

Oligonucleotide Purification using Ion Pair Reversed-Phase Liquid Chromatography

Synthetic Oligonucleotides (ONs) are a class of compounds that have gained increasing interest over the last few years because of their use in biochemical research and as pharmaceuticals. The process of synthesizing ONs has become much more efficient and can often reach 99% coupling efficiency. However, a 25 mer ON synthesis will yield less than 80% of the desired product, with decreased yield as a function of length.

Separation of the final oligonucleotide product from its closest impurity is challenging, as these impurities are highly related to the full-length product. This challenge is exacerbated as a function of length, with longer oligonucleotides having more complex impurity profiles. Beyond n-1,2,3,...x impurities, synthesis-related base loss, incomplete thiolation of the backbone and others must also be considered.

Factors to consider

Selecting the right column chemistry

Decide which column chemistry to use based on purity requirements, buffer and column chemistry options, and scale of purification. Ion pair reversed-phase and anion exchange are the most common tools for the purification of oligonucleotides ranging from a few bases, to thousands of bases like those found in mRNA.

Ion pair reversed-phase (IP-RP) chromatography is one of the most common techniques used for ON analysis and small-scale purification.¹⁻⁴ ONs are polar products and carry many anionic groups (normally one phosphate group on each nucleotide).



Agilent PLRP-S columns offer scalable purification solutions

- Analytical and preparative prepacked columns⁵⁻⁶ along with bulk media for large-scale production.
- Polymeric PS-DVB base particles that are stable at high temperatures and pH.
- 100 and 300 Å and large pore 1000 and 4000 Å options that ensure optimal resolution of oligonucleotides ranging from small oligos with tens of bases all the way to thousands of base mRNA.

IP-RP is often selected for its resolving power using alkyl amine acetate salts as ion pair reagents and UV detection. Mass spectrophotometry (MS) analysis can elucidate and identify impurities with similar masses such as base loss, oxidation impurities in thiolated oligos, and adducts by substituting UV compatible acetate with MS compatible hexafluoroisopropanol (HFIP).

Anion exchange chromatography: Unlike ion pair reversed-phase, anion exchange is a UV technique that is not typically paired with MS due to the high salt concentrations used. To learn more, refer to the PL-SAX workflow ordering guide, [5994-4635EN](#).

Selecting the right pore and particle size

Oligonucleotides and nucleic acids come in a range of sizes and structures from a few bases, to thousands of bases. Depending on the oligonucleotide of interest and separation goals, the choice of pore size can be critical to ensure effective mass transfer of the oligonucleotide into the pore structure.

PLRP-S 100 Å columns are commonly used for smaller oligonucleotides, such as antisense and siRNA. PLRP-S

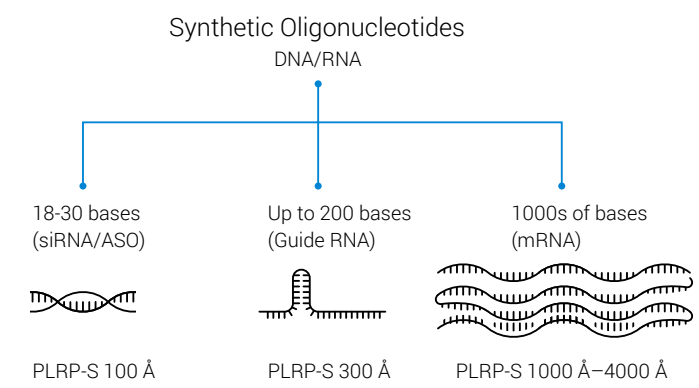


Figure 1. Types of oligonucleotides and recommended pore sizes.

300 Å columns provide increased permeability and binding capacity for larger oligonucleotides from 75 to 200 bases, such as gRNA. PLRP-S 1000 Å–4000 Å columns are ideal for larger constructs, including mRNA, ensuring effective separation of the full-length product and impurities.⁷

The range of PLRP-S pore sizes are available in particle sizes from 3 to 50 µm. Bulk media and larger particle sizes are available as prepacked analytical and preparative dimensions for method optimization on a smaller scale before scale up.

