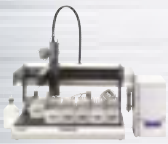
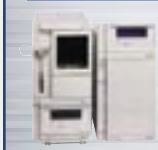
Product Nos.: 171011 (FC 203B)
171011DV (FC 203B with 3-way valve)
171041 (FC 204)
171043 (FC 204 with prep valve)

Choose the compact FC 203B for small-capacity collection or the FC 204 for large volumes and capacities. Collect fractions by time, drop or peak to suit all your LC applications. Both models accept a wide variety of collection vessels, including microplates, microvials and tubes.

Specifications

Dimensions (w x d x h) FC 203B: 32.4 x 29.2 x 26.7 cm (12.8 x 11.5 x 10.5 in) FC 204: 47.9 x 46.4 x 33 cm (18.9 x 18.3 x 13 in)	**Valve Switching speed** 100 ms
Liquid Contact Material PTFE and 316 stainless steel	**Flow Rate** FC 203B: up to 25 mL/min FC 204: up to 25 or 200 mL/min
Valve Dead Volume FC 203B: 64 µL internal volume; 3.5 µL dead volume from common port to normally closed port FC 204: 114 µL internal volume; 6 µL dead volume from common port to normally closed port	

HPLC: HPLC Systems

	Column Internal Diameter								Description	Page Number
	300 µm	1 mm	2 mm	4.6 mm	10 mm	21.2 mm	30 mm	50 mm		
 **GX-281 Preparative HPLC System**				●	●	●	●	●	High Bed Capacity Flow Rates from 1 mL/min to 200 mL/min Injection volumes 250 µL to 25 mL Sample Mass up to 15 g/injection	22
 **GX-281 Analytical-to-Semipreparative HPLC System**				●	●	●			High Bed Capacity Flow Rates from 150 µl to 30 mL/injections Injection volumes 250 µL to 10 mL Sample Mass up to 300 mg/injection	23
 **845Z PREP™ System**				●	●	●	●	●	High Bed Capacity Flow Rates from 1 mL/min to 150 mL/min Injection volumes 5 µl to 10 mL Sample Mass up to 15 g/injection	23
 **cLC™ System**				●	●	●	●	●	High Bed Capacity Flow Rates from 1 mL/min to 200 mL/min Injection volumes 5 µL to 10 mL Sample Mass up to 15 g/injection Flash Chromatography	24
 **215 Direct-Inject System (Micro 215 System)**					●	●			High Bed Capacity Flow Rates from 150 µL/min to 30 mL/min Injection volumes 500 nL to 5mL Sample Mass ng to 75 mg (0.5 µL-5 mL)	24
 **235 Analysis System**					●	●			High Bed Capacity for vials and microplates Flow Rates from 150 µL/min to 30 mL/min Injection volumes 500 nL to 5 mL Sample Mass 20 ng to 75 mg	25
 **MALDILC™ System**		●							High Bed Capacity for vials and microplates Flow Rates from 300 nL/min to 50 µL/min Injection volumes 500 nL to 5 mL Sample Mass .01 ng to 200 µg (0.5-100 µL)	25

GX-281 Preparative HPLC System

Injection of up to 15 g per run depending on column dimensions

Aspirate the sample directly into the valve without a separate injection port, eliminating a source of potential carryover with the GX Z-Injection Module.

GX Direct Injection Module with 1/8″ OD sample loop valve can accommodate up to 25 mL sample loops.

Wide flow rate range of the 333 and 334 Pumps allows you to perform both semipreparative and preparative separations with the same system

Add the PREPELS™ detector to any Gilson HPLC System for added detection capabilities.

Low dwell volume allows fast, reproducible gradients

Gilson's GX-281 Prep Solvent System features a large dynamic range in volumes and flow rates using syringe-less technology and the ability to select from up to 5 off-bed solvents.

Specifications

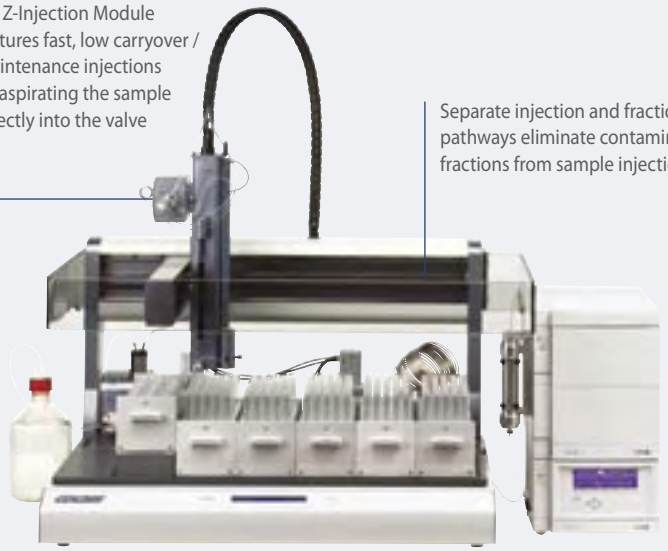
Sample Loading Capacity Up to 15 g/injection	**Optimal Column Size (mm)** 10-100	**Maximum Injection Pressure** 5,000 psi (345 bar)
Injection Volume 250 µL to 25 mL	**Flow Rate (mL/min)** 1.0-200	**Maximum Pump Pressure** 3,040 psi (210 bar)

GX-281 Analytical-to-Semipreparative HPLC System

GX Z-Injection Module features fast, low carryover / maintenance injections by aspirating the sample directly into the valve

Separate injection and fraction collection pathways eliminate contamination of fractions from sample injection

A single instrument for injection, fraction collection and re-injection – no need to transfer tubes or racks to another system



Specifications	
Sample Loading Capacity Up to 300 mg/injection	**Injection Volume** 250 µL to 10 mL
Optimal Column Size (mm) 2.0-20	**Flow Rate (mL/min)** H1: 0.15-15; H2: 0.3-30
Maximum Injection Pressure 5,000 psi (345 bar)	**Maximum Pump Pressure** H1: 8,700 psi (600 bar); H2: 4,350 psi (300 bar)

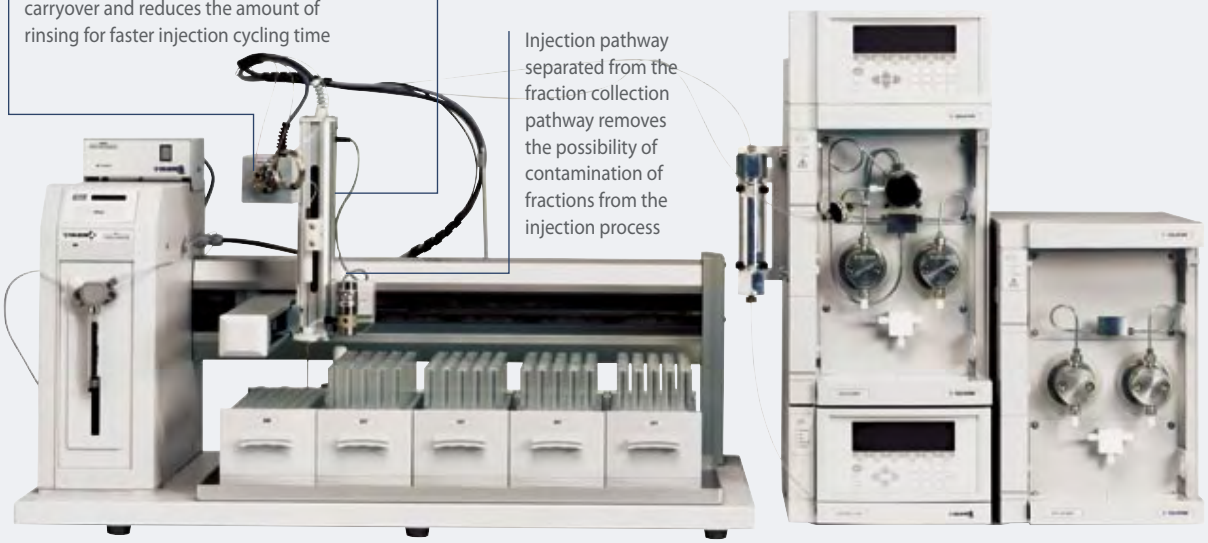
845Z PREP™ System

No extra-volume total loop injections with <0.01% carryover and CVs <1.0%

Sample is aspirated directly into the injection valve, removing the need for an injection port; eliminates a source of carryover and reduces the amount of rinsing for faster injection cycling time

Injection and fraction collection from 5 to 150 mL/min with a large-bore rotor seal to minimize pressure spikes when operating at high flows

Injection pathway separated from the fraction collection pathway removes the possibility of contamination of fractions from the injection process



Gilson's 845Z PREP™ System features Gilson's innovative injection technique of the 845Z Injection Module paired with the large 0.040 ID ports in the valve to accommodate flow rates up to 150 mL/min for semiprep to prep applications. The fast injection switching time of <200 ms provides optimal injection results by preventing pressure spikes.

Specifications	
Sample Loading Capacity Up to 15 g/injection	**Maximum Injection Pressure** 3,000 psi (207 bar)
Optimal Column Size (mm) 10-100	**Maximum Pump Pressure** 3,040 psi (210 bar)
Injection Volume 100 µL-10 mL	**Carryover** <0.01 %
Injection Variability <1.5 %	**Flow Rate (mL/min)** 1 to 150 mL/min

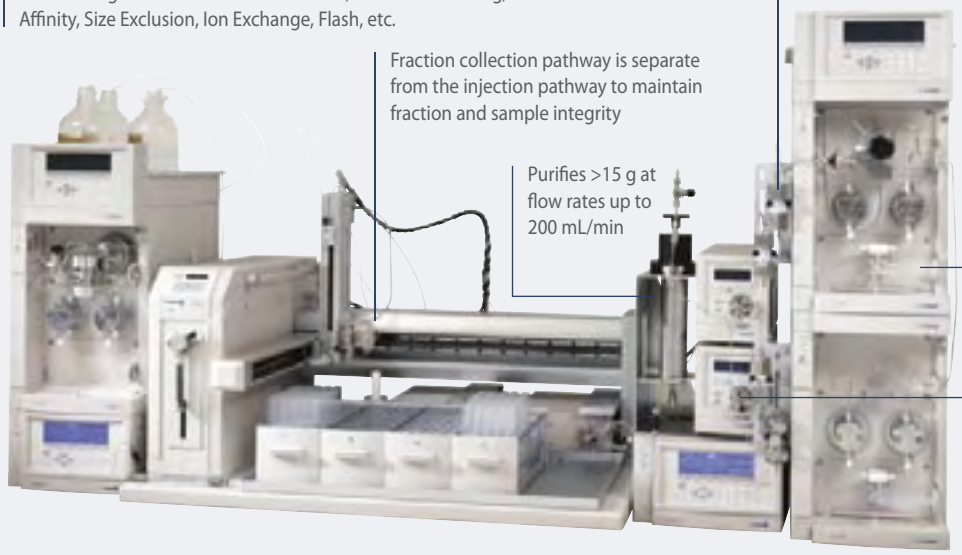
cLC™ System (Analytical to Prep)

Capable of performing more than 20 different chromatography applications on one system for analytical, semiprep, and preparative LC including: Reverse- and Normal-Phase, Chromatofocusing, Affinity, Size Exclusion, Ion Exchange, Flash, etc.

Accommodates up to five columns (analytical, semiprep and preparative) in a variety of sizes configured on a single system

Fraction collection pathway is separate from the injection pathway to maintain fraction and sample integrity

Purifies >15 g at flow rates up to 200 mL/min



Automated solvent selection and equilibration of up to 12 different solvents

Modular design allows you to configure only the components you need – with the flexibility to easily add more functionality

Gilson's cLC™ System is a complete chromatography system capable of automating the purification of compounds using both reverse-phase and normal-phase columns. The cLC System also has the ability to accommodate various modes of detection including UV/VIS, MS, ELSD or RI. Additional analytical components are also integrated into the cLC System, enabling automated on-line evaluation of the collected fractions for purity and recovery.

Specifications

Sample Loading Capacity Up to 15 g/injection	**Injection Volume** 5 µL to 10 mL
Optimal Column Size (mm) 4-50	**Flow Rate (mL/min)** 1.0-200
Max. Injection Pressure 5,000 psi (345 bar)	**Max. Pump Pressure** 3,040 psi for 33K pump; 8,700 psi for 32K pump

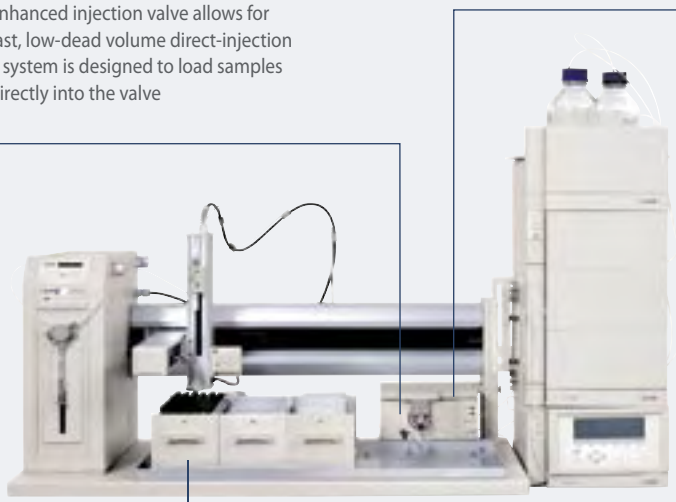
215 Direct-Inject System (Micro 215 System)

Enhanced injection valve allows for fast, low-dead volume direct-injection – system is designed to load samples directly into the valve

Low dead volume with direct injection decreases carryover and increases injection reproducibility

Ideal for microbore to semiprep applications

Ideal for small-volume injections (as low as 500 nL), as well as micro pipetting into microplates and vials for reagent and internal standards addition



Large bed can accommodate up to 17 microplates

Specifications

Sample Loading Capacity ng–75 mg (0.5 µL-5 mL)	**Injection Volume** 500 nL to 5 mL
Optimal Column Size (mm) 2-10	**Flow Rate** 150 µL/min – 30 mL/min
Max. Injection Pressure 5,000 psi (345 bar)	**Max. Pump Pressure** H1: 8,700 psi (600 bar); H2: 4,350 psi (300 bar)

235 Analysis System

High capacity in a small footprint. The 235 Autoinjector can inject from four 384- or 96-well microplates, or 192 2 mL or 384 0.7 mL vials.

