

HUMAN HEALTH

ENVIRONMENTAL HEALTH



THE TECHNOLOGY  
YOU NEED TO  
**SEPARATE**  
FROM THE PACK



### **Brownlee SPP**

HPLC and UHPLC Column Solutions with  
Superficially Porous Particle Technology

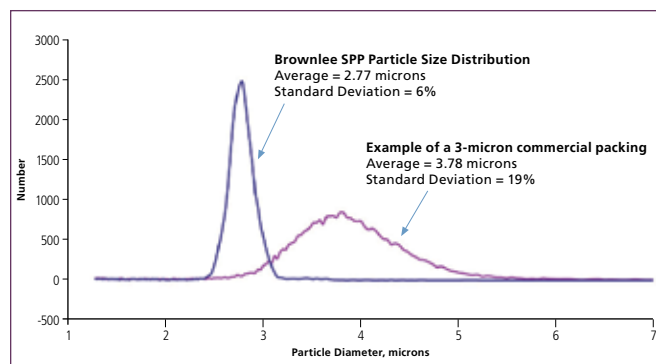
  
**PerkinElmer**<sup>®</sup>  
*For the Better*

# GREATER SPEED, LASTING DURABILITY, BETTER RESULTS.

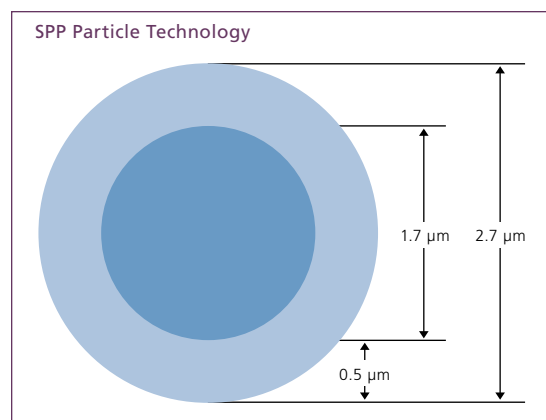
Say goodbye to the limitations of traditional columns. Break free from the constraints of your Liquid Chromatography instrument. With Brownlee Superficially Porous Particle (SPP) columns, you can achieve sharper peaks and faster separation results without changing instruments, worrying about high backpressure or compromising column longevity.

With their unique particle composition, only Brownlee SPP columns offer you the freedom to push your process farther:

- Generate “UHPLC-like” separations on a standard HPLC system.
- Achieve ultra fast performance and efficiency on your UHPLC system.
- Run samples in a fraction of the time of conventional 3  $\mu\text{m}$  or 5  $\mu\text{m}$  particle columns.
- Realize significant savings through faster method development, column longevity and use of less mobile phase solvent.
- Easily optimize or convert any instrument, including HPLC or UHPLC systems from PerkinElmer, Agilent, and other manufacturers.



Compared to traditional columns, the narrow particle size distribution of Brownlee SPP columns results in sharper peak resolution.



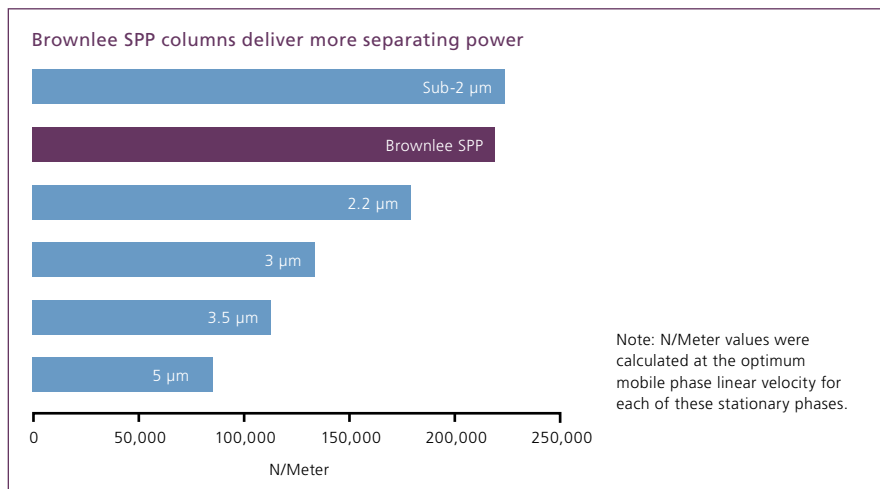
Smaller in size and innovative in design, superficially porous particles are made by fusing a porous silica layer to a solid inner core.