		Analytical	Semipreparative	Preparative
Column id	2.1 mm	0.1–0.2 mL/min		
	4.6 mm		0.5–1.0 mL/min	
	7.5 mm		1.3–2.7 mL/min	
	25 mm		14.7–20.5 mL/min	
	50 mm			58.8–120 mL/min
	100 mm			240–480 mL/min
Instruments	Agilent 1220/1260/1290 Infinity II (Bio) Analytical-Scale LC Purification Systems, 0.1 mL/min–10 mL/min			
	Agilent 1260 Infinity II Preparative LC System 1 mL/min–50 mL/min			
	Agilent 1290 Infinity II Preparative LC System 1 mL/min–50 mL/min		4 mL/min–200 mL/min	

Figure 2. Range of analytical to preparative Agilent instruments and column dimensions for oligonucleotide purification. Recommended flow rates and instrumentation is outlined for each column dimension.

Determining optimal conditions for ion-pair reversed phase separations

Limit oligonucleotide secondary interactions to achieve sharp peaks and separate failed sequences by ion-pair reversed phase separations. This can be achieved by using:

1) **Increased temperature**⁸: Temperature is a common parameter to investigate when optimizing ion pair reversed-phase or anion exchange purifications. Instruments equipped with a column heater can be used to increase temperature, up to ~80° C. This sharpens peaks by breaking up secondary interactions. Though useful, modulation of temperature may be difficult when moving up to large-scale columns.

2) **Selecting an ion-pairing agent**³: IP-RP utilizes an ion pairing reagent, generally amines, that interact with the anionic ONs to form a hydrophobic pair.

The ion pair selected influences the retention time and resolution between ONs and impurities and can be adjusted to achieve the desired separation. Higher concentrations of organic phase, such as acetonitrile, may be necessary for elution when increasing the hydrophobicity of the ion pair.

3) **Mass spectrometry vs UV compatibility**³: IP-RP purification of oligonucleotides is commonly performed using a UV compatible method with acetate as the counter ion for the ion-pairs. However, MS directed prep may be of interest in some instances to verify the oligonucleotide mass and associated impurities. MS compatible methods require the acetate counterion to be replaced with hexafluoroisopropanol (HFIP) to increase ionization of the oligonucleotide. HFIP is not miscible in acetonitrile, and therefore requires a different organic phase. Methanol is the most common replacement. Method development commonly starts with the use of 15 mM TEA with 400 mM HFIP. Ion-pairs with increased hydrophobicity, such as 25 mM HFIP/15 mM HA, have demonstrated similar sensitivity compared to 400 mM HFIP/15 mM TEA and reduce the cost associated with HFIP use.

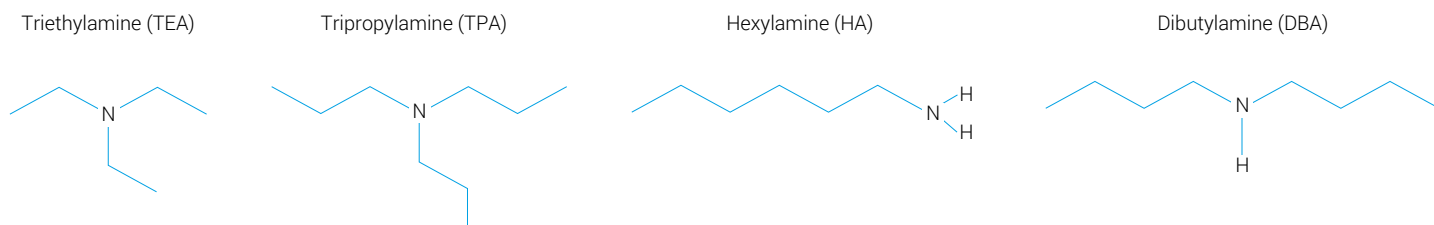


Figure 3. Commonly used ion pairing amines.

Scale

Scale is one of the many factors to consider when preparing for ON purification. The quantity of oligonucleotide that needs to be purified will determine the size of the column and the instrument configuration that will provide the required linear velocity.