Integrate the 235 Analysis System with your HPLC or LC/MS system for sample injection

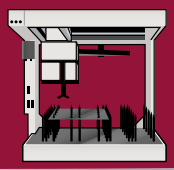
Specifications	
Sample Loading Capacity 20 ng-75 mg	**Injection Volume** 500 nL to 5 mL
Optimal Column Size (mm) 2-10	**Flow Rate (mL/min)** 150 µL to 30 mL (depending upon pump head)
Max. Injection Pressure 5,000 psi (345 bar)	**Max. Pump Pressure** H1: 8,700 psi (600 bar); H2: 4,350 psi (300 bar)

MALDILC™ System

Gilson's MALDILC™ System is designed to perform nano to microbore HPLC with fraction collection and simultaneous matrix addition onto MALDI plates. The plated fractions can then be analyzed repeatedly by MALDI-TOF MS. The Gilson MALDILC System is an ideal preparation technique for easily automating what has historically been a manual procedure.

Specifications	
Sample Loading Capacity 0.1 ng-200 µg (0.5-100 µL)	**Matrix Compatibility** THAP, HPA, CHCA, SA, HABA, DHB
Optimal Column Size 180 µm-1 mm	**Flow Rate (µL/min)** 0.3-50
Max. Injection Pressure 5,000 psi (345 bar)	**Max. Pump Pressure** 4,350 psi (300 bar)

Software

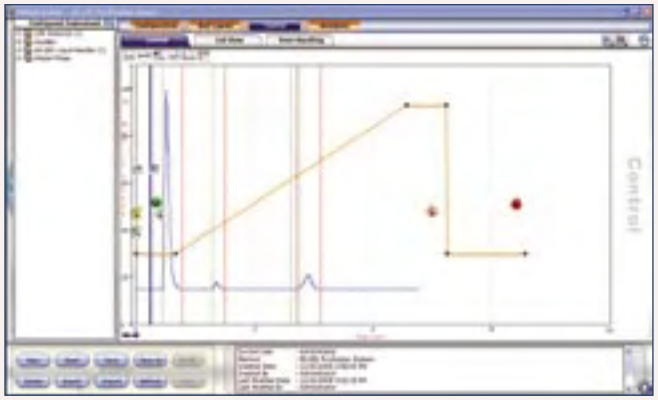
	Instrument Control			Page Number
	HPLC Systems	Liquid Handlers	925/940 Workstations	
Trilution™ LC				27
Trilution™ LH				28
UniPoint™				29
745 Control				29

Gilson offers powerful software to compliment its rugged instruments. With easy-to-use features and numerous supplied tasks, Gilson's software packages allow you to effortlessly control your instruments.

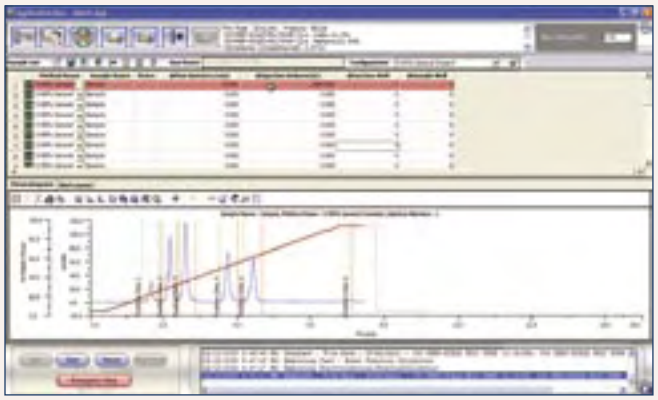
TRILUTION™ LC Software

Gilson has re-defined purification with new HPLC system control software: Trilution™ LC. This new liquid chromatography software, specifically designed for purification, now gives you complete control of your run to achieve the challenging results that your work requires. Setting up and running your preparative LC run has never been simpler with our new, easy-to-use graphical interface and powerful control. You never knew your HPLC system could be so flexible and do so much!

Configuration and Virtual Lab Screen



Method Builder Control Screen



Application Run Screen

Fraction Collection
- Enhanced fraction collection capabilities specifically designed for purification and preparative LC include conditional logic FC, graphical FC optimization, front and tail slope settings, apex collection capabilities, auto sample list generation and much more.

Open Access
- TRILUTION™ LC gives you administrator control and permission setting
- You are up and running with just five mouse clicks with the easy-to-use walk-up software
- Control the HPLC without being an expert at the software

Ease of Use
- Easy to use drag and drop interface and configuration wizards
- TRILUTION™ LC offers graphical gradient creation with pre-defined gradient templates

Total Control
- TRILUTION™ LC gives you complete control from task to application and everything in between including custom task and rack capabilities
- Conform the software to your application rather than compromising your application to fit the software

Product Nos.: 21063130 (LC Lifetime License)
21063130L5 (LC Multi-User Lifetime License (5))
21063130L10 (LC Multi-User Lifetime License (10))
21063131 (LC 1 year License)
Note: Requires TRILUTION LC Media and ORACLE

Computer Recommendation		
Processor Intel® Pentium® 4 (2.8 GHz)	**Fixed Drive** 80 GB, Available space: 4 GB (6 GB at install)	**Video Card** 1024 x 768 with 24 bit True Color
RAM 1 GB	**Additional Drive** DVD/CD-RW	**Serial Ports** 2
Operating System Microsoft® Windows® 2000 SP4 or Microsoft® Windows® XP Professional SP2 or later		

Trilution™ LH Software

Trilution™ LH is a powerful software package for all of Gilson's automation instrumentation. This revolutionary software provides a flexible, single point of control for automation applications ranging from the simplest to the most complex assays. Trilution's flexibility comes from its innovative and progressive interface, programmable liquid characteristics and unlimited number of variables. Trilution's easy-to-use and intuitive design lets you focus on the science instead of the software.

Task Builder

Log-on Screen

Main Menu

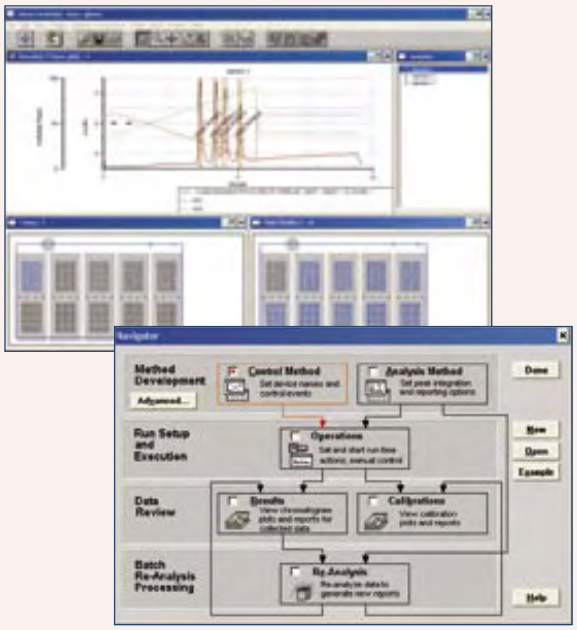
- More than 40 supplied tasks to get the instrument immediately up and running
- Supports more than 150 rack styles to help you configure your system to your specific needs
- Integrated customization is included to allow you to create your own racks and tasks
- Simple drag-and-drop method creation
- Easily integrates with third-party applications
- Reports document all aspects of your application
- Graphical application simulation and validation features ensure the functionality and reliability of the application prior to use with samples
- Control of all Gilson 215 Series and XL Series instruments for liquid handling applications
- Intuitive interface facilitates the learning process
- Support multiple configurations and bed layouts to provide the ultimate in flexibility

Product No.: 21063020 (Trilution LH License, Lifetime)
21063021 (Trilution LH License, 1 year)
21063022 (Trilution LH License, 3 year)
Note: Requires Trilution LH Media and ORACLE

Computer Recommendation

Processor Intel® Pentium® 4 (2.8 GHz)	**Fixed Drive** 80 GB, Available space: 4 GB (6 GB at install)	**Video Card** 1024 x 768 with 24 bit True Color
RAM 1 GB	**Additional Drive** DVD/CD-RW	**Serial Ports** 2
Operating System Microsoft® Windows® 2000 SP4 or Microsoft® Windows® XP Professional SP2 or later		

UniPoint™ System Software



Product No.: 21064651 (UniPoint v. 5.1)
362831 (506C System Interface; 110V)
362832 (506C System Interface; 220V)

Graphical tracking offers several time-saving features:

- Comprehensive sample tracking
- The interactive screen allows you to click on a fraction tube/ well, peak or sample location; the screen automatically updates corresponding windows

Electronic Record Management features:

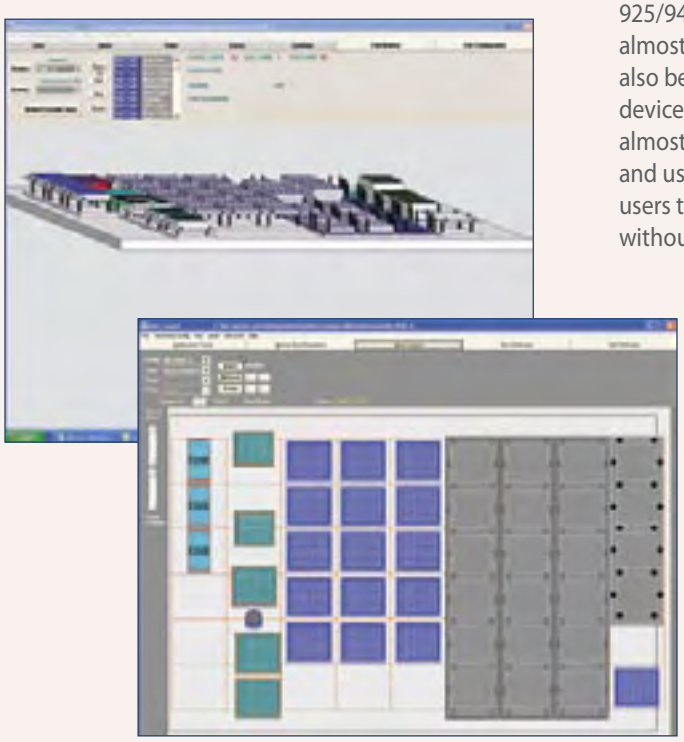
- Help ensure GMP, GLP and 21 CFR Part 11 compliance
- Electronic signatures and workflow capabilities
- Automatic versioning of records

Multitasking capabilities:

- Control multiple systems simultaneously from a single computer
- Versatile and flexible injection techniques
- Injection and fraction collection on one hardware platform
- Use multiple variables to customize operations and methods
- Multiple detector signals with a single run

Computer Recommendation		
Processor Intel® Pentium® 4 (2.8 GHz)	**Fixed Drive** 80 GB, Available space: 4 GB (6 GB at install)	**Video Card** 1024 x 768 with 24 bit True Color
RAM 1 GB	**Additional Drive** DVD/CD-RW	**Serial Ports** 2
Operating System Microsoft® Windows® 2000 SP4 or Microsoft® Windows® XP Professional SP2 or later		

745 Control Software



Product No.: 2106167 (745 Control Software)

745 Control Software controls every aspect of the Gilson 925/940 Workstations. The software can accommodate almost any physical layout of a workstation deck, while also being able to incorporate a multitude of integrated devices and peripheral accessories. The software allows for almost any type of consumable product to be integrated and used in a method. 745 Control Software also allows users to create methods with enhanced flexibility and without generating software code.

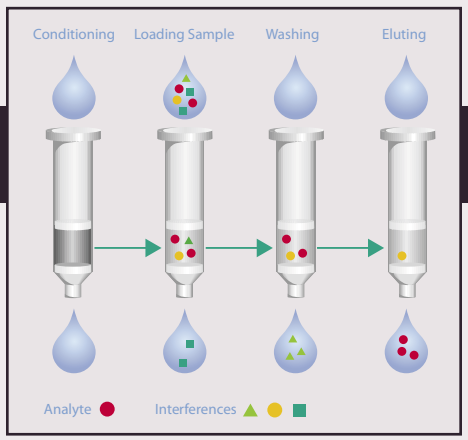
- User-friendly, graphical control system
- Create custom routines in minutes using the drag-and-drop programming environment
- Enables you to control the Gilson Workstations and create procedures using a graphical interface
- User Access Control lets you set a password that will allow access only to the "Run Procedures" screen

Computer Recommendation		
Processor Intel® Pentium® 4 (2.8 GHz)	**Fixed Drive** 80 GB, Available space: 4 GB (6 GB at install)	**Video Card** 1024 x 768 with 24 bit True Color
RAM 1 GB	**Additional Drive** DVD/CD-RW	**Serial Ports** 2
Operating System Microsoft® Windows® 2000 SP4 or Microsoft® Windows® XP Professional SP2 or later		

Solid Phase Extraction Systems

	Liquid Handler	Muliti Collection Feature	Keypad Control	Elution Methods		Cartridge Sizes				Page Number
				Positive Pressure	Vacuum	1 mL	3 mL	6 mL	96-well Plate	
SPE 215				✔						31
QuadZ 215 with Vacuum Rack					✔					31
ASPEC™ XLi SPE				✔						32
ASPEC™ XL4 SPE				✔						32

Automate your SPE process with Gilson's complete line of SPE instruments. From SPE microplates to 1, 3 or 6 mL SPE cartridges, Gilson provides the automated SPE solution for you.



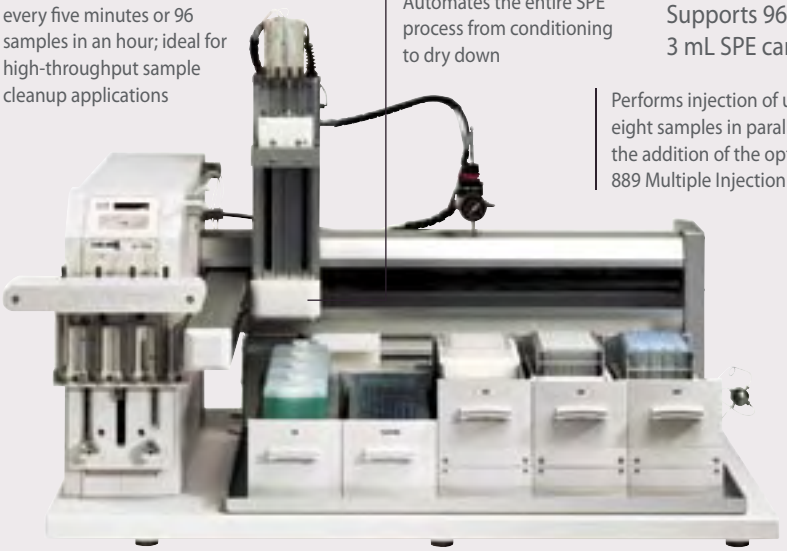
SPE 215 System

The optimal solution for high-throughput solid phase extraction and sample purification. Supports 96-well extraction plates, 1 mL and 3 mL SPE cartridge applications.