## Innovative to the core

Brownlee SPP columns generate fast separations and superior results because of their breakthrough particle design and size. Unlike other columns that use 3  $\mu\text{m}$  fully porous particles, Brownlee SPP columns use 2.7  $\mu\text{m}$  particles comprised of a thin outer shell of high-quality porous silica fused to a solid inner core. This advanced design allows for a shorter diffusion path, which reduces the time solute molecules spend inside the particles while passing through the stationary phase. This, in turn, keeps backpressure to a minimum and improves column efficiency. In addition, the combined particle density and narrow particle size distribution improves column durability and reduces eddy diffusion of solute molecules. It all adds up to sharper peaks, faster separation and greater resolution, time and time again.

## Super separating power

Compared to columns of the same length packed with 3 µm particles, Brownlee SPP columns deliver over 90% more separating power (plates), and almost three times the separating power of columns packed with 5 µm particles for a similar cost.



## Efficiencies all the way

At PerkinElmer, we understand the importance of time demands with your workflow. That's why our SPP columns are designed to help you achieve greater efficiencies with minor to no instrument modification. By maintaining their resolving power at high flow rates, Brownlee SPP columns allow for higher sample throughput with enhanced results. In a recent study, SPP columns separated seven compounds in less than 48 seconds with better than baseline resolution for all peak pairs.\* In fact, an incremental 50% improvement in efficiency may be achieved on your traditional analytical 400 bar HPLC system with no instrument modification. And with instrument optimization, you can enjoy system performance that rivals a UHPLC system at pressures up to 9000 p.s.i.

But Brownlee SPP columns don't just save valuable process time; they provide significant cost and environmental savings as well. The SPP design allows for less solvent consumption and reduced waste disposal. Plus, the columns are compatible with 2 µm inlet frits, so you can use traditional solvents and sample preparation, while enjoying the same ease-of-use of 5 µm particle columns. For UHPLC system users, there's no need to purchase specialized filters.

## The durability and longevity to go the distance

The demands of high-speed applications make it difficult for most columns to perform consistently over time. Brownlee SPP columns, however, feature an advanced design that can handle the pressure. First, the particles have an extremely narrow size distribution range. Second, the particles are more consistent in size than conventional particles, allowing them to be more easily and securely packed into the column. The resulting columns are extremely rugged, reproducible and reliable—so much so that tests show they can handle over a thousand injections for numerous applications.

## HOW THE UNIVERSITY OF TENNESSEE SEPARATED FROM THE PACK.

When the University of Tennessee Center for Renewable Carbon wanted to speed up their process, we worked with them to optimize their Flexar™ LC with Brownlee SPP columns. Within two hours, we reduced their run time from 60 minutes to under 10 minutes while improving resolution.

\*Study based on Fast Separation of Benzoic acids. Brownlee SPP: C18, 2.7 µm x 4.6 x 50 mm. Mobile Phase: 55% Methanol, 45% 25mM sodium phosphate, pH 2.5. Flow rate: 2.2 ml/min. Temperature: ambient (24 C). Pressure: 4,700 psi, 320 bar. Sample: 1) Uracil 2) Phthalic Acid 3) Impurity 4) 2-Fluorobenzoic acid 5) 3-Nitrobenzoic acid 6) 3-Fluorobenzoic acid 7) m-Toluic Acid