When performing analytical run scale up, it is important to determine the appropriate flow rate to apply when moving to a semiprep or prep column. For PLRP-S columns, the recommended linear velocity is between 180 and 360 cm/hr. Therefore, an analytical injection optimized with a flow rate of 0.8 mL/min on a 4.6 mm id column scales to a flow of 24 mL/min on a semiprep 25 mm id column using the flow equation:

$$V = \frac{L}{60} * \frac{\pi * d^2}{4}$$

V = volumetric flow rate (mL/min)

d = column inner diameter (cm)

L = linear flow rate (cm/hr)

This equation can be simplified once the volumetric flow of the analytical dimension is determined, assuming particle size remains constant:

$$V_p = V_a * \left(\frac{D_p^2}{D_a^2} \right)$$

V_p = volumetric flow rate prep (mL/min)

V_a = volumetric flow rate analytical (mL/min)

D_p = diameter prep (mm)

D_a = diameter analytical (mm)

Scaling the particle size from small analytical particles (3 μ m) to prep particle sizes (10 to 50 μ m) may be required to stay within the operating range of your preparative instrument. A change in particle size can affect the overall resolution and mean retention time of the primary oligonucleotide product. Maintaining resolution may require increasing column length to increase the plate count (N) so it is equivalent to the analytical column particle. Calculate theoretical plates using the following equation:

$$N_a = \frac{L_a}{Dp_a}$$

N_a = analytical column theoretical plates

L_a = column length analytical (mm)

Dp_a = particle diameter analytical (mm)

Example: If moving from a 5 μ m analytical column with dimensions of 2.1 x 150 mm to a 10 μ m column with a 25 mm id, consider moving to a column length of 300 mm to maintain equivalent theoretical plates.

$$N_a * Dp_p = L_p$$

N_a = Theoretical plates analytical run

Dp_p = prep particle diameter (mm)

L_p = suggested prep column length (mm)

Bulk media PLRP-S

To accommodate a range of scale and throughput requirements, PLRP-S bulk media is available in 100 g or 1 kg. Bulk media can be used with Agilent [Load & Lock](#) 1, 2, and 3 inch columns⁹ offering higher flow rates and delivery pressures to meet the high-throughput demands of pilot-scale purification.

Best practices and helpful tips

PLRP-S conditioning, cleaning, and storage

New PLRP-S columns contain shipping solution (a mixture of organic solvents and water) and require conditioning with mobile phase before use. Detailed conditioning, cleaning, and storage recommendations can be found in the [Agilent PLRP-S User Guide](#).

Operating tips

- Reverse flow will not usually harm the column but should be avoided except when removing a clogged frit (see “[column care](#)”).
- Start the flow rate at a reduced rate and gently increase it to the desired operating flow rate to prevent overpressure.
- Always use high purity reagents and chromatography grade solvents to prepare your mobile phase. Degas and filter all mobile phase before use.
- Use an inline filter to protect your column and increase its lifetime.
- Avoid operating at the maximum temperature for prolonged periods as this will reduce the column lifetime.
- Avoid using 100% aqueous eluents with PLRP-S columns as they will significantly reduce the column lifetime and may result in a rapid deterioration in peak width and symmetry.

Recommended PLRP-S column conditions and operating ranges

Column Specifications	Particle Size	Pressure Limit	Linear Velocity	pH Range	Max Temperature
PLRP-S (100 Å, 300 Å, 1000 Å, 4000 Å)	3 µm	275 bar (27.5 MPa)	180–360 cm/hr	1 to 14	200 °C
	5 µm, 8 µm, 10 µm	207 bar (20.7 MPa)			
	10 to 15 µm, 15 to 20 µm, 30 µm, 50 µm	103 bar (10.3 MPa)			
Shipping Solvent	7:1 acetonitrile/water	Compatibility	Compatible with aqueous organic solvents including N, N-dimethylformamide and dimethyl sulfoxide. 100% aqueous is not recommended as it will reduce column performance and lifetime.		

Selecting the right instrument¹⁰

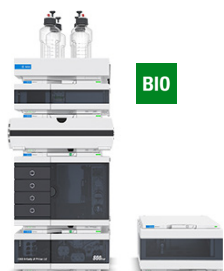


Agilent 1260/1290 Infinity II Preparative LC Systems

Dynamic flow range up to 200 mL/min.

Seamless method transfer from rapid analytical scouting runs to scale up to gram-level purification of compounds on a single system.

Purification up to 50 mm id columns.