Processes up to eight samples every five minutes or 96 samples in an hour; ideal for high-throughput sample cleanup applications

Automates the entire SPE process from conditioning to dry down

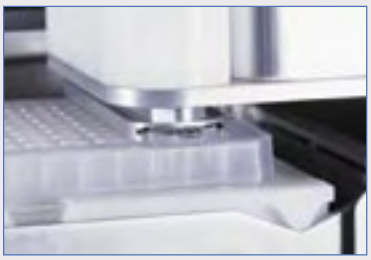
Performs injection of up to eight samples in parallel with the addition of the optional 889 Multiple Injection Module



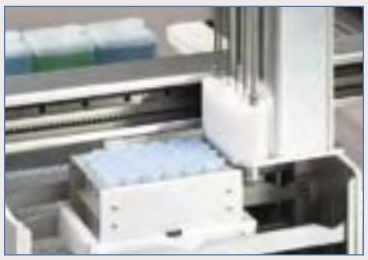
Product No.: 25101321 (SPE 215)

An automated solution for sample preparation, sample reconstitution, and injection onto HPLC or LC/MS systems that enables parallel cleanup, filtration and purification of combinatorial libraries and biological fluids.

Specifications	
Reproducibility 0.98% CV at 100 µL	**Accuracy** 97.1% at 100 µL
Dimensions (w x d x h) 97.8 x 61 x 64 cm (38.5 x 24 x 25.2 in)	



Positive pressure elution accomplished through Gilson's "Integrated Sealing Foot Design."



Gilson's mobile racks allow you to automate your entire SPE and liquid handling processes from the initial load to the final transfer.

The SPE 215 System's large assortment of racks offers sample preparation solutions for virtually any application.

SPE Vacuum Rack

The SPE Vacuum Rack provides a high-throughput solution for automating manual vacuum processes utilizing 96-well SPE plates. Combines the flexibility of the Quad-Z with the ability to perform vacuum SPE.

Gilson's Vacuum Rack provides a flexible SPE solution on the bed of the Quad-Z 215.

The SPE Vacuum Rack can be configured to accommodate a variety of SPE extraction plates. The plate styles include 3M Empore™, Varian VeraPlates™, and Waters Oasis®.

Provides automated liquid handling, sample clean-up and vacuum collection of samples

Allows the use of a vacuum in a 96-well SPE extraction plate format

Provides the ability to collect into shallow or deep 96 square-well microplates

The Quad-Z 215 Liquid Handler configured with a Vacuum Rack and Vacuum Controller.
Product No.: 2515352 (SPE Vacuum Rack with Controller)

ASPEC™ XLi SPE System

Gilson's ASPEC XLi System automates all SPE steps and offers automated sample pretreatment with on-line injection.

Improved speed and precision of both large and small volumes with Gilson's 402 Syringe Pump

Transport samples quick and easy with the ASPEC's modular design.

Can operate in batch and sequential mode increasing throughput and maximizing efficiency.

Positive pressure elution technology, assuming better reproducibility and higher precision.

Accommodates 1, 3 and 6 mL SPE cartridges

Eluting fractions can be collected into different rows allowing fractionation of the product.

Specifications	
Reproducibility 0.8% CV at 10 µL	**Accuracy** 98.2% at 10 µL
Dimensions (w x d x h) 51.5 x 62 x 30 cm (20.3 x 24.4 x 11.8 in)	

Product No.: 2910715 (ASPEC XLi SPE System)

ASPEC™ XL4 SPE System

Can operate in batch and sequential mode increasing throughput and maximizing efficiency

Eluting fractions can be collected into different rows allowing fractionation of the product

Accepts 1, 3 and 6 mL standard SPE cartridges and 3M 96-well microplates

Uses positive-pressure elution technology, assuring better reproducibility and higher precision.

Processes four samples in parallel with the capacity of processing up to 50 samples per hour.

The ASPEC™ XL4's capacity enables processing of up to 108 samples in a single batch.

Specifications	
Reproducibility 0.8% CV at 10 µL	**Accuracy** 98.2% at 10 µL
Dimensions (w x d x h) 52 x 66 x 84 cm (21 x 26 x 33 in)	

Product No.: 2910915F
(ASPEC XL4 SPE System)

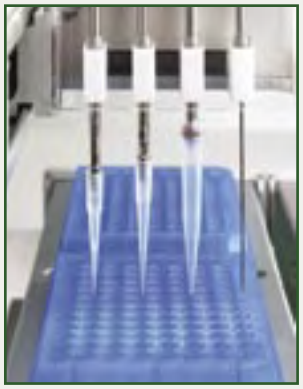
Liquid Handlers

	Instrument Control			Disposable Tips	Reproducibility (water)	Accuracy	Page Number
	Liquid Handler	Plate/ Tube Gripper	Protein Crystall-ography				
GX-281	✓				±2% for (100 µL-25 mL) <2%	±2% (100 µL-25 mL)	5
215	✓				1.37% CV with 50 µL syringe	99.7% (50 µL)	6
Multiple Probe 215	✓				0.57% CV with 500 µL of water	99.2% (50 µL)	7
Quad-Z with Disposable Tips	✓			✓	4.3% CV with 1 µL of DMSO	113% with 1 µL of DMSO	34
Quad-Z 215	✓				2.1% CV with 1 µL of DMSO	104% with 1 µL of DMSO	35
223	✓				0.8% of 10 µL	98.2% at 10 µL	36
221 XL/ 222 XL	✓				0.8% CV at 100 µL	98.2% at 100 µL	37
925/940 Weigh Stations	✓	✓		✓	4% CV with 1 µL on a dry plate	97% with 1 µL of DMSO	37
925/940 Workstations	✓	✓		✓	4% CV with 1 µL on a dry plate	97% at 1 µL	38
925 PC Workstations	✓	✓	✓	✓	<3% CV with 0.5 µL of 30% PEG 8000	101% with 0.5 µL of 30% PEG 8000	40

Quad-Z 215 Liquid Handler with Disposable Tips

The addition of disposable tips to Gilson's Quad-Z 215 Liquid Handler offers an important tool for molecular biology applications including DNA probes, PCR preparation, automated sample prep and electrophoresis. The disposable tips option increases throughput, efficiency, reproducibility and lowers costs by automating manual pipetting procedures. Disposable tips also eliminate the problem of contamination from carryover and increase speed by eliminating wash steps.

Based on the robust design of the 215 Liquid Handler, the Quad-Z 215 combined with two 402 Dual Syringe Pumps or a 444 QuadDilutor allows unparalleled flexibility and functionality.



Variable probe configurations, use 10 µL, 200 µL, 1.0 mL disposable tips or fixed probes

Zero Contamination

On-bed storage of tips allows quick and easy tip loading, use and disposal.

Product Nos.: 25101412 (Quad-Z 215 Liquid Handler)
2506163 (Quad-Z 215 Adapter Kit for Disposable Tips)
F410513 (402 Dual Syringe Pump)

Specifications

Reproducibility	Accuracy
4.3% CV with 1 µL of DMSO	113% with 1 µL of DMSO

Dimensions (w x d x h)
Quad-Z: 91 x 61 x 61 cm (36 x 24 x 24 in)
402 Syringe Pump: 17 x 20 x 24 cm (6.7 x 7.9 x 9.4 in)

Quad-Z 215 Liquid Handler/Injector

Based on the robust design of the 215 Liquid Handler, the Quad-Z 215 features four independent probes with variable horizontal spacing from 9 to 18 mm for access to a wide range of sample vessels. Large bed capacity holds up to 17 microplates. Accommodates many of Gilson's racks for maximum flexibility for sample transfer between tubes, vials and plates.

Vacuum Rack can be incorporated for a complete liquid handling / solid phase extraction, filtration, and protein precipitation solution.

Quad-Z 215's 4 independent probes with variable horizontal probe spacing spannable from 9 to 18 mm. Allows access to a wide range of tubes, vials, and micro plates.

Using two 402s with the Quad-Z allows 4 independently controlled syringes customizable with all available syringe sizes ranging from 100 µL to 25.0 mL.

Product Nos.: 2510412 (Quad-Z Liquid Handler)
2515352 (Vacuum Rack with Controller)
F410513 (402 Dual Syringe Pump)

Specifications

Reproducibility Liquid Handling: 2.1% CV with 1 µL of DMSO Injection: <2.0% CV w/500 µL syringe and partial loop filling method; <5.0% CV w/500 µL syringe and total loop filling method		
Accuracy Liquid Handling: 104% with 1 µL of DMSO	**Injection Carryover** <0.05%	**Injection Volume Range** 5 µL-5 mL
Dimensions (w x d x h) Quad-Z: 91 x 61 x 61 cm (36 x 24 x 24 in) 402 Syringe Pump: 17 x 20 x 24 cm (6.7 x 7.9 x 9.4 in)		

223 Sample Changer

Programmable sampler for automated sample preparation and transfer. The 223 Sample Changer is the perfect solution for protocols such as serial dilutions, addition of samples, sampling into vials, timed reactions and tube-to-tube transfers.

Optional flow-through rinse station eliminates carryover and contamination

New spring-loaded probe is ideal for low- and sub-microliter liquid handling applications including MALDI plate preparation and micro array spotting

Choose from a wide variety of probe designs as well as standard and custom racks

Ideal for automated transfer of samples in analytical techniques like FIA and spectroscopy (UV/VIS, AA, ICP).

Liquid level sensing and user-selectable rinsing parameters help eliminate sample contamination due to carryover

Product No.: 191015 (223 Sample Changer)

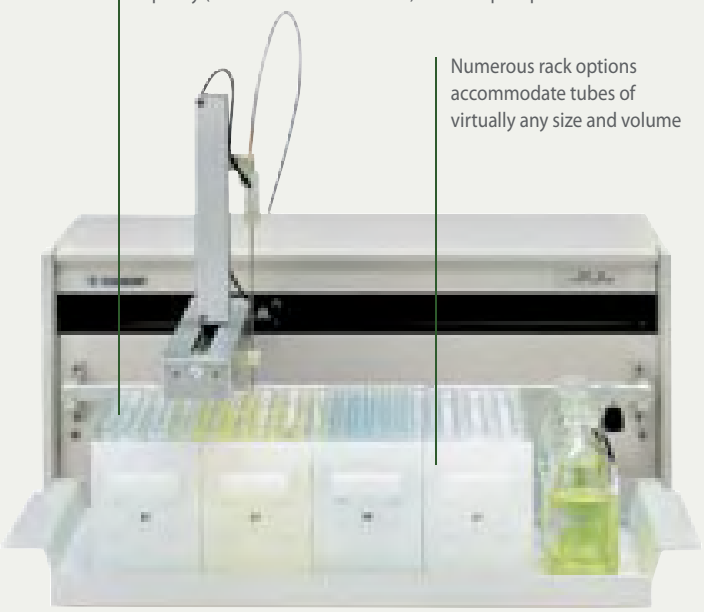
Specifications	
Reproducibility 0.8% at 10 µL	**Accuracy** 98.2% at 10 µL
Dimensions (w x d x h) 53.5 x 43.7 x 60 cm (21.1 x 17.2 x 24 in)	

221 XL/222 XL Liquid Handlers

221 XL has a 120-tube capacity (6 x 32 mm or 7 x 40 mm); 222 XL offers a 540-tube capacity (7 x 40 mm or 10 x 75 mm) and accepts up to five different racks in a single tray

Integration with 221 XL/222 XL liquid handlers is ensured with multiple control options such as RS-232 and contact closure I/O's.

Numerous rack options accommodate tubes of virtually any size and volume



Built for easy, unattended operation

Robotic liquid handlers to automate your sample preparation and transfer protocols. The 221 XL and 222 XL are ideal for automating liquid transfer for many applications, including ICP, AA, UV/VIS spectrophotometry, FIA and colorimetery.

Product Nos.: 271021 (221 XL)
271052 (222 XL)

222 XL

Specifications	
Reproducibility 0.8% CV at 100 µL	**Accuracy** 98.2% at 100 µL
Dimensions (w x d x h) 221 XL: 33 x 46.5 x 23 cm (13 x 18.3 x 9 in) 222 XL: 51.5 x 62 x 23 cm (20.3 x 24.4 x 9 in)	

925 and 940 Weigh Stations

The 925/940 Weigh Stations are specifically designed to take advantage of the Workstation's platform. The Weigh Stations incorporate a number of integrated tools to automate this process and provide you with a complete weighing station solution. Multiple combinations of these accessories create two of the most flexible Weigh Stations on the market today.

Up to three single-channel probes for multiple sample processing

The Capper/Decapper is used to decap sample vials for easy access to the sample. After the sample is processed, the capper then recaps the vial with the original cap, ensuring minimal exposure to the sample.

Peristaltic pumps for bulk dispensing, or for a flowing rinse station

pH meter to record pH values of dissolved or mixed samples

Gripper to move tubes and plates to other bed components such as the analytical balance

Syringe pumps offering syringe sizes from 100 µL to 25 mL

Bar code reader to record sample IDs for sample tracking

Analytical balance to record sample weight down to 0.01 mg

Racks to fit a wide variety of tubes, plates, reservoirs, etc.

Orbital shaker for dissolving samples online

Capper/Decapper to add or remove screw caps for sensitive samples before adding diluent

Gilson Workstations

Workstations are engineered to increase throughput while decreasing the complexity that is normally associated with laboratory automation. The workstation head can be configured with up to five tools, including single- and 96-channel pipettors with grippers to move tubes, plates, tip boxes and other devices around the deck. In addition to pipetting, plate gripping and moving capabilities, the workstations can easily integrate other laboratory equipment such as balances, mixers, vortexers and vacuum blocks. This gives you the ability to automate a full range of liquid handling and sample preparation steps on a single workstation. The workstations have large, flexible deck layouts: the 925 Workstation holds up to 236 microplates and the 940 Workstation holds up to 416 microplates.