# Performance For Every Phase

## Brownlee SPP 2.7 µm Columns

Diameter/Length	Part Number
<b>C18</b>	
2.1 x 20 mm	N9308400
2.1 x 30 mm	N9308401
2.1 x 50 mm	N9308402
2.1 x 75 mm	N9308403
2.1 x 100 mm	N9308404
2.1 x 150 mm	N9308405
3.0 x 20 mm	N9308406
3.0 x 30 mm	N9308407
3.0 x 50 mm	N9308408
3.0 x 75 mm	N9308409
3.0 x 100 mm	N9308410
3.0 x 150 mm	N9308411
4.6 x 20 mm	N9308412
4.6 x 30 mm	N9308413
4.6 x 50 mm	N9308414
4.6 x 75 mm	N9308415
4.6 x 100 mm	N9308416
4.6 X 150 mm	N9308417

Diameter/Length	Part Number
<b>C8</b>	
2.1 x 20 mm	N9308418
2.1 x 30 mm	N9308419
2.1 x 50 mm	N9308420
2.1 x 75 mm	N9308421
2.1 x 100 mm	N9308422
2.1 x 150 mm	N9308423
3.0 x 30 mm	N9308424
3.0 x 50 mm	N9308425
3.0 x 75 mm	N9308426
3.0 x 100 mm	N9308427
3.0 x 150 mm	N9308428
4.6 x 20 mm	N9308429
4.6 x 30 mm	N9308430
4.6 x 50 mm	N9308431
4.6 x 75 mm	N9308432
4.6 x 100 mm	N9308433
4.6 x 150 mm	N9308434

Diameter/Length	Part Number
<b>HILIC</b>	
2.1 x 30 mm	N9308435
2.1 x 50 mm	N9308436
2.1 x 75 mm	N9308437
2.1 x 100 mm	N9308438
2.1 x 150 mm	N9308439
3.0 x 30 mm	N9308440
3.0 x 50 mm	N9308441
3.0 x 75 mm	N9308442
3.0 x 100 mm	N9308443
3.0 x 150 mm	N9308444
4.6 x 30 mm	N9308445
4.6 x 50 mm	N9308446
4.6 x 75 mm	N9308447
4.6 x 100 mm	N9308448
4.6 x 150 mm	N9308449

<b>Peptide ES-C18</b>	
2.1 x 30 mm	N9308450
2.1 x 50 mm	N9308451
2.1 x 75 mm	N9308452
2.1 x 100 mm	N9308453
2.1 x 150 mm	N9308454
3.0 x 30 mm	N9308455
3.0 x 50 mm	N9308456
3.0 x 75 mm	N9308457
3.0 x 100 mm	N9308458
3.0 x 150 mm	N9308459
4.6 x 30 mm	N9308460
4.6 x 50 mm	N9308461
4.6 x 75 mm	N9308462
4.6 x 100 mm	N9308463
4.6 x 150 mm	N9308464

<b>PFP</b>	
2.1 x 20 mm	N9308465
2.1 x 30 mm	N9308466
2.1 x 50 mm	N9308467
2.1 x 75 mm	N9308468
2.1 x 100 mm	N9308469
2.1 x 150 mm	N9308470
3.0 x 30 mm	N9308471
3.0 x 50 mm	N9308472
3.0 x 75 mm	N9308473
3.0 x 100 mm	N9308474
3.0 x 150 mm	N9308475
4.6 x 30 mm	N9308476
4.6 x 50 mm	N9308477
4.6 x 75 mm	N9308478
4.6 x 100 mm	N9308479
4.6 x 150 mm	N9308480

<b>Phenyl-Hexyl</b>	
2.1 x 20 mm	N9308481
2.1 x 30 mm	N9308482
2.1 x 50 mm	N9308483
2.1 x 75 mm	N9308484
2.1 x 100 mm	N9308485
2.1 x 150 mm	N9308486
3.0 x 30 mm	N9308487
3.0 x 50 mm	N9308488
3.0 x 75 mm	N9308489
3.0 x 100 mm	N9308490
3.0 x 150 mm	N9308491
4.6 x 30 mm	N9308492
4.6 x 50 mm	N9308493
4.6 x 75 mm	N9308494
4.6 x 100 mm	N9308495
4.6 x 150 mm	N9308496