Agilent 1260/1290 Infinity II Bio Analytical-Scale LC Purification Systems

Biocompatible solvent and sample flow path ensure integrity of biomolecules.

Binary or quaternary gradient pump delivers flow rates up to 5 mL/min.

Purification up to 10 mm id columns.



Agilent 1220/1260/1290 Infinity II Analytical Scale

Ideal for purification of multi-milligram quantities of materials.

Flow rates between 0.1 and 10 mL/min.

Works with 2.1 and 10.0 mm id analytical column.

References

1. Purification of Single-Stranded RNA Oligonucleotides Using High-Performance Liquid Chromatography [5994-3514EN](#)
2. Direct Analysis of In-Process Oligonucleotides Without Manual Purification [5991-9490EN](#)
3. Evaluation of Different Ion-Pairing Reagents for LC/UV and LC/MS Analysis of Oligonucleotides [5994-2957EN](#)
4. Ion-Pair Reversed-Phase Purification of De-Protected Oligonucleotides - Choice of Pore Size [5990-7763EN](#)
5. Improved Column Lifetime with Thermally Stable Polymer Columns for Oligonucleotide Ion-Pair RP HPLC [5990-7764EN](#)
6. Agilent PLRP-S HPLC Columns and Media [5990-8187EN](#)
7. Dynamic Binding Capacity of Oligonucleotides on PLRP-S Columns and Stationary Phases [5994-4526EN](#)
8. Use Temperature to Enhance Oligonucleotide Mass Transfer and Improve Resolution in Ion-Pair RP HPLC [5990-7765EN](#)
9. Purify Your Way, Agilent Lock & Load Columns [5994-3907EN](#)
10. Agilent InfinityLab LC Purification Solutions [5991-9153EN](#)
11. Purify Your Samples with Maximum Flexibility [5991-9154EN](#)

Easy selection and ordering information

This guide lists all the columns and supplies you will need for oligonucleotide analysis using PLRP-S and appropriately setup system. To order items listed in the tables below from the Agilent online store, add items to your Favorite Products list by clicking on the MyList # header links. You can then enter the quantities for the products you need, add the products to your Cart and proceed to checkout. Your list will remain under Favorite Products for your use with future orders.

If this is your first time using Favorite Products, you will be asked to enter your email address for account verification. If you have an existing Agilent account, you will be able to log in. However, if you don't have a registered Agilent account, you will need to register for one. This feature is valid only in regions that are e-commerce enabled. All items can also be ordered through your regular sales and distributor channels.

MyList 1: Oligonucleotide standards

Description	Part No.
Standards	
DNA ladder standard, oligos at 15, 20, 25, 30, 35, 40 mer, 1 mL	5190-9029
RNA resolution standard, oligos at 14, 17, 20, and 21 mer, 1 mL	5190-9028

MyList 2: Analytical scale PLRP-S columns

Dimensions (mm)	Particle Size (µm)	PLRP-S 100 Å USP L21	PLRP-S 300 Å USP L21	PLRP-S 1000 Å USP L21	PLRP-S 4000 Å USP L21
1.0 x 150	3	PL1312-3300			
1.0 x 50		PL1312-1300			
2.1 x 150		PL1912-3300	PL1912-3301		
2.1 x 50		PL1912-1300	PL1912-1301		
4.6 x 150		PL1512-3300	PL1512-3301		
4.6 x 50		PL1512-1300	PL1512-1301		
1.0 x 50	5	PL1312-1500		PL1312-1502	
2.1 x 250		PL1912-5500	PL1912-5501		
2.1 x 150		PL1912-3500	PL1912-3501		
2.1 x 100 PEEK-lined SS				PL1912-2502PK	
2.1 x 50		PL1912-1500	PL1912-1501	PL1912-1502	PL1912-1503
2.1 x 50 PEEK-lined SS				PL1912-1502PK	
4.6 x 250		PL1512-5500	PL1512-5501		
4.6 x 150		PL1111-3500	PL1512-3501		
4.6 x 50		PL1512-1500	PL1512-1501	PL1512-1502	PL1512-1503
1.0 x 50				PL1312-1802	
2.1 x 250	8		PL1912-5801		
2.1 x 150			PL1912-3801	PL1912-3802	PL1912-3803
2.1 x 50			PL1912-1801	PL1912-1802	PL1912-1803
4.6 x 250		PL1512-5800	PL1512-5801	PL1512-5802	
4.6 x 150		PL1512-3800	PL1512-3801	PL1512-3802	PL1512-3803
4.6 x 50			PL1512-1801	PL1512-1802	PL1512-1803
PLRP-S guard cartridges 3.0 x 5.0 mm, 2/pk		PL1612-1801	PL1612-1801	PL1612-1801	PL1612-1801
Guard cartridge holder for 3.0 x 5.0 mm cartridges		PL1310-0016	PL1310-0016	PL1310-0016	PL1310-0016