Ideal for cherry picking applications or bulk dilutions

Pipettes in and out of 96- and 384- well plates for reformatting applications

All 8 nozzles are "ganged" acting as one to aspirate and dispense all channels simultaneously

Gripper allows access to plates, tip boxes, lids and other deck accessories

925 and 940 Workstations

Multiple-function X/Y/Z robots hold up to five tools (1-, 8-, 96-channel pipettors and gripper) to allow immediate access to multiple tools on the same head; no need to drop off or pick up tools, saving time and increasing efficiency

Standard Deck

- Comes with up to 4 stacking trays for plates and tipbox storage
- Up to 4 delivery trays for reservoir storage plate processing
- A microplate barcode reader
- Tip installer for the 96 channel pipettor
- Rinse station for the single probe pipettor

Optional Deck Accessories

- BioTek Plate Washer ELx405
- SPECTRAmax Gemini XS Spectrofluorometer
- Millipore Vacuum
- Gilson Minipuls 3 Peristaltic Pump
- H+P TeleShaker

940 Specifications	
Working Area 144x66x89 cm (57x26x35 in)	**Deck Capacity** Over 400 Shallow-well Microplates
Weight 500 lbs	**X/Y speed** 45in/sec

Product No.: 16101940 (940 Workstaion)

925 Workstation

925 Specifications	
Working Area 79x66x89 cm (31x26x35 in)	
Weight 440 lbs	**X/Y speed** 45 in/sec
Deck Capacity Over 200 Shallow-well plates	

Product No.: 16101925 (925 Workstaion)


1 mL Disposable Tip


5 mL Disposable Tip


Single Channel Fixed Probe with Rinse Station


Micro 8 Channel Volume Range 0.1 µL to 50 µL


Tube Gripper


Capper Decapper with Barcode Reader


402 Syringe Pump


Balance (Analytical balance to record sample weight down to 0.01 mg)

925 PC Protein Crystallography Workstation

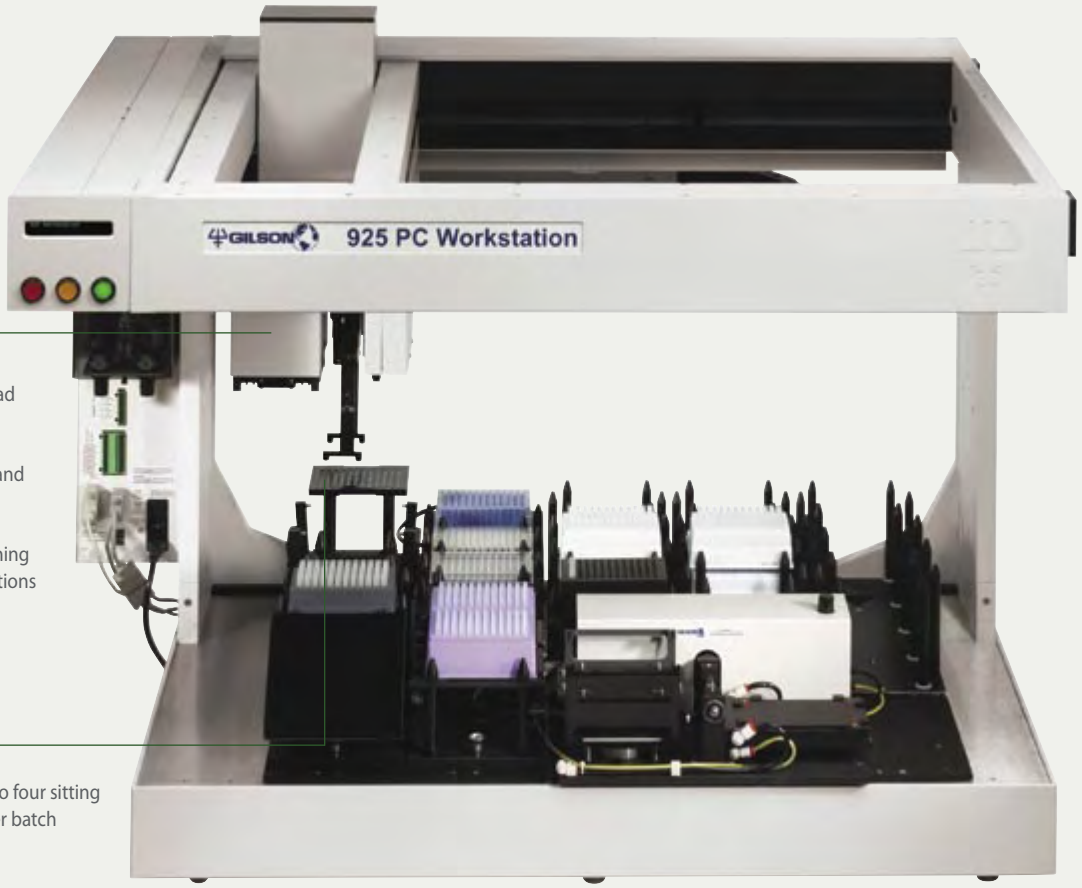
925 PC Workstation automates the preparation of high-throughput protein crystallography. It is engineered to meet the demand for high-throughput reagent screening, yet can provide large, high-quality crystals suitable for X-ray diffraction.

Rapid and efficient screening of large numbers of different proteins

96-well coverslip rotator allows easy placement of well solution and protein on coverslip and automates the placement of the coverslip onto the crystal plate

Flexibility of using time-tested hanging or sitting drop vapor diffusion techniques – no need to validate new methods

Ideal for high-throughput crystallography rapid screening protocols



Multiple-tool head allows plate configuration of gripper and 96- and eight-channel pipettors for fast transfer of screening and protein solutions

Processes up to four sitting drop plates per batch

Product No.: 16101925PC (925 PC Workstation)

Significantly reduces the time and expense needed to determine strategies for optimization experiments – processes 96 samples in less than 7 minutes

Specifications		
Working Area 79 x 66 x 89 cm (31 x 26 x 35 in)	**Weight** 500 lbs	**X/Y speed** 45 in/sec
Deck Capacity 1 hanging drop plate; 3 sitting drop or under Oil plates		

Accessories

	Switching Valve	Mixing	Racks	Heating/Cooling	Page Number
 VALVEMATE®					42
 Orbital Shaker					43
 RackCount™					43
 818 AutoMix					44
 852/853/854 Peltier Racks					44
 242/542 Peltier Racks					45

Matching our robust and flexible instruments, Gilson's accessories allow you to configure our instrumentation to your application for the ultimate solution.

VALVEMATE® Valve Actuator

Controls six- and ten-port high-pressure valves with up to six positions. Controls low-pressure valves ranging from four to eight ports and up to eight positions.

Controls one multiport, multiposition valve or operates in concert with additional VALVEMATE® actuators when two or more valves are required

Fast valve switching times

Automates HPLC and LC techniques to save time and extend column life. Controls high- and low-pressure valves to facilitate both solvent selection and column switching. This amazing flexibility allows multiple valve and multiple column configurations on Gilson systems.

Easy to integrate into any system with RS-232 control; contact closure inputs and Gilson Serial Input/Output Channel (GSIOC) interface available

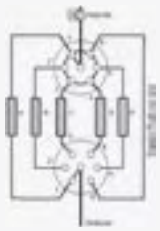
Specifications

Dimensions (w x d x h)
12.7 x 39 x 15 cm (5 x 15.4 x 5.9 in)

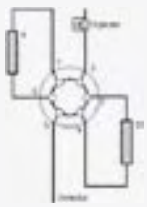
Product No.: 331051
(VALVEMATE Valve Actuator)

High-Pressure Applications

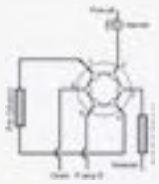
Five-Column Switching
In multiuser labs, two VALVEMATEs operating in tandem allow easy selection from up to five columns.



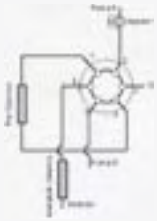
Two-Column Switching
Samples can be injected onto two different column stationary phases to check sample purity.



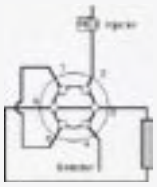
Sample Cleanup
With a two-pump system, undesired compounds are removed from the sample with a precolumn. The second pump flushes the precolumn.



Sample Enrichment
Sample is loaded and concentrated on a precolumn. The VALVEMATE then switches the mobile phase to elute the concentrated sample.



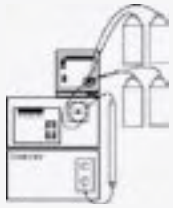
Column Backflushing
The VALVEMATE reverses the mobile phase flow, backflushing the analytical columns to elute unwanted sample components as a single peak.



Low-Pressure Applications

Fraction Collection
The VALVEMATE can function as a preparative fraction collector with detector eluent directed to a low-pressure valve.

Mobile Phase Selection
With a low-pressure valve connected to the pump inlet, the VALVEMATE can switch solvents to create a step gradient. This can also provide a way to automatically flush salts from the pump.



Orbital Shaker

Large dynamic shaking range (20-720 rpm) is generated by a single stepper motor.

Designed to accommodate one Code 200 series rack.

Product No.: 251711 (Orbital Shaker)

The Orbital Shaker can be used as a stand alone unit or can be placed on the bed of the GX-281 or 215 series of instruments using the optional mounting plate kits.

Specially designed to satisfy your liquid handling need for an on or off bed orbital shaker. The Gilson Orbital Shaker is a fully functional stand alone shaker that can be easily incorporated onto the deck of our automated systems.

Orbital Shaker with three modes of operation: Contact Closure, GSIOC Control, and Manual Control.

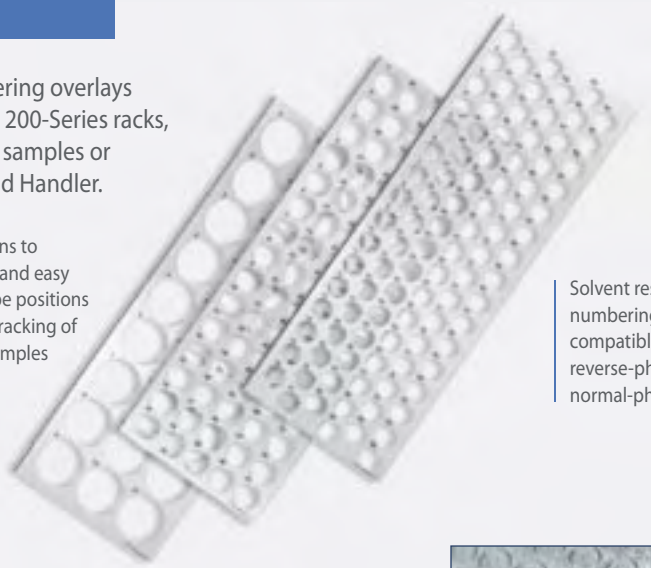
Specifications	
Shaking Speeds 20-720 rpm	**Rack Capacity** One Code 200-Series rack
Dimensions (w x d x h) 11.8 x 31.6 x 4.7 cm (4.65 x 12.44 x 1.85 in)	

RackCount™ System

Gilson's RackCount™ System, a series of numbering overlays designed to fit securely on top of several Code 200-Series racks, allows you to quickly and easily locate specific samples or collected fractions on the bed of a Gilson Liquid Handler.

Sequentially numbered fraction collection positions for four complete rack positions with a fifth position for sample locations.

Adds numbering patterns to rack positions for quick and easy matching of on-bed tube positions with graphical sample tracking of collected fractions or samples



Solvent resistant numbering patterns compatible with most reverse-phase and normal-phase solvents.

RackCount Overlays are available for a wide selection of Gilson Code 200-Series racks: 200, 202, 203, 204, 206, 207, 208, 209, 210, 219 and 222*

*For part numbers and additional patterns, please contact Gilson Customer Service at 800-445-7661.

Use the RackCount Overlays with new rack purchases – or retrofit to existing Gilson Code 200-Series racks.

818 AutoMix

Mix an entire rack of samples with oscillating mixing

Typical applications include mixing whole blood samples, mixing immiscible liquids and much more

Provides fully automated, software-driven mixing and sampling. Designed for Gilson's 215 series of instruments.

Operates at two settings: low (10 rpm) and high (20 rpm)

Product No.: 251520 (818 AutoMix)

Specifications	
Mixing Speed/Accuracy Low Speed: 10 rpm/±0.5 rpm High Speed: 20 rpm/±1 rpm	**Rack Capacity** One Code 200 Series rack
	Dimensions (w x d x h) 22.9 x 50.8 x 16.5 cm (9 x 20 x 6.5 in)

852/853/854 Peltier Racks

Flexible, accurate and programmable racks for heating and cooling. Three versatile rack options: 852 for shallow-well plates, 853 for 2 mL vials and 854 for deep-well plates.

Control up to five racks from a single Programmable Peltier Controller

Precise temperature control from 4-40°C

Peltier Racks allow both cooling and heating of the sample. Cooling to reduce evaporation and maintain sample integrity, heating to facilitate reactions and improve kinetics.

Control via the Programmable Peltier Controller as an integral part of any system or as a stand-alone unit

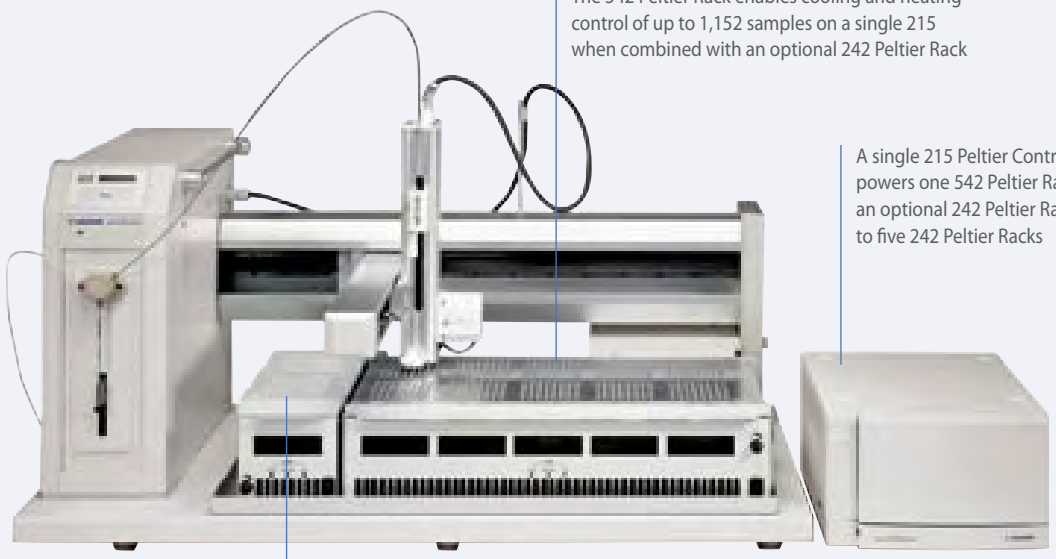
Product Nos.: 2514852 (852 Peltier Rack)
2514853 (853 Peltier Rack)
2514854 (854 Peltier Rack)

Specifications
Rack Capacity 852: (2) 96-well, shallow, "U-bottomed" microplates 853: (96) 12 x 32 mm (2 mL) flat-bottom vials 854: (2) 96-well, deep microplates
Dimensions (w x d x h) 11.9 x 33.8 x 16.8 cm (4.7 x 13.3 x 6.6 in)

Gilson offers more than 3000 standard and custom rack configurations. See page 46 for our Rack/Instrument Compatibility Chart to assist you with choosing the proper rack for your Gilson instrument.

242/542 Peltier Racks

Provide cooling and heating for Gilson's Liquid Handlers/Injectors. Individually controlled to allow cooling and heating for microplates on the same bed. The racks deliver temperature control from 4-40˚C.