Diameter/Length	Part Number	Diameter/Length	Part Number	Diameter/Length	Part Number
<b>RP-Amide</b>		<b>C18 Guard Column Packs</b>		<b>PPF Guard Column Packs</b>	
2.1 x 20 mm	N9308497	2.1 x 5 mm, 3 pk	N9308513	2.1 x 5 mm, 3 pk	N9308531
2.1 x 30 mm	N9308498	3.0 x 5 mm, 3 pk	N9308514	3.0 x 5 mm, 3 pk	N9308532
2.1 x 50 mm	N9308499	4.6 x 5 mm, 3 pk	N9308515	4.6 x 5 mm, 3 pk	N9308533
2.1 x 75 mm	N9308500	<b>C8 Guard Column Packs</b>		<b>Phenyl-Hexyl Guard Column Packs</b>	
2.1 x 100 mm	N9308501	2.1 x 5 mm, 3 pk	N9308522	2.1 x 5 mm, 3 pk	N9308519
2.1 x 150 mm	N9308502	3.0 x 5 mm, 3 pk	N9308523	3.0 x 5 mm, 3 pk	N9308520
3.0 x 30 mm	N9308503	4.6 x 5 mm, 3 pk	N9308524	4.6 x 5 mm, 3 pk	N9308521
3.0 x 50 mm	N9308504	<b>HILIC Guard Column Packs</b>		<b>RP-Amide Guard Column Packs</b>	
3.0 x 75 mm	N9308505	2.1 x 5 mm, 3 pk	N9308525	2.1 x 5 mm, 3 pk	N9308516
3.0 x 100 mm	N9308506	3.0 x 5 mm, 3 pk	N9308526	3.0 x 5 mm, 3 pk	N9308517
3.0 x 150 mm	N9308507	4.6 x 5 mm, 3 pk	N9308527	4.6 x 5 mm, 3 pk	N9308518
4.6 x 30 mm	N9308508	<b>Peptide ES-C18 Guard Column Packs</b>		<b>Guard Column Holder</b>	
4.6 x 50 mm	N9308509	2.1 x 5 mm, 3 pk	N9308528	N9308534	
4.6 x 75 mm	N9308510	3.0 x 5 mm, 3 pk	N9308529		
4.6 x 100 mm	N9308511	4.6 x 5 mm, 3 pk	N9308530		
4.6 x 150 mm	N9308512				

## Brownlee SPP Phases And Applications

UHPLC Phases*	Pore Size (Å)	Coverage (μmol/m <sup>2</sup> )	pH Range	Temp Limit (°C)	Applications	Chromatographic Properties
C18	90	3.5	2 to 9	60	General Purpose Octadecyl phase for reversed phase separations.	A high-purity column that exhibits excellent peak shape for a wide range of compounds.
C8	90	3.7	2 to 9	60	General Purpose Octyl phase for reversed phase separations when less retention than a C18 is desired.	High purity reversed phase packing that exhibits excellent peak shape for a wide range of compounds.
HILIC†	90	N/A	2 to 8	60	General purpose bare silica column for normal phase and HILIC applications.	High purity silica substrate.
Peptide ES-C18†	160	2.0	1 to 8	90	Sterically protected ligand (isobutyl - side chains), results in an Extra Stable bonded phase at low pH where most peptide separations are performed.	The 160 Angstrom pore size was specially chosen for the molecular weight range of peptides. The ligand was chosen due to its sterically protected bonding technology that inhibits acid hydrolysis of the siloxane bonds, even under extremes of high temperature and low pH.
PPF (pentafluorophenylpropyl)	90	3.6	2 to 8	60	Highly retentive and selective for protonated basic analytes and molecules containing aromatic moieties.	End-capped pentafluorophenyl with a propyl spacer.
PhenylHexyl	90	3.0	2 to 9	60	Alternative selectivity to alkyl bonded phases, recommended for aromatic groups. Compatible with highly aqueous mobile phases to facilitate the retention and separation of polar compounds.	Base-deactivated for good peak shapes when separating basic compounds. Hexyl spacer provides optimal flexibility for phenyl ring to facilitate π-π interactions with solutes.
RP-Amide	90	3.0	2 to 9	60	Excellent phase for significantly increasing the retention and selectivity of acids, for symmetrical peak shapes of bases, zwitterions and other polar compounds.	Base-deactivated phase with a polar group within the alkyl bonded phase. Provides unique selectivity and a high level of base deactivation while reducing or eliminating the need for mobile phase additives.