MyList 3: Analytical scale supplies

Description	Part No.
Solvent and Sample Preparation	
AdvanceBio Spin columns for desalting or buffer exchange, <100 µL samples, 25/pk, collection tubes included	1980-1103
AdvanceBio Spin 96-sample plate for desalting or buffer exchange, 10 to 50 µL samples, 1/pk	1980-1104
96-well plate, polypropylene, 0.33 mL, 14 mm, round wells, V shape, 25/pk Recommended for final collection step with p/n 1980-1104	5043-9312
Captiva disposable syringe, 5 mL, 100/pk	9301-6476
Captiva premium syringe filter, PES, 4 mm, 0.2 µm, 100/pk (<1 mL sample volume)	5190-5094
Captiva premium syringe filter, PES, 15 mm, 0.2 µm, 100/pk (sample volume 1–15 mL sample volume)	5190-5096
InfinityLab Ultrapure LC/MS Water, 1 L	5191-4498
InfinityLab Ultrapure LC/MS Acetonitrile, 1 L	5191-4496
InfinityLab Quick Change inline filter assembly, for HPLC	5067-1602
InfinityLab Quick Change inline filter assembly, for UHPLC	5067-1603
Column Fittings and Connectors	
Agilent InfinityLab Quick Connect fitting (for connection on column inlet)	5067-5965
Agilent InfinityLab Quick Connect capillary MP35N 0.12 x 105 mm (for Quick Connect fitting)	5500-1578
Agilent InfinityLab Quick Turn fitting (for connection on column outlet)	5067-5966
Quick Turn capillary MP35N 0.12 x 280 mm (for Quick Turn fitting)	5500-1596

Description	Part No.
Mounting tool for Quick Turn fittings	5043-0915
Capillary MP35N 0.12 x 90 mm SL/SL ns/ns (for connecting guard and column)	5004-0018
Sample Containment	
A-line screw top vial, 2 mL, amber, write-on spot, 100/pk Vial size 12 x 32 mm (12 mm cap)	5190-9590
Screw cap, bonded, blue, PTFE/white silicone septa, 100/pk. Cap size 12 mm	5190-7021
Vial insert, 250 µL, deactivated glass with polymer feet, 100/pk. Insert size 5.6 x 30 mm	5180-8872
InfinityLab 96-well plate, 0.5 mL 30/pk	5043-9310
InfinityLab 96-well plate, 1 mL, 50/pk	5043-9305
InfinityLab 96-well plate, 1.2 mL, 25/pk Recommended for wash steps with p/n 1980-1104	5043-9308
InfinityLab 96-well plate, 2 mL, 30/pk	5043-9302
InfinityLab 96-well plate, 2.2 mL, 30/pk	5043-9300
InfinityLab 96-well plate closing mat, 50/pk (for 5043-9310, 5043-9305, 5043-9308, 5043-9302)	5042-1389
InfinityLab 96-well plate closing mat, 50/pk (for 5043-9300)	5043-9319
1260 Infinity II/1260 Infinity II Bio-Inert Analytical Fraction Collection (G1364F and G5664B)	
Glass test tubes, 12 x 48 mm, 5 mL, 100/pk	5022-6534
Glass test tubes, 16 x 48 mm, 9 mL, 100/pk	5022-6533
Glass test tubes, 30 x 48 mm, 20 mL, 100/pk	5042-6470