The 542 Peltier Rack enables cooling and heating control of up to 1,152 samples on a single 215 when combined with an optional 242 Peltier Rack

A single 215 Peltier Controller powers one 542 Peltier Rack and an optional 242 Peltier Rack or up to five 242 Peltier Racks

Product Nos.:
25146331 (242 Peltier Rack)
2514542 (542 Peltier Rack)

Each 242 Peltier Rack handles up to two standard 96-well microplates

Specifications

Rack Capacity 242: (2) 96-well, shallow, flat-bottomed microplates 542: (10) 96-well, shallow, flat-bottomed microplates
Dimensions (w x d x h) 242: 11.4 x 30.5 x 12.4 cm (4.5 x 12 x 4.9 in) 542: 50.1 x 33.6 x 11.4 cm (20.1 x 13.3 x 4.5)

Standard and Custom Racks

Gilson offers over 3,000 standard and custom racks to meet the needs of almost any application. Racks range from holding microplates, vials, test tubes and bottles, to even the most custom chip or vessel.

Gilson Rack/Instrument Compatibility Chart

Rack Code	Rack Product No.	Description	Microplate?	Vessel Capacity (mL)	Max. Vessel Quantity	Max. Vessel Diameter	Min. Vessel Height	GX-281	215	Multiple Probe 215	Direct Inject 215 (Micro 215)	235/SP235 235P/SP235P	234	231 XL	232 XL/233 XL	FC 203B	FC 204	PREP FC	SPE 215	ASPEC XLi	ASPEC XL4	Quad-Z 215	Quad-Z 215 (Disposable Tips)	223	221 XL	222 XL	Orbital Shaker
0	270430	80 of 12 x 32 mm vials	No	2.0	80	12.0	32.0		X		X			X	X	X								X	X	X	
0	12040302	80 of Eppendorf vials (1.5 mL)	No	1.5	80	N/A	N/A							X	X										X	X	
1	12040101	80 of 13 x 65 mm or 13 x 100 mm tubes	No	9.0	80	13.0	65.0									X											
2	130402	119 of 6 x 50 mm tubes	No	1.0	119	6.0	50.0									X											
4	130412	80 of 12 x 75 mm or 12 x 100 mm tubes	No	5.0	80	12.0	75.0									X											
7	2707401	1 of 96-well microplate, shallow, flat-bottom	Yes	N/A	1	N/A	N/A							X	X									X	X	X	
8	270438	120 of 6 x 32 mm vials	No	0.3	120	6.0	32.0		X		X			X	X									X	X	X	
9	270439	120 of 7 x 40 mm vials	No	0.7	120	7.0	40.0		X		X			X	X									X	X	X	
11	170413	105 of 13 x 100 mm tubes	No	9.0	105	13.0	100.0									X											
14	170414	128 of 12 x 75 mm or 12 x 100 mm tubes	No	5.0	128	12.0	75.0									X											
15	170415	1 of 96-well microplate, shallow	Yes	N/A	1	N/A	N/A									X											
16	170416	4 of 96-well microplates, shallow	Yes	N/A	4	N/A	N/A										X										
16D	170416D	4 of 96-well microplates, deep	Yes	N/A	4	N/A	N/A										X										
17	170418	8 of microplates 24-, 48- or 96-well, Whatman deep polyfiltronics plates	Yes	N/A	8	N/A	N/A										X										
20	150425	108 of 10 x 100 mm tubes	No	4.5	108	10.0	100.0							X	X		X		X			X	X		X	X	
21	150422	60 of 13 x 100 mm tubes	No	9.0	60	13.0	100.0		X		X			X	X	X	X		X	X		X	X	X	X	X	
22	150424	44 of 18 x 100 mm or 18 x 150 mm tubes	No	25.0	44	18.0	100.0		X		X				X		X		X	X				X		X	
22U	150498	44 of 10 x 100 mm to 18 x 180 mm tubes	No	N/A	44	18.0	100.0		X		X			X	X		X		X					X	X	X	
23	150426	44 of 17 x 55 mm or 17 x 65 mm scintillation vials	No	6.8	44	17.0	55.0		X		X			X	X	X	X		X	X		X	X	X	X	X	
23W	270433	44 of 15 x 45 mm WISP vials	No	4.0	44	15.0	45.0		X		X			X	X	X	X		X	X				X	X	X	
24	150427	14 of 28 x 57 mm or 20 mL scintillation vials	No	20.0	14	28.0	57.0		X		X			X	X	X	X		X	X		X	X	X	X	X	
28	150420	108 of 10 x 65 mm or 10 x 75 mm tubes	No	3.5-4.0	108	10.0	65.0		X		X			X	X	X	X		X	X		X	X	X	X	X	
29	150429	60 of 12 x 75 mm or 13 x 75 mm tubes	No	5.0-6.0	60	13.0	75.0		X		X			X	X	X	X		X	X		X	X	X	X	X	
29LE	2704342	60 of Eppendorf vials (1.5 mL)	No	1.5	60	N/A	N/A								X	X	X		X					X			
29SE	2704341	60 of Eppendorf vials (0.5 mL)	No	0.5	60	N/A	N/A								X	X	X		X					X			
30	2704430	60 of 12 x 32 mm vials	No	2.0	60	12.0	32.0		X		X		X	X	X	X				X				X	X	X	
30P	2704530P	60 of 12 x 32 mm vials	No	2.0	60	12.0	32.0						X	X	X	X				X				X	X	X	
31	2704431	108 of 7 x 40 mm vials	No	0.7	108	7.0	40.0		X		X		X	X	X									X	X	X	
31P	2704531P	108 of 7 x 40 mm vials	No	0.7	108	7.0	40.0						X	X	X									X	X	X	
32	2704432	60 of 13 x 65 mm tubes	No	6.0	60	13.0	65.0		X		X		X	X	X	X				X				X	X	X	
33	2704433	14 of 28 x 57 mm scintillation vials	No	20.0	14	28.0	57.0		X		X		X	X	X	X				X				X	X	X	
33P	2704533P	14 of 28 x 57 mm scintillation vials	No	20.0	14	28.0	57.0						X	X	X	X				X				X	X	X	
34	2704434	36 of 15 x 45 mm WISP vials	No	4.0	36	15.0	45.0		X		X		X	X	X					X				X	X	X	
34P	2704534P	36 of 15 x 45 mm WISP vials	No	4.0	36	15.0	45.0						X	X	X					X				X	X	X	
35P	2704535P	71 of 12 x 32 mm vials (2 mL) + 1 of 28 x 60 mm vial (20 mL)	No	N/A	N/A	N/A	N/A						X	X	X									X	X	X	

Rack Code	Rack Product No.	Description	Microplate?	Vessel Capacity (mL)	Max. Vessel Quantity	Max. Vessel Diameter	Min. Vessel Height	GX-281	215	Multiple Probe 215	Direct Inject 215 (Micro 215)	235/SP235 235P/SP235P	234	231 XL	232 XL/233 XL	FC 203B	FC 204	PREP FC	SPE 215	ASPEC XLi	ASPEC XL4	Quad-Z 215	Quad-Z 215 (Disposable Tips)	223	221 XL	222 XL	Orbital Shaker
36P	2704536P	120 of 7 x 41 mm vials (0.7 mL) + 1 of 28 x 60 mm vial (20 mL)	No	N/A	N/A	N/A	N/A						X	X	X									X	X	X	
37	2704437	56 of 12 x 32 mm vials (2 mL) + 1 of 28 x 60 mm vial (20 mL)	No	N/A	N/A	N/A	N/A						X	X	X									X	X	X	
38	2704438	96 of 7 x 41 mm vials (0.7 mL) + 1 of 28 x 60 mm vial (20 mL)	No	N/A	N/A	N/A	N/A						X	X	X									X	X	X	
41	2954850	108 of 10 x 75 mm tubes	No	3.5	108	10.0	75.0														X						
42	2954855	80 of 12 x 32 mm vials	No	2.0	80	12.0	32.0														X						
43	2954852	80 of 13 x 100 mm tubes	No	9.0	80	13.0	100.0														X						
45	2954851	44 of 16 x 150 mm tubes	No	20.0	44	16.0	150.0														X						
51	27041020	4 of 28 x 57 mm scintillation vials	No	20.0	4	28.0	57.0																				
52	27041002	4 of 12 x 32 mm vials	No	2.0	4	12.0	32.0																				
53	27604441	56 of 12 x 32 mm vials	No	2.0	56	12.0	32.0																				
60	2954651	4 of 180 mL (glass) OR 250 mL (pp) bottles	No	N/A	4	N/A	N/A							X	X										X	X	
61	2954715	4 of 180 mL (glass) OR 250 mL (pp) bottles	No	N/A	4	N/A	N/A	X												X						X	
62	2954692	3 of 180 mL (glass) OR 250 mL (pp) bottles	No	N/A	3	N/A	N/A								X											X	
80	2749662	2 of 96-well microplates, shallow or deep	Yes	N/A	2	N/A	N/A							X	X										X	X	
81	1904301	2 of 96 well microplates, shallow	Yes	N/A	2	N/A	N/A							X	X						X			X	X	X	
91	17041950	11 of 500 mL Kimax or Pyrex Bottles	No	N/A	11	N/A	N/A	X									X										
92	17041951	8 of 1000 mL Kimax or Pyrex Bottles	No	N/A	8	N/A	N/A	X									X										
101	2954848	36 of 1 mL DECs	No	1.0	36	N/A	N/A													X	X						
103	2954658	20 of 3 mL DECs	No	3.0	20	N/A	N/A													X							
106	2954720	15 of 6 mL DECs	No	6.0	15	N/A	N/A													X							
143	2954843	20 of 3 mL DECs	No	3.0	20	N/A	N/A														X						
146	2704146	8 of 6 mL DECs	No	6.0	8	N/A	N/A														X						
200	2504600	96 of 13 x 100 mm Vacutainer tubes	No	9.0	96	13.0	100.0	X	X		X							X				X	X				X
201	2504601	2 of 96-well microplates + 2 of 1.5 mL microcentrifuge tubes + 2 of 13 x 100 mm tubes	Yes	N/A	N/A	N/A	N/A	X	X	X	X							X	X			X	X				X
201H	2504601H	2 of 96-well microplates w/covers + 2 of 1.5 mL microcentrifuge tubes + 2 of 13 x 100 mm tubes	Yes	N/A	N/A	N/A	N/A	X	X	X	X							X	X			X	X				X
202	2504602	96 of 10.25 x 47 mm Vacutainer tubes or 1.5 mL microcentrifuge tubes	No	N/A	96	N/A	N/A	X	X		X							X				X					X
203	2504603	96 of 10.25 x 64 mm Vacutainer tubes or 96 of 10 x 65 or 96 of 10 x 75 mm tubes	No	3.0	96	10.3	64.0	X	X		X							X				X	X				X
204	2504604	27 of 28 x 57 mm scintillation vials	No	20.0	27	28.0	57.0	X	X		X							X				X	X				X
204F	2504604F	24 of 28 x 57 mm scintillation vials	No	20.0	24	28.0	57.0		X																		X
205	2504605	2 of deep-well microplates + 2 of 1.5 mL tubes + 2 of 13 x 100 mm tubes	No	N/A	N/A	N/A	N/A	X	X	X	X							X	X			X	X				X
205H	2504605H	2 of deep-well microplates w/covers + 2 of 1.5 mL tubes + 2 of 13 x 100 mm tubes	Yes	N/A	N/A	N/A	N/A	X	X	X	X							X	X			X	X				X

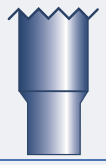
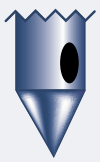
Gilson Rack/Instrument Compatibility Chart cont.

Rack Code	Rack Product No.	Description	Microplate?	Vessel Capacity (mL)	Max. Vessel Quantity	Max. Vessel Diameter	Min. Vessel Height	GX-281	215	Multiple Probe 215	Direct Inject 215 (Micro 215)	235/SP235 235P/SP235P	234	231 XL	232 XL/233 XL	FC 203B	FC 204	PREP FC	SPE 215	ASPEC XLi	ASPEC XL4	Quad-Z 215	Quad-Z 215 (Disposable Tips)	223	221 XL	222 XL	Orbital Shaker
206	2504606	96 of 13 x 75 mm Vacutainer tubes	No	4.0	96	13.0	75.0	X	X		X							X				X	X				X
207	2504607	75 of 16 x 100 mm Vacutainer tubes	No	12.0	75	16.0	100.0	X	X		X							X				X	X				X
208	2504608	70 of 18 x 150 mm tubes	No	25.0	70	18.0	150.0	X	X		X							X				X					X
209	2504609	96 of 12 x 32 mm vials	No	2.0	96	12.0	32.0	X	X		X							X				X	X				X
210	2504610	75 of 16 x 75 mm Vacutainer tubes	No	10.0	75	16.0	75.0	X	X		X							X				X	X				X
211	2504611	9 of 48 x 113 mm bottles	No	125.0	9	48.0	113.0	X	X		X							X				X					X
211F	2504611F	8 of 48 x 113 mm with 12 funnel locations (125 mL bottles)	No	125.0	8	48.0	113.0		X																		X
211H	2504611H	9 of 48 x 113 mm	No	125.0	9	48.0	113.0	X	X		X							X									X
212	2504612	48 of 13 x 75 mm + 48 of 13 x 100 mm Vacutainer tubes	No	N/A	96	N/A	N/A	X	X		X							X				X	X				X
213	2504613	37 of 16 x 75 mm + 37 of 16 x 100 mm Vacutainer tubes	No	N/A	74	N/A	N/A	X	X		X							X				X	X				X
214	2504614	48 of 10.25 x 47 mm + 48 of 10.25 x 64 mm Vacutainer tubes	No	N/A	96	N/A	N/A	X	X		X							X				X	X				X
216	2504616	60 of 15 x 45 mm WISP vials	No	4.0	60	15.0	45.0	X	X		X							X				X	X				X
217	2504617	96 of 10 x 75 mm tubes	No	4.0	96	10.0	75.0	X		X								X	X			X	X				X
218	2504618	2 of shallow- or deep-well microplates + 8 of 10 x 75 mm tubes; also holds Beckman modular reservoirs	Yes	N/A	N/A	N/A	N/A	X		X									X			X	X				X
219	2504619	27 of 30 x 95 mm vials	No	40.0	27	30.0	95.0	X	X		X							X				X	X				X
220	2504620	70 of 17 x 65 mm vials	No	7.0	70	17.0	62.0	X	X		X							X									X
222	2504622	27 of 30 x 115 mm conical-bottom tubes	No	50.0	27	30.0	115.0	X	X		X							X				X	X				X
222F	2504622F	24 of 30 x 115 mm (50 mL conical-bottom tubes with 12 funnel locations)	No	50.0	24	30.0	115.0		X																		X
223	2504623	96 of 16 x 100 mm tubes w/screw caps	No	10.0	96	16.0	100.0	X	X		X							X									X
224	2504624	192 of 8.5 x 41 mm vials	No	N/A	192	8.5	41.0	X	X		X							X									X
225	2504625	30 of 25 x 150 mm vials	No	45.0	30	25.0	150.0	X	X		X							X									X
226	2504626	96 of 15 x 45 mm WISP vials	No	4.0	96	15.0	45.0	X	X		X							X									X
228	2504628	4 of 500 mL or 700 mL bottles	No	N/A	4	N/A	N/A	X	X	X									X			X					X
234	2504634	2 of Tipack boxes (10 µL or 200 µL tips)	No	N/A	2	N/A	N/A																X				
235	2504635	2 of Tower Pack boxes (10 µL or 200 µL tips)	No	N/A	2	N/A	N/A																X				
237	2504637	2 of 384-well or 96-well shallow flat-bottom microplates	Yes	N/A	2	N/A	N/A		X	X	X								X			X	X				
239	2504639	40 of 25 x 200 mm test tubes	No	70	40	25.0	200.0	X								X	X	X									X
242	25146331	2 of 96-well microplates, shallow	Yes	N/A	2	N/A	N/A	X	X													X					X
350	24014050	4 of 96-well microplates, shallow	Yes	N/A	4	N/A	N/A					X															
351	24014051	4 of 96-well microplates, deep	Yes	N/A	4	N/A	N/A					X															
353	24014053	384 of 7 x 40 mm vials	No	0.7	384	7.0	40.0					X															
354	24014054	4 of 96-well, shallow, flat-bottom microplates	Yes	N/A	4	N/A	N/A					X															