\*Maximum pressure 9,000 p.s.i. for all columns.

\*\*All particle sizes are 2.7 μm.

†Not end-capped. All others end-capped.

# EASY INSTRUMENT OPTIMIZATION

Brownlee SPP columns can be used to enhance the performance of virtually any HPLC or UHPLC system. Our OneSource Service Engineers are certified on all leading manufacturer instruments and can help optimize your instrument's performance with minor modifications combined with our Brownlee SPP columns.

## PerkinElmer Flexar/Series 200 Analytical System Optimization Kits for Ultimate Performance

For both Flexar UHPLC and Series 200 conventional LC systems (non-UHPLC), we have created and tested two optimization kits for SPP column applications: one for UV/Vis systems (N2920191) and one for PDA systems (N2920193). With Brownlee SPP optimization kits, which contain smaller diameter tubing and a 2.4 uL flow cell, users can significantly minimize band broadening for enhanced operation on conventional LC systems.

### N2920191—for Series 200 LC or Flexar UHPLC systems with UV/Vis detector

Description	Quantity	Part Number
Ferrule 1/16 inch	2	00873032
Tubing .005 ID 316 Stainless Steel (SS) (50 cm)	1	02507060
Fingertight 1-piece Nut and Ferrule	1	09920513
Nut 10-32 CPI Stainless Steel Gland for 1/16 inch Tubing	2	N2916202
Tubing 30 inch .004 ID 1/16 OD Peek (black)	1	N2916260
Flowcell Assembly for UV/Vis 6 MM 2.4 uL	1	N2920127

### N2920193—for Series 200 LC or Flexar UHPLC systems with PDA detector

Description	Quantity	Part Number
Ferrule 1/16 inch	2	00873032
Tubing .005 ID 316 Stainless Steel (50 cm)	1	02507060
Fingertight 1-piece Nut and Ferrule	1	09920513
Nut 10-32 CPI Stainless Steel Gland for 1/16 inch Tubing	2	N2916202
Tubing 30 inch .004 ID 1/16 OD Peek (black)	1	N2916260
Flowcell Assembly for PDA 6 MM 2.4 uL	1	N2920128



## Agilent Optimization Kits

Brownlee SPP columns offer Agilent 1100 users the opportunity to obtain enhanced performance from their existing HPLC instrument. Our SPP columns deliver resolution and speed similar to sub-2  $\mu\text{m}$  UHPLC columns, but generate only 40% to 50% of the backpressure. By combining high efficiency and lower backpressure, Brownlee SPP columns make it possible to get "UHPLC-like" performance from conventional 400-bar equipment, such as the Agilent 1100. PerkinElmer has created and tested eight optimization kits for your Agilent systems.

Description	Part Number
Extra column volume (ECV) - STD Autosampler and Variable Wavelength Detector (VWD) Optimization Kit	ZECVSTDVWD

Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Needle Seat Capillary, 0.12 mm ID capillary, 1.2  $\mu\text{L}$   
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 Semi-Micro Cell Assembly  
 Seat Capillary 0.12 x 100 mm, 0.8 mm OD  
 Carrier for Heat Exchanger Thermostatted Column Compartments (TCC) SL

ECV - STD Well Plate Autosampler and Diode Array Detector / Multiple Wavelength Detector (DAD/MWD)	ZECVSTDWPDADMWD
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Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 1100 DAD Cell Assembly, 6 mm, 5  $\mu\text{L}$ , 120 bar  
 Seat Capillary 0.12 x 100 mm, 0.8 mm OD  
 SS Capillary 0.12 x 100 mm, 0.8 mm OD  
 Carrier for Heat Exchanger TCC SL