MyList 4: Preparative scale PLRP-S columns

Dimensions (mm)	Particle Size (µm)	PLRP-S 100 Å	PLRP-S 300 Å	PLRP-S 1000 Å	PLRP-S 4000 Å
25 x 150	8	PL1212-3800	PL1212-3801		
25 x 300		PL1212-6800	PL1212-6801		
50 x 150		PL1712-3800	PL1712-3801		
50 x 300		PL1712-6800	PL1712-6801		
100 x 300		PL1812-6800	PL1812-6801		
25 x 50	10			PL1212-1102	PL1212-1103
25 x 150		PL1212-3100	PL1212-3101	PL1712-3102	PL1712-3103
25 x 300		PL1212-6100	PL1212-6101		
50 x 150		PL1712-3100	PL1712-3101	PL1712-3102	PL1712-3103
100 x 300		PL1812-6100	PL1812-6101		
25 x 300	10–15	PL1212-6400	PL1212-6401		
50 x 150		PL1712-3400	PL1712-3401		
100 x 300		PL1812-6400	PL1812-6401		
25 x 300	15–20	PL1212-6200	PL1212-6201		
50 x 150		PL1712-3200	PL1712-3201		
100 x 300		PL1812-6200	PL1812-6201		
25 x 150	30			PL1212-3702	PL1212-3703
50 x 150				PL1712-3702	PL1712-3703
100 x 300				PL1812-3102	PL1812-3103

MyList 5: Preparative scale supplies

Description	Part No.
Solvent and Sample Preparation	
AdvanceBio Spin columns for desalting or buffer exchange, <1000 µL samples, 50/pk columns, plus 4 reusable adapters	1980-1105
AdvanceBio Spin column re-usable adapters, 8/pk For optional use with p/n 1980-1105	1980-1106
Centrifuge tube, polypropylene, graduated, 29 mm od, 115 mm, 50 mL, conical base, wide neck, threaded top, 25/pk	5610-2049
Centrifuge tube, polypropylene, graduated, 29 mm od, 115 mm, 50 mL, skirted conical base, wide neck, threaded top, 500/pk	190065200
Captiva disposable syringe, 5 mL, 100/pk	9301-6476
Captiva disposable syringe, 10 mL, 100/pk	9301-6474
Captiva disposable syringe, 20 mL, 100/pk	5190-5103
Captiva premium syringe filter, PES, 15 mm, 0.2 µm, 100/pk (1–15 mL sample volume)	5190-5096
Captiva premium syringe filter, PES, 15 mm, 0.45 µm, 100/pk (1–15 mL sample volume)	5190-5097
Captiva Econofilter, polypropylene, PES, 25 mm, 0.2 µm, 100/pk (15–100 mL sample volume)	5190-5098
Captiva Econofilter, polypropylene, PES, 25 mm, 0.45 µm, 100/pk (15–100 mL sample volume)	5190-5099
Semiprep filter, 0.5 µm, 12.7 mm id, 1–5 mL/min (replacement frit 5022-2185)	5064-8273
High pressure semiprep filter, 10 µm, 19 mm id, 5–10 mL/min (replacement frit: 5022-2166)	5022-2165
Sample Containment	
A-line screw top vial, 2 mL, amber, write-on spot, 100/pk. Vial size 12 x 32 mm (12 mm cap)	5190-9590
Screw cap, bonded, blue, PTFE/white silicone septa, 100/pk. Cap size 12 mm	5190-7021
Vial, screw top, clear, high recovery, 5 mL, for LC, 30/pk	5188-5369

Description	Part No.
Septum, preslit PTFE/silicone, 16 mm, 100/pk	5188-2758
Cap, screw, for 6 mL vials, 100/pk	9301-1379
InfinityLab 96-well plate, 2 mL, 30/pk	5043-9302
InfinityLab 96-well plate, 2.2 mL, 30/pk	5043-9300
InfinityLab 96-well plate closing mat, 50/pk (for 5043-9302)	5042-1389
InfinityLab 96-well plate closing mat, 50/pk (for 5043-9300)	5042-9319
1260 & 1290 Infinity II Preparative LC System	
System capillary kit, 15–40 mL/min	5067-7016
System capillary kit, 40–80 mL/min	5067-7017
System capillary kit, 80–200 mL/min	5067-7018