Rack Code	Rack Product No.	Description	Microplate?	Vessel Capacity (mL)	Max. Vessel Quantity	Max. Vessel Diameter	Min. Vessel Height	GX-281	215	Multiple Probe 215	Direct Inject 215 (Micro 215)	235/SP235 235P/SP235P	234	231 XL	232 XL/233 XL	FC 203B	FC 204	PREP FC	SPE 215	ASPEC XLi	ASPEC XL4	Quad-Z 215	Quad-Z 215 (Disposable Tips)	223	221 XL	222 XL	Orbital Shaker
355	24014055	4 of 96-well, shallow microplates	Yes	N/A	4	N/A	N/A					X						X									
356	24014056	192 of 12 x 32 mm vials	No	2.0	192	12.0	32.0					X						X									
502	2504652	100 of 12 x 32 mm vials (for HP 1100LC autosampler tray)	No	2.0	100	12.0	32.0		X																		
505	2504651	10 of 96-well microplates, standard or deep	Yes	N/A	10	N/A	N/A		X	X	X											X	X				
505H	2504651H	10 of 96-well microplates w/covers, standard or deep	Yes	N/A	10	N/A	N/A		X	X	X											X	X				
517	2504653	17 of 96-well microplates, standard or deep	Yes	N/A	17	N/A	N/A				X																
542	2514542	10 of 96-well microplates, shallow	Yes	N/A	10	N/A	N/A	X	X													X					
641	2504641	24 of 28 x 100 mm vials	No	45.0	24	28.0	100.0		X																		
642	2504642	48 of 16 x 78 mm tubes	No	N/A	48	16.0	78.0		X																		
643	2504643	2 of Charybdis Tech. solid & solution phase blocks	No	N/A	2	N/A	N/A		X																		
644	2504644	2 of Charybdis Tech. solid & solution phase blocks w/gas manifold	No	N/A	2	N/A	N/A		X																		
645	2504645	2 of Charybdis Tech. multitemp. solid & solution phase blocks w/gas manifold	No	N/A	2	N/A	N/A		X																		
646	2504646	2 of Charybdis Tech. multitemp. solid & solution phase blocks	No	N/A	2	N/A	N/A		X																		
647	2504647	4 of Robbins Scientific Flexchem™ solid phase synthesis reaction blocks	No	N/A	4	N/A	N/A		X																		
801	2504801	36 of 1 mL tabbed SPE cartridges + 36 of 12 x 75 mm tubes (in collection block)	No	N/A	36	N/A	N/A												X								
802	2504802	96 of 1 mL tabless SPE cartridges + 1 of 96-well microplate, deep	No	N/A	96	N/A	N/A												X								
803	2504803	48 of 3 mL tabless SPE cartridges + 36 of 12 x 75 mm tubes (in collection block)	No	N/A	48	N/A	N/A												X								
804	2504804	1 of 96-well Wide SPE plate (porvair style: Varian Microlute, and Waters Oasis) + 1 of 96-well microplate, deep for collection	No	N/A	1	N/A	N/A												X								
805	2504805	1 of 96-well narrow SPE plate (3M Empore, and Ansys SPEC) + 1 of 96-well microplate, deep for collection	No	N/A	1	N/A	N/A												X								
852	2514852	2 of Becton Dickinson Falcon™ 96-well assay plate, shallow, U-bottom	Yes	N/A	2	N/A	N/A	X	X	X	X											X	X				
853	2514853	96 of 12 x 32 mm vials, flat-bottom	No	2.0	96	12.0	32.0	X	X		X											X	X				
854	2514854	2 of Beckman or Ritter 96-well microplate, deep	Yes	N/A	2	N/A	N/A	X	X	X	X											X	X				
VR	2514701	Quad-Z 215 Vacuum Rack, 1 of SPE extraction plate (Waters OASIS®, 3M Empore™, Varian VersaPlate™)	No	N/A	N/A	N/A	N/A															X					
M	1907152	223 MALDI Rack, 1 of Bruker MALDI plate	No	N/A	N/A	N/A	N/A																	X			

Probes

Gilson offers many different types of probes and probe tips to allow you to select the design that best fits your application. Gilson's broad array of probes, tips and coatings provides solutions for all your liquid handling needs. To order, call 800-445-7661.

Tip Design	Description	Features
Flat 	The tip is cut perpendicular to the length of the probe.	· Aspirates the last drop of liquid · Non-septum piercing · No injection
Constricted 	The tip of the probe has a smaller outer diameter than the rest of the shaft. Constricted-tip probes may have different tip designs. For example, a probe may be constricted and beveled.	· Compatible with injection ports
Beveled 	The tip is cut at an angle, leaving a bevel.	· Sharp tip enables septum-piercing · Compatible with injection ports
Spring Loaded 	Low volume touch off dispensing	· Spring loaded probe removes any potential of damaging spotting surface • Ideal for MALDI spotting applications • Incorporated mixing tee for spotting multiple liquids flows
Vented 	Two styles: 1. A shallow groove cut in the probe shaft, above the tip (shown at left). 2. Two probes are assembled concentrically, creating two separate channels: the inner channel for liquid, and the outer channel for gas. Vented probes may have different tip designs.	· Septum-piercing · Vent allows pressures inside and outside a sealed vessel to equilibrate as liquid is dispensed or aspirated
Side-entry 	The liquid flowpath opens on the side of the probe, not at the tip.	· Recommended for thick septa · Prevents coring of septa · Compatible with injection ports
Deflected 	Based on the beveled tip design. The probe tip is curved and very sharp.	· Septum-piercing · Tip pushes septa out of the way as it pierces to prevent coring · Compatible with injection ports
Conical 	Designed for PEEK injection ports.	· Capable of piercing thin septa · Used only on the Micro 215 Injector and 235 Autoinjector · Aspirates the last drop of liquid

Gilson Probe Selection Guide

Part #	Septum-piercing	Tip Shape	Material	Dimensions (mm, L x OD x ID)	Injection Compatibility	Instrument Compatibility
175 mm Z-arm						
2507214	No	Constricted, flat	Stainless steel	269 x 1.8 x 1.4	**GX Z-Injection Module**	GX-281 215 215 SW Multiple Probe 215
2507215	No	Constricted, flat	Stainless steel	269 x 1.3 x 0.8	**819** (requires Injection Port #25051015) **849/889** (requires Injection Port #25051213) **GX Direct Injection Module** (requires Injection Port #26035410)	GX-281 215 215 SW Multiple Probe 215 Quad-Z 215
2507216	No	Beveled, level-sensing	Stainless steel	269 x 1.3 x 0.8 Tip: 1.6 x 1.2 x 0.8	**819** (requires Injection Port #2954674) **849/889** #25051215 Seal #2954674 **GX Direct Injection Module** (requires Injection Port #26035410)	GX-281 215 215 SW Multiple Probe 215 Quad-Z 215
2507247	Yes	Beveled	Stainless steel	375 x 1.8 x 0.85	**889** (requires Injection Port #250512752)	215 SPE
2507249	No	Conical, micro-volume	Stainless steel	269 x 2.4 x 0.4	**841**	215
2507253	Micro Septum-Piercing	Beveled, level-sensing	Stainless steel	269 x 1.5 x 1.1 Tip: 10 x 0.7 x 0.4	**819** (requires Injection Port #270728)	Quad-Z 215
2507254	No	Flat, level-sensing	Stainless steel	269 x 1.8 x 1.4	**GX Z-Injection Module**	GX-281 215 215 SW Quad-Z 215
2507255	No	Beveled, level-sensing	Stainless steel	270 x 1.5 x 0.4	**819** (requires Injection Port #295640) **849/889** #25051215 **GX Direct Injection Module** (requires Injection Port #26035411)	GX-281 215 215 SW Quad-Z 215
25073645	Yes	Beveled	Stainless steel	269 x 1.3 x 0.8	**819** (requires Injection Port #250510153) **849** (requires Injection Port Bar #250512862) **889** (requires Injection Port Bar #250512752)	215 215 SW Multiple Probe 215 Quad-Z 215
2507551	No	Flat	Stainless steel	272.5 x 2.7 x 0.8	**GX Z-Injection Module**	GX-281 215
2507555	No	Straight	Stainless steel, Teflon coated (plastic tip)	272.5 x 2.7 x 0.8 Tip: 10 mm plastic	**GX Z-Injection Module**	GX-281 215
251646 Inert Gas Probe	Yes	Beveled	Stainless steel	317 x 1.8 x 0.8	**GX Z-Injection Module**	GX-281 215
25075551	No	Straight	Stainless Steel	256.6 x 2.7 x 0.8	**GX Z-Injection Module**	GX-281 215
26017050	Yes	Beveled	Stainless steel	269 x 2.0 x 0.8 Tip: 1.5 OD x 0.8 ID	**819** (requires Injection Port #2954640) **GX Direct Injection Module** (requires Injection Port #26035411)	GX-281 215 215 SW
125 mm Z-arm						
2507234	Yes	Side-entry	Stainless steel	274 x 1.8 x 0.8	**819** (requires Injection Port #25051015) **GX Z-Injection Module**	GX-281 215
2507235	Yes	Side-entry	Stainless steel	274 x 1.8 x 0.8	**819** (requires Injection Port #25051015) **GX Z-Injection Module**	GX-281 215
2507236	Yes	Side-entry	Stainless steel	272.5 x 1.5 x 0.8	**819** (requires Injection Port #25051015) **GX Z-Injection Module**	GX-281 215
2507237	Yes	Side-entry	Stainless steel	273 x 1.8 x 0.8	**819** (requires Injection Port #25051015) **GX Z-Injection Module**	GX-281 215
2507242	Yes	Deflected	Stainless steel, Teflon® interior	274 x 1.8 x 0.8	**GX Z-Injection Module**	GX-281 215
2507243	Yes	Deflected	Stainless steel, Teflon interior	274 x 1.8 x 0.8	**GX Z-Injection Module**	GX-281 215
2507244	Yes	Deflected	Stainless steel	274 x 1.8 x 0.8	**GX Z-Injection Module**	GX-281 215

Gilson Probe Selection Guide cont.

Part #	Septum-piercing	Tip Shape	Material	Dimensions (mm, L x OD x ID)	Injection Compatibility	Instrument Compatibility
125 mm Z-arm cont.						
2507245	Yes	Deflected	Stainless steel	274 x 1.8 x 0.8	**GX Z-Injection Module**	GX-281 215
2507248	No	Conical, micro-volume	Stainless steel	220 x 2.4 x 0.4	**841**	215
2507252	Micro Septum-Piercing	Constricted, beveled	Stainless steel	220 x 1.5 x 0.4 Tip: 10 x 0.7 x 0.4	**819** (requires Injection Port #25051213) **849** #250512861 **889** #250512751	215 Multiple Probe 215
2507256	Yes	Beveled	Stainless steel	221 x 1.5 x 0.4	**819** (requires Injection Port #2954640) **GX Direct Injection Module** (requires Injection Port #26035411)	GX-281 215
2507414	No	Constricted, flat	Stainless steel	220 x 1.3 x 0.8	**819** (requires Injection Port #25051015) **849** (requires Injection Port Bar #250512862) **889** (requires #250512752) **GX Direct Injection Module** (requires Injection Port #26035410)	GX-281 215 Multiple Probe 215
27067361	No	Beveled	Stainless steel	220.5 x 1.5 x 1.1	**819** (requires Injection Port #2954640) **849** #250512863 **889** #250512753 **GX Direct Injection Module** (requires Injection Port #26035411)	GX-281 215 Multiple Probe 215
27067373	No	Constricted, flat	Stainless steel	221 x 1.5 x 1.1	**819** (requires Injection Port #2954640) **849** #250512863 **889** #250512753 **GX Direct Injection Module** (requires Injection Port #26035411)	GX-281 215 Multiple Probe 215 232 XL/233 XL
27067382	Yes	Beveled	Stainless steel	221 x 2.0 x 0.8 Tip: 2.1 x 1.5 x 0.8	**819** (requires Injection Port #2954640) **GX Direct Injection Module** (requires Injection Port #26035411)	GX-281 215 Multiple Probe 215 221 XL, ASPEC XL, XLi, XL4 (183 mm arm)
27067383	Yes	Beveled	Stainless steel	221 x 1.5 x 0.4	**819** (requires Injection Port #2954640) **849** #250512863 **889** #250512753 **GX Direct Injection Module** (requires Injection Port #26035411)	GX-281 215 Multiple Probe 215 221 XL, ASPEC XL, XLi, XL4 (183 mm arm)
56 mm Z-arm						
496215	No	Straight	Stainless steel	51 x 0.7 x 0.4	None	234
27067251	Yes	Beveled	Stainless steel	103 x 0.7 x 0.4	Requires Injection Port #2954645	231 234
27067113	No	Constricted, flat	Stainless steel	93.5 x 1.5 x 1.1	None	221 XL 231 XL 223
27067131	Yes	Beveled	Stainless steel	95 x 0.7 x 0.42	Requires Injection Port #270728 & Probe Sleeve #27067132	231 XL/232 XL/233 XL 223
27067133	Yes	Beveled	Titanium	95 x 0.7 x 0.42	Requires Injection Port #270728 Requires sleeve #27067132	231 XL/232 XL/233 XL 223
123 mm Z-arm						
27067211	Yes	Beveled	Stainless steel	160.5 x 1.5 x 1.1	None	221 XL
27067212	Yes	Side-entry	Stainless steel	160.5 x 1.5 x 1.1	Requires Injection Port #2954645	231 XL/232 XL/233 XL 223 221 XL ASTED XL
27067213	No	Tapered, flat	Stainless steel	160.5 x 1.5 x 1.1	None	221 XL 223