ECV - STD Autosampler and DAD/MWD	ZECVSTDADMWD
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Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Needle Seat Capillary, 0.12 mm ID capillary, 1.2  $\mu\text{L}$   
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 1100 DAD Cell Assembly, 6 mm, 5  $\mu\text{L}$ , 120 bar  
 Seat Capillary 0.12 x 100 mm, 0.8 mm OD  
 Carrier for Heat Exchanger TCC SL

ECV - STD Well Plate Autosampler and VWD	ZECVSTDWVWD
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Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 Semi-Micro Cell Assembly  
 Seat Capillary 0.12 x 100 mm, 0.8 mm OD  
 SS Capillary 0.12 x 100 mm, 0.8 mm OD  
 Carrier for Heat Exchanger TCC SL

Description	Part Number
Ultra Low ECV - STD Autosampler and VWD	ZULECVSTDVWD

Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Needle Seat Capillary, 0.12 mm ID capillary, 1.2  $\mu\text{L}$   
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 Micro Flow Cell, 5 mm, 1  $\mu\text{L}$ , 40 bar  
 High Temperature Heat Exchanger, 1.6  $\mu\text{L}$ , 0.12 mm ID  
 Carrier for Heat Exchanger TCC SL

Ultra Low ECV - STD Well Plate Autosampler and DAD/MWD	ZULECVSTDWPDADMWD
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Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 Micro Flow Cell 2  $\mu\text{L}$ , 3 mm path  
 High Temperature Heat Exchanger, 1.6  $\mu\text{L}$ , 0.12 mm ID  
 SS Capillary 0.12 x 100 mm, 0.8 mm OD  
 Carrier for Heat Exchanger TCC SL

Ultra Low ECV - STD Autosampler and DAD/MWD	ZULECVSTDADMWD
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Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Needle Seat Capillary, 0.12 mm ID capillary, 1.2  $\mu\text{L}$   
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 Micro Flow Cell 2  $\mu\text{L}$ , 3 mm path  
 High Temperature Heat Exchanger, 1.6  $\mu\text{L}$ , 0.12 mm ID  
 Carrier for Heat Exchanger TCC SL

Ultra Low ECV - STD Well Plate Autosampler and VWD	ZULECVSTDWVWD
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Capillary Column-by-Pass , 280 mm, 0.12 mm  
 Capillary, 18 cm, 0.12 mm ID, 1/16 m/m  
 Micro Flow Cell, 5 mm, 1  $\mu\text{L}$ , 40 bar  
 High Temperature Heat Exchanger, 1.6  $\mu\text{L}$ , 0.12 mm ID  
 SS Capillary 0.12 x 100 mm, 0.8 mm OD  
 Carrier for Heat Exchanger TCC SL

# SUPERIOR SUPPORT

TODAY AND TOMORROW

Whether you need help choosing the right SPP columns for your LC instrument, assistance with installation, or restocking your inventory, PerkinElmer is ready to assist you with trained customer service representatives and experienced field service engineers.

But we don't stop there. Brownlee SPP columns are just one of the many analytical solutions we offer to power your process. We boast an industry-leading portfolio that encompasses instruments, accessories, consumables, supplies, training and service. It's a breadth of capabilities that enables you to have a single supplier for all your laboratory needs at every stage of your workflow. So you can benefit from greater responsiveness, superior reliability and dramatic cost savings.

Our OneSource Laboratory Services division even takes it a step further. With more than 1,500 trained and certified field service engineers and service personnel around the world, OneSource offers the most comprehensive range of professional laboratory services in the industry, including complete care programs for virtually every technology and manufacturer.

So turn to PerkinElmer. For the experience. For the confidence. For the better.



**Couple SPP With Leading  
Instrumentation For Ultimate  
Laboratory Efficiency**

Series 200 HPLC

Flexar HPLC and UHPLC

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