MyList 6: Infinity II Preparative Open-Bed Fraction Collection

Description	Part No
Glass test tubes, 12 x 48 mm, 5 mL, 100/pk	5022-6534
Glass test tubes, 12 x 100 mm, 7 mL, 250/pk	5022-6531
Glass test tubes, 16 x 48 mm, 9 mL, 100/pk	5022-6533
Glass test tubes, 16 x 100 mm, 14 mL, 250/pk	5022-6532
Glass test tubes, 25 x 100 mm, 35 mL, 100/pk	5042-6459
Glass test tubes, 30 x 48 mm, 20 mL, 100/pk	5042-6470
Glass test tubes, 30 x 100 mm, 45 mL, 100/pk	5042-6458
Glass test tubes, 12 x 150 mm, 11 mL, 250/pk	5190-9093
Glass test tubes, 16 x 150 mm, 21 mL, 250/pk	5190-9092
Glass test tubes, 25 x 150 mm, 55 mL, 100/pk	5190-9091
Glass test tubes, 30 x 150 mm, 85 mL, 100/pk	5190-9090

MyList 7: PLRP-S bulk media and columns

Agilent PLRP-S Bulk Media					
Particle Size (µm)	Unit	PLRP-S 100 Å	PLRP-S 300 Å	PLRP-S 1000 Å	PLRP-S 4000 Å
8	100 g		PL1412-4801		
	1 kg	PL1412-6800	PL1412-6801		
10	10 g	PL1412-2100	PL1412-2101	PL1412-2102	PL1412-2103
	100 g	PL1412-2101	PL1412-4101	PL1412-4102	PL1412-4103
	1 kg	PL1412-2102	PL1412-6101	PL1412-6102	PL1412-6103
10–15	10 g	PL1412-2400	PL1412-2401		
	100 g	PL1412-2103	PL1412-4401		
	1 kg	PL1412-6400	PL1412-6401		
15–20	10 g	PL1412-2200	PL1412-2201		
	100 g	PL1412-4200	PL1412-4201		
	1 kg	PL1412-6200	PL1412-6201		

Agilent PLRP-S Bulk Media					
30	10 g			PL1412-2702	PL1412-2703
	100 g			PL1412-4702	PL1412-4703
	1 kg			PL1412-6702	PL1412-6703
50	10 g	PL1412-2K00	PL1412-2K01	PL1412-2K02	
	100 g	PL1412-4K00	PL1412-4K01	PL1412-4K02	
	1 kg	PL1412-6K00	PL1412-6K01	PL1412-6K02	

MyList 7: Bulk media and columns (continued)

Agilent PLRP-S Bulk Media	Part No.
Load & Lock Columns for Bulk Media	
Load & Lock column, 27 id x 500 mm L	PCG93LL500X25WJ
Load & Lock column, 50 id x 500 mm L	PCG93LL500X50WJ
Load & Lock column, 75 id x 500 mm L	PCG93LL500X75WJ
Mobile packing station (air driven hydraulic)	PCG93LLSTAND123
Load & Lock low pressure upgrade kit for mobile packing station	PCG93LLSTAND123LPU*

* Not available for purchase online. Please contact your local sales representative for details.

MyList 8: Solvent filtration supplies

Description	Part No.
Solvent Filtration	
InfinityLab solvent filtration assembly	5191-6776
InfinityLab solvent filtration flask, glass, 2 L	5191-6781
Filter membrane, Nylon 47 mm, pore size 0.2 µm, 100/pk	5191-4341
Filter membrane, Regenerated Cellulose 47 mm, pore size 0.2 µm, 100/pk	5191-4340
Solvent bottle glass filter, solvent inlet, 20 µm	5041-2168

MyList 9: Solvent handling supplies

Description	Part No.
Solvent Handling	
InfinityLab Stay Safe cap starter kit	5043-1222
InfinityLab solvent bottle, clear, 1 L	9301-6524
InfinityLab solvent bottle, amber, 1 L	9301-6526
Solvent bottle, clear, 2 L	9301-6342
Solvent bottle, amber, 2 L	9301-6341
InfinityLab Stay Safe purging bottle	5043-1339
InfinityLab waste can, GL45, 6 L with Stay Safe cap (charcoal filter 5043-1193 not included)	5043-1221
InfinityLab charcoal filter with time strip, 58 g (use with 5043-1221)	5043-1193

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