Part #	Septum-piercing	Tip Shape	Material	Dimensions (mm, L x OD x ID)	Injection Compatibility	Instrument Compatibility
123 mm Z-arm cont.						
27067217	No	Flat	Teflon coated (plastic tip)	157.5 x 0.9 (18 g.) Tip: 10 mm Teflon	None	221 XL
27067218	No	Flat	Teflon coated (plastic tip)	157.5 x 0.9 (22 g.) Tip: 10 mm Teflon	None	221 XL 223
27067231	No	Tapered, beveled	Stainless steel	162 x 0.7 x 0.42	Requires Injection Port #270728 & Probe Sleeve #27067232	231 XL/232 XL/233 XL 223 221 XL ASTED XL
27067235	Yes	Beveled	Stainless steel	162 x 0.7 x 0.42	Requires Injection Port #270728 & Probe Sleeve #27067236	231 XL/232 XL/233 XL 223 221XL ASTED XL
27067237	Yes	Beveled	Titanium	162 x 0.7 x 0.42	Requires Injection Port #270728 & Probe Sleeve #27067239	231 XL ASTED XL
27067238	Yes	Beveled	Stainless steel	162 x 0.7 x 0.4	Requires Injection Port #270728	231 XL/232 XL/233 XL 223 ASTED XL
27067272	No	Tapered, beveled	Stainless steel	160.5 x 1.5 x 1.1	Requires Injection Port #2954645	231 XL/ 232 XL/233 XL 221 XL 223 ASTED XL
27167215 Double probe kit	Yes	Beveled	Stainless steel	probe 1: 181.5 x 1.5 x 1.1 probe 2: 169.5 x 2.5 x 1.1	None	221 XL
27367513	No	Flat	Teflon coated (plastic tip)	157.5 x 0.9 Tip: 10 mm Teflon	None	221 XL
183 mm Z-arm						
27067361	No	Beveled, level-sensing	Stainless steel	220.5 x 1.5 x 1.1	**819** (requires Injection Port #2954640) **232 XL/233 XL** (requires Injection Port #2954645)	215 232 XL/233 XL 221 XL 223
27067362	Yes	Side-entry	Stainless steel	220.5 x 1.5 x 1.1	Requires Injection Port #2954645	232 XL/233 X 221 XL 223
27067373	No	Constricted, flat, level-sensing	Stainless steel	221 x 1.5 x 1.1 Tip: 2 x 1.1 x 0.4	**819** (requires Injection Port #2954640) **849** #250512863 **889** #250512753	215 Multiple Probe 215 232 XL/233 XL ASPEC XL, XLi 223
27167215	No	Flat	Stainless steel	169.5 x 2.5 x 1.1	None	223
27367423	No	Flat	Teflon coated	220.5 x 0.9 ID	None	232 XL/233 XL 221 XL
210 mm Z-arm						
26037001	Yes	Beveled	Stainless steel	301.3 x 2.0 x 0.8 (Tip Dimensions: 2.1 x 1.5 x 0.8)	**GX Direct Injection Module** (requires Injection Port #26035411)	GX-281
260370011	Yes	Beveled	Stainless steel (coated)	301.3 x 2.0 x 0.8 (Tip Dimensions: 2.1 x 1.5 x 0.8)	**GX Direct Injection Module** (requires Injection Port #26035411)	GX-281
26037002	Yes	Beveled	Stainless steel	301.3 x 1.5 x 0.4	**GX Direct Injection Module** (requires Injection Port #26035411)	GX-281
260370021	Yes	Beveled	Stainless steel (coated)	301.3 x 1.5 x 0.4	**GX Direct Injection Module** (requires Injection Port #26035411)	GX-281
26037004	Yes	Beveled	Stainless steel	301.3 x 1.5 x 0.4	**GX Direct Injection Module** (requires Injection Port #26035411)	GX-281
26037005	No	Beveled	Stainless steel	301.3 x 1.5 x 1.1	**GX Direct Injection Module** (requires Injection Port #26035411)	GX-281
26037006	No	Straight	Stainless steel	301.3 x 2.4 x 1.8	None	GX-281
26037007	No	Straight	Stainless steel	301.3 x 1.8 x 1.4	None	GX-281

Periodic Table of the Elements

1A												3A	4A	5A	6A	7A	8A
1 H 1.008	2A																2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 23.00	12 Mg 24.31	3B	4B	5B	6B	7B	8B			1B	2B	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.70	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.0	89 Ac 227.0	104 Rf (261)	105 Ha (262)	106 Unh (263)	107 Uns (262)		109 Une (267)									

Lanthanides	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
Actinides	90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np 237.0	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

Flow Cell Selection Chart for Optimizing Sensitivity on 15x Series Detectors

To choose the correct flow cell for an application, use the following chart. Flow cells are paired with the appropriate column, flow rate and sample concentration. Selecting the correct flow cell will optimize sensitivity and peak shape.

	Capillary Flow Cell	Micro Flow Cell	Analytical Flow Cell	Semiprep Flow Cell	Prep Flow Cell
Product No.	104446	104442	104445	104441	104443
Internal Volume	35 nL	1.5 µL	12 µL	0.7 µL	0.16 µL
Pathlength	8 mm	2 mm	5 mm	0.2 mm	0.05 mm
Column Size	180-300 µm	1-2 mm	4 mm 10 mm	20 mm	>40 mm
Flow Rate	1-10 µL/min	25-200 µL/min	1 mL/min	50 mL/min	>100 mL/min
		Purify 2-15 mg	Purify 15-75 mg	Purify 40-300 mg	Purify >15 g

pH of Acids and Bases

pH of Common Acids

Acids (pH <7)	Molarity	pH
Acetic	1 N	2.4
Acetic	0.1 N	2.9
Acetic	0.01 N	3.4
Alum	0.1 N	3.2
Arsenious	Saturated	5
Benzoic	0.1 N	3
Boric	0.1 N	5.3
Carbonic	Saturated	3.8
Citric	0.1 N	2.1
Formic	0.1 N	2.3
Hydrochloric	1 N	0.1
Hydrochloric	0.1 N	1
Hydrochloric	0.01 N	2
Hydrocyanic	0.1 N	5.1
Hydrogen Sulfide	0.1 N	4.1
Lactic	0.1 N	2.4
Malic	0.1 N	2.2
Nitric	0.1 N	1
Orthophosphoric	0.1 N	1.5
Oxalic	0.1 N	1.3
Succinic	0.1 N	2.7
Salicylic	Saturated	2.4
Sulfuric	1 N	0.3
Sulfuric	0.1 N	1.2
Sulfuric	0.01 N	2.1
Sulfurous	0.1 N	1.5
Tartaric	0.1 N	2
Trichloracetic	0.1 N	1.2

pH of Common Bases

Bases (pH > 7)	Molarity	pH
Ammonia	1 N	11.6
Ammonia	0.1 N	11.1
Ammonia	0.01 N	10.6
Barbital Sodium	0.1 N	9.4
Borax	0.01 N	9.2
Calcium Carbonate	Saturated	9.4
Calcium Hydroxide	Saturated	12.4
Ferrous Hydroxide	Saturated	9.5
Lime	Saturated	12.4
Magnesia	Saturated	10.5
Potassium Acetate	0.1 N	9.7
Potassium Bicarbonate	0.1 N	8.2
Potassium Carbonate	0.1	11.5
Potassium Cyanide	0.1 N	11
Potassium Hydroxide	1 N	14
Potassium Hydroxide	0.1 N	13
Potassium Hydroxide	0.01 N	12
Sodium Acetate	0.1 N	8.9
Sodium Benzoate	0.1 N	8
Sodium Bicarbonate	0.1 N	8.4
Sodium Carbonate	0.1 N	11.6
Sodium Hydroxide	1 N	14
Sodium Hydroxide	0.1 N	13
Sodium Hydroxide	0.01 N	12
Sodium Metasilicate	0.1 N	12.6
Sodium Sesquicarbonate	0.1 N	10.1
Trisodium Phosphate	0.1 N	12

Column Sizes and Capacities

Column Sizes and Capacities

Internal Diameter (mm)	Typical Injection Volume (µL)	Load Capacity (mg)	Typical Flow Rates (mL/min)
4.6	15	1	0.5 - 2.0
10	100	4.7	4 - 15
21.2	400	19.5	10 - 50
30	1,000	42.5	40 - 100
50	2,000	118	100 - 300
100	10,000	473	400 - 1000

Maximum UV Absorbance for Commonly Used Solvents

Operating at a wavelength near or below a mobile phase solvent's maximum UV absorbance increases baseline noise due to the UV response of the solvent. Refer to tables 1 and 2 below to optimize chromatographic conditions.

Table 1

Solvent	Max. UV Absorbance (nm)	Solvent	Max. UV Absorbance (nm)
1-Nitropropane	380	Ethylene dichloride	230
2-Butoxyethanol	220	Ethylene glycol	210
Acetone	330	Heptane	200
Acetonitrile	190	Hexane	195
Amyl alcohol	210	Isooctane	215
Amyl chloride	225	Isopropanol	205
Benzene	280	Isopropyl chloride	225
Butanol-1	215	Isopropyl ether	220
Butanol-2	260	Methanol	205
n-Butyl Chloride	220	Methyl acetate	260
Carbon disulfide	380	Methyl ethyl ketone	330
Carone tetrachloride	265	Methyl isobutyl ketone	334
Chloroform	245	Methylene chloride	233
Clorobenzene	287	n-Pentane	190
Cyclohexane	200	n-Propanol	210
Cyclopentane	200	n-Propyl chloride	225
Diethyl amine	275	Nitromethane	380
Dimethyl sulfoxide	268	Petroleum ether	210
Dioxane	215	Pyridine	330
Ethanol	210	Tetrahydrofuran	230
Ethyl acetate	256	Toluene	285
Ethyl ether	220	Xylene	290
Ethyl sulfide	290		

Table 2

Mobile Phase Conditioners & Buffers	Max. UV Absorbance (nm)
Acetic acid, 1%	230
Ammonium acetate, 10 mM	205
Ammonium bicarbonate, 10 mM	190
Diammonium phosphate, 50 mM	205
EDTA, disdodium, 1 mM	190
HEPES, 10 mM, pH 7.6	225
Hydrochloric acid, 0.1%	190
MES, 10 mM, pH 6.0	215
Potassium phosphate monobasic, 10 mM dibasic, 10 mM	 190 190
Sodium acetate, 10 mM	205
Sodium chloride, 1M	207
Sodium citrate, 10 mM	225
Sodium dodecyl sulfate	190
Sodium formate	200
Triethylamine, 1%	235
Trifluoracetic acid, 0.1%	190
TRIS HCl, 20 mM pH 7.0 pH 8.0	 202 212

Optimizing Preparative HPLC

There are numerous parameters and techniques to be aware of when optimizing preparative HPLC. The following three reference tables can be used to help improve chromatography and percent recovery of collected fractions.

Pumping System Tubing: At high flow rates, tubing can cause high back pressure. To prevent excessive back pressure, it is essential to optimize your pumping system by ensuring that the tubing ID is appropriate for the flow rate.

**Tubing pressure through 30" lengths of tubing at corresponding flow rates.*

Tubing was connected directly to the pump. All pre-filters were removed.

Table 1: 33X Series Pump Tubing (PEEK)*

Flow Rate (mL/min)	Tubing ID (in)		
	0.020 Pressure (psi)	0.030 Pressure (psi)	0.040 Pressure (psi)
25	0	0	0
50	43.5	0	0
75	101.5	0	0
100	203.1	14.5	0
125	333.6	43.5	0
150	464.1	87	14.5
175	623.7	101.5	14.5
200	797.7	145	29

Valve plumbing: #25051043 (Gilson part # for 7010 valve with make-before-break stator and large-bore rotor seal)

- 0.018" make-before-break stator orifice
- 1 mL stainless steel 0.030" ID loop
- All other plumbing used is stainless steel 0.040" ID tubing

Table 2: Rheodyne 7010-156 Factory Installed Large-Bore Rotor Seal

Flow Rate (mL/min)	Valve Position and Pressure			
	Load Position Pressure (psi)	Inject Position Pressure (psi)	Gilson Installed Load Position Pressure (psi)	Gilson Installed Inject Position Pressure (psi)
25	0	14.5	0	0-14.5
50	0	43.5	0	43.5
75	0	87	0	116
100	14.5	145	14.5	203.1
150	43.5	290	72.5	435.1
200	87.0	435.1	145	696.2

References

HPLC Scaling from Preparative-to-Nano

Preparative-to-Nano HPLC Scaling

	Preparative HPLC	Semiprep-to-Prep HPLC	Semiprep HPLC	Analytical HPLC	Micro HPLC	Capillary HPLC	Capillary HPLC	Nano HPLC
Column ID (mm)	50.0	21.0	10.0	4.6	1.0	0.300	0.180	0.075
Column Cross Sectional Area (mm^2)	1,963.5	346.4	78.5	16.2	0.78	0.0707	0.0254	0.0043
Reduction Factor	1	6	25	121	2,517	27,772	77,303	456,627
Flow Rate (mL/min)	120	20	5.0	1	0.048	0.0043	0.0016	0.00026
Solvent Consumption per hour (mL)	7,200	1,200	300	60	3	0.24	0.06	0.012
Solvent Consumption per 24 hours	172.8 L	28.8 L	7.2 L	1,440 mL	72 mL	5.76 mL	1.44 mL	0.29 mL
Typical Mass Injected	200-1,800 mg	40-300 mg	15-75 mg	250 ng	12 ng	1.08 ng	0.39 ng	0.067 ng
Typical Volume Injected	2.5-5 mL	500 µL-1.0 mL	100-250 µL	20 µL	0.95 µL	0.09 µL	0.03 µL	0.005 µL
UV Sensitivity Factor	0.008 decrease in sensitivity from analytical	0.04 decrease in sensitivity from analytical	0.2 decrease in sensitivity from analytical	1	21	230	639	3,774
Typical Detector Cell Volume (µL)	0.16	0.7	1.6	12	0.59	0.06	0.019	0.0032

Separation Scale-up Equations

Scale-up Factor

$$\text{Scale-up factor} = \frac{(\text{Diameter prep})^2 \times \text{Length prep}}{(\text{Diameter analytical})^2 \times \text{Length analytical}}$$

Flow Rate

$$\text{Flow rate (prep)} = \text{Flow rate (analytical)} \times = \frac{(\text{Diameter prep})^2}{(\text{Diameter analytical})^2}$$

Gradient Duration (GD)

$$\text{GD (prep)} = \text{GD (analytical)} \times \frac{\text{Length (prep)}}{\text{Length (analytical)}} \times \frac{\text{Diameter (prep)}^2}{\text{Diameter (analytical)}^2} \times \frac{\text{Flow rate (analytical)}}{\text{Flow rate (prep)}}$$

Common Conversion Tables

Tubing Internal Diameters & Volumes

Inches	Millimeters	Microns	µL/in	µL/mm
0.001	0.025	25	0.013	0.0005
0.002	0.051	51	0.051	0.0020
0.003	0.076	76	0.116	0.0046
0.004	0.102	102	0.206	0.0081
0.005	0.127	127	0.322	0.0127
0.006	0.152	152	0.463	0.0182
0.007	0.178	178	0.631	0.0248
0.008	0.203	203	0.824	0.0324
0.009	0.229	229	1.042	0.0410
0.010	0.254	254	1.287	0.0507
0.011	0.279	279	1.557	0.0613
0.012	0.305	305	1.853	0.0730
0.013	0.330	330	2.175	0.0856
0.014	0.356	356	2.523	0.0993
0.015	0.381	381	2.896	0.1140
0.016	0.406	406	3.295	0.1297
0.017	0.432	432	3.720	0.1464
0.018	0.457	457	4.170	0.1642
0.019	0.483	483	4.646	0.1829
0.020	0.508	508	5.148	0.2027
0.028	0.711	711	10.090	0.3973
0.030	0.762	762	11.583	0.4560
0.032	0.813	813	13.179	0.5189
0.040	1.016	1016	20.593	0.8107
0.042	1.067	1067	22.703	0.8938
0.055	1.397	1397	38.933	1.5328
0.062	1.575	1575	49.474	1.9478

Pressure Conversion

kPa	psi	bar	MPa
690	100	6.9	0.7
3450	500	34.5	3.4
6890	1000	68.9	6.9
10340	1500	103.4	10.3
13790	2000	137.9	13.8
17240	2500	172.4	17.2
20680	3000	206.8	20.7
24130	3500	241.3	24.1
27580	4000	275.8	27.6
31030	4500	310.3	31.0
34470	5000	344.7	34.5
37920	5500	379.2	37.9
41370	6000	413.7	41.4
44820	6500	448.2	44.8
48260	7000	482.6	48.3
51710	7500	517.1	51.7
55160	8000	551.6	55.2
58610	8500	586.1	58.6
62050	9000	620.5	62.1
65500	9500	655.0	65.5
68950	10000	689.5	68.9

Temperature Conversion Formulas

$^{\circ}C = {}^{\circ}F - 32 \div 1.8$	$^{\circ}C$ = degrees Celsius $^{\circ}F$ = degrees Fahrenheit $^{\circ}K$ = degrees Kelvin $^{\circ}R$ = degrees Rankine
$^{\circ}C = {}^{\circ}K - 273.15$	
$^{\circ}F = 1.8 \times {}^{\circ}C + 32$	
$^{\circ}F = {}^{\circ}R - 459.67$	
$^{\circ}K = {}^{\circ}C + 273.15$	
$^{\circ}R = {}^{\circ}F + 459.67$	

Metric Prefixes

Prefix	Symbol	Scientific Notation
yotta	Y	1024
zetta	Z	1021
exa	E	1018
peta	P	1015
tera	T	1012
giga	G	109
mega	M	106
kilo	k	103
hecto	h	102
deka	da	10
deci	d	10-1
centi	c	10-2
milli	m	10-3
micro	µ	10-6
nano	n	10-9
pico	p	10-12
femto	f	10-15
atto	a	10-18
zepto	z	10-21
yocto	y	10-24

Common Conversion Tables

Temperature Conversion

Celsius (°C)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit (°F)
-100	-148	50	122	130	266
-50	-58	55	131	135	275
-40	-40	60	140	140	284
-30	-22	65	149	145	293
-20	-4	70	158	150	302
-10	14	75	167	155	311
0	32	80	176	160	320
5	41	85	185	165	329
10	50	90	194	170	338
15	59	95	203	175	347
20	68	100	212	180	356
25	77	105	221	185	365
30	86	110	230	190	374
35	95	115	239	195	383
40	104	120	248	200	392
45	113	125	257		

Fractional Inch-to-Decimal-to-Millimeter Conversion

Fraction	Decimal	Millimeter	Fraction	Decimal	Millimeter
1/32	.0313	.7938	17/32	.5313	13.4938
1/16	.0625	1.5875	9/16	.5625	14.2875
3/32	.0938	2.3813	19/32	.5938	15.0813
1/8	.1250	3.1750	5/8	.6250	15.8750
5/32	.1563	3.9688	21/32	.6563	16.6688
3/16	.1875	4.7625	11/16	.6875	17.4625
7/32	.2188	5.5563	23/32	.7188	18.2563
1/4	.2500	6.3500	3/4	.7500	19.0500
9/32	.2813	7.1438	25/32	.7813	19.8438
5/16	.3125	7.9375	13/16	.8125	20.6375
11/32	.3438	8.7313	27/32	.8438	21.4313
3/8	.3750	9.5250	7/8	.8750	22.2250
13/32	.4063	10.3188	29/32	.9063	23.0188
7/16	.4375	11.1125	15/16	.9375	23.8125
15/32	.4688	11.9063	31/32	.9688	24.6063
1/2	.5000	12.7000	1	1.0000	25.4000

Gilson Applications

Liquid Chromatography

Application Note #204 – *cLC™ System: An Automated Solution for Normal- and Reverse-Phase Prep HPLC with Analytical Purification Determination*
The cLC system offers researchers the capabilities of both RP and NP chromatography in one system. This paper includes data representing the throughput and analysis capabilities of the system.

Application Note #206 – *Make-up Solvent Considerations for Prep and Semiprep LC/MS Mass-Based Fraction Collection*
This application addresses the use of different solvents and their effects on a set of pharmaceutical target compounds and related analytes.

Application Note #209 – *Optimizing Purified Sample Recovery on Reverse-Phase HPLC Systems*
The purpose of this application is to present the factors that can directly affect purity and recovery when processing compounds on a preparative level. The following system parameters were evaluated: collection valve switch time, detector time constant delay, DMSO sandwich solvent, delay volume from detector to collection valve and software response.

Application Note #212 – *Determination of Reproducibility within an Analytical System via Repeat Injections*
The data presented in this application shows that the Gilson HPLC system provides consistent, reproducible chromatography. A mixture of three compounds was injected repeatedly under analytical reverse-phase conditions; the results are presented.

Application Note #218 – *Novel Approach for Screening of Drug Absorption via an Automated System*
The automated system presented is shown to provide a faster alternative to other screening methods, as well as an inexpensive analysis estimate of drug permeability for hundreds of drug candidates in a fraction of the time of conventional screening methods.

Application Note #219 – *Analysis of Peptides via Capillary HPLC and Fraction Collection Directly onto a MALDI Plate for Off-line Analysis by MALDI-TOF*
This applications presents a solution for direct spotting of fractions onto MALDI plates with the added flexibility of on-line matrix addition. The compact Gilson maldiLC™ System offers a total solution for the analysis of proteins/peptides via capillary splitless flow and direct collection of fractions onto MALDI plates, eliminating the manual and/or automated formatting of the MALDI plates prior to analysis.

Application Note #221 – *Automated On-Line SDS Removal from Diminutive Protein Samples Prior to Capillary HPLC*
The system presented incorporates automated on-line microcolumn switching in order to separate ionic detergents from the protein samples. Tryptic digested protein samples containing detergent were directly applied to the micro pre-columns without pre-treatment. Analysis of the samples after on-line detergent removal was performed by capillary HPLC and UV absorption. Data is presented for tryptic digested proteinaceous samples that were analyzed via the automated on-line cleanup method.

Application Note #222 – *Automated Sample Preparation/Concentration of Biological Samples Prior to Analysis via MALDI-TOF Mass Spectroscopy*
Biomolecules covering a molecular weight range and present in biological fluids are evaluated under the sample preparation procedures and analyzed via MALDI-TOF MS. Results are presented in regards to the analysis of the proteins and peptides, practical limitations associated with automating the sample preparation procedure and MALDI spotting. The data pertains not only to spotting of samples after sample cleanup, but also to direct spotting via a HPLC onto a MALDI plate.

Application Note – *A Multipurpose preparative System for the Detection and collection of Active and Non-Active UV/VIS Compounds*
The process relies on an analytical scout analysis to determine the best gradient conditions to optimize the separation of the compounds under preparative conditions and minimize the number of factions collected per run.

Gilson Applications cont.

Liquid Chromatography cont.

Application Note – *Systematic Look at the Affects of Various Solvents, Injection Techniques and Sample Amounts in Preparative HPLC Columns*
Data is presented documenting the affects elicited in preparative chromatography under various conditions.

Application Note – *A Totally Integrated 2D System Incorporating Ion-Exchange via SPE and RP-HPLC for Natural and Biological Products*
An automated 2 dimensional application that incorporates ion-exchange and reverse phase chromatography for the separation of complex mixtures. Data is presented that show the usefulness of 2 dimensional chromatography and implementing alternative chromatography modes e.g. SPE in one of the dimensions.

Application Note – *Preparative HPLC: Factors and Parameters that directly affect recovery of Collected Fractions*
Parameters discussed are column performance, mobile phase constituents, detector settings and collection parameters such as collection via level versus slope and delay volumes. The data offers guidelines for all chromatographers purifying compounds by preparative HPLC and can be implemented into existing systems.

Automated Liquid Handling

Application Note #200 – *Technical Data for the Quad-Z 215 (fixed probes) Dispensing Small Volumes of DMSO*
This study determined the accuracy and CVs for the Quad-Z 215 (fixed probes) for low-volume dispensing of DMSO. As shown from the results of the testing, the Quad-Z 215 is capable of transferring low volumes of DMSO from a 96-well format into an empty, flat-bottomed, 96-well microplate.

Application Note #201 – *Quad-Z 215 with Disposable Tips: Implementing the Use of ZipTips® for the Purification of Biological Samples*
This application demonstrates how the Quad-Z 215 automates sample cleanup using ZipTips. The Quad-Z 215 is also capable of completing numerous liquid handling techniques – with or without tips – under varying plate formats.

Application Note #202 – *Reformatting Procedures Employing a Quad-Z 215 with Disposable Tips*
The volumetric accuracy and precision data presented shows that the Quad-Z 215 with Disposable Tips offers researchers the consistency they require in all assays. The use of common plates and tubes, along with the option of designing a custom rack, provides a high degree of versatility to accommodate variations in procedures.

Application Note #203 – *Automated Preparation of MALDI-TOF Plates via a Spring-Loaded Probe*
The focus of this application is to present an alternative to the larger, more expensive MALDI spotters. Both the Micro 215 and 223 Liquid Handlers can be used to spot the matrix and the fractions on the MALDI plate, offering two viable options for automated MALDI spotting.

Automated Liquid Handling cont.

Application Note #208 – *Cost/Benefit Analysis of Automated Pipetting: Fixed Tips vs. Disposable Tips*
This paper addresses the pros and cons of using fixed tips vs. disposable tips in a simple reformatting procedure; four 96-well plates were transferred to one 384-well plate using a 96-channel pipettor. In addition to the 384-well reformatting procedure, other common reformatting tasks are explored and evaluated. In this procedure, the cost, throughput, accuracy and carryover of disposable tips are compared against fixed tips.

Application Note #211 – *Accessing the E-Gel® 96 System via the Quad-Z 215 with Disposable Tips*
This application examines the suitability of the Quad-Z 215 with Disposable Tips for the delivery of proteins to the wells of the E-Gel 96 gels for electrophoresis.

Application Note – *A Compact Automated Liquid Handler for Microbatch Protein Crystallography*
An automated system that incorporates fixed and disposable tips on the Quad Z 215. Independent probe motion and the use of virtual pumps makes the automated system very versatile in the field of protein crystallography via microbatch techniques.

Application Note – *Automated Protein Precipitation*
An automated system capable of protein precipitation on a wide variety of filter plates by vacuum. The liquid handler can also add precipitation solvents and agitate the filter plates prior to extraction.

Application Note – *A Novel Approach for the Isolation and concentration of Drugs in Biological Fluids via In-Line Dialysis and Enrichment*
On-line dialysis and trace enrichment prior to analysis offers a unique approach to sample preparation. The automated system introduces a biological sample to a dialysis membrane and through positive fluidics separates the drugs/compounds from the matrix and concentrates it onto a trace enrichment cartridge prior to analysis via HPLC. The system operates parallel to the chromatography system; therefore little or no time is lost to sample preparation. Data is presented that verifies the usefulness of this sample preparation technique for the analysis of drugs from biological fluids.

Protein Crystallography

Application Note #216 – *Fully Automated Workstation for Vapor Diffusion and Microbatch Protein Crystallography*
The capabilities and performance specifications for the Gilson 925 PC Workstation are presented in regards to protein crystallization for vapor diffusion, microbatch and common liquid handling practices used in crystallography laboratories. Some of the factors examined in this application include protein concentration, ratio of protein-to-reagent dispensed and the different oils used in microbatch crystallography.

Application Note #217 – *Investigation of the Effects of Various Crystallization Factors via an Automated Small-Volume Liquid Handler*
This study examines the effects of various factors on a microbatch crystallography experiment that was automated on a small-volume liquid handler. Some of the factors investigated in this application include different types of crystallography oils and plates, concentration of protein samples and the ratio of protein-to-reagent dispensed.

Gilson Applications cont.

Solid Phase Extraction

Application Note #213 – *An Automated SPE Procedure and Analysis for the Extraction of Chlorpromazine and Thioridazine from Plasma*
The application presented here describes an automated solid phase extraction method coupled with HPLC analysis to determine the levels of Chlorpromazine and Thioridazine in human plasma.

Application Note #214 – *An Automated SPE Procedure and Analysis for the Determination of Ibuprofen and Ketoprofen in Plasma*
This application describes an automated solid phase extraction method coupled with HPLC analysis to determine the various levels of Ibuprofen and Ketoprofen in human plasma.

Application Note #215 – *The Ephedra Story: An Automated SPE Procedure and Analysis for the Determination of Ephedra and Ephedra-like Compounds in Dietary Supplements*
The purpose of this application is to present the advantages of using an automated solid phase extraction method coupled with HPLC to determine the various levels of ephedra and ephedra-like compounds in dietary supplements versus manual solid phase extraction.

Application Note – *Optimization of Solid phase Extraction by an Automated Method Development Procedure*
The automated system allows for the optimization of SPE process via multiple collection sites and various conditions without manual intervention. Incorporation of a trace enrichment cartridge to concentrate the eluent versus a dry down step offers advantages to the dry down bottle neck and analyte degradation.

Application Note – *A Rapid Extraction and Cleanup Procedure for the Determination of Amnesic Shellfish Poison toxins in Shellfish*
A rapid sample preparation procedure has been developed via solid phase extraction to determine the levels of domoic acid in shellfish. Data supporting this approach will be presented along with the automated SPE procedure incorporating trace enrichment cartridges to increase sensitivity of the assay.

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