

Waters Sep-Pak®

Sample Extraction Products

Sep-Pak® sample extraction products are recognized throughout the world and remain the most referenced SPE products for GC, HPLC and LC/MS analysis. Sep-Pak® products are now available in the following formats:

- Cartridges
- 96-well plate
- μ Elution plate



NEW—Sep-Pak® 96-well Plates

Sep-Pak® 96-well plates are now available with the same chemistries proven for years in Sep-Pak® cartridges. The Sep-Pak® 96-well plates have been designed to enable high throughput SPE, and they can be used on most vacuum manifolds and automated sample handling systems. Sep-Pak® plates are available in different sorbent masses for a variety of sample loads.

Sep-Pak® 96-well plates are extensively tested for quality control, each plate is shipped with a certificate of analysis which covers tests performed on raw silica and the bonded silica phase. Each lot is tested for bonding, cleanliness and chromatographic selectivity. The plates are packed and tested to ensure consistent flow properties and sorbent mass across the 96 wells.

Sep-Pak® 96-well Plates

Description	Qty	Part Number
Sep-Pak® tC ₁₈ 25 mg Plate	1/pkg	186002319
Sep-Pak® tC ₁₈ 40 mg Plate	1/pkg	186002320
Sep-Pak® tC ₁₈ 100 mg Plate	1/pkg	186002321
Sep-Pak® Accell Plus OMA 100 mg Plate	1/pkg	186001917

NEW—Sep-Pak® 96-well μ Elution Plates

Sep-Pak® tC₁₈ is now available in the patented* μ Elution plate. This plate is designed to enable SPE clean up and concentration of small volume samples. The recommended protocol for elution from this plate is as low as 25 μ l. The low volume extracts from the plate can be injected directly, eliminating time consuming evaporation steps.

Sep-Pak® 96-well μ Elution Plate

Description	Qty	Part Number
Sep-Pak® tC ₁₈ μ Elution Plate	1/pkg	186002318

* Patent pending

Sep-Pak® Solid-Phase Extraction Cartridges

Which Cartridge Design is Best for Your Application

Sep-Pak® cartridges are available in a variety of designs; each offers specific functional benefits but all contain the same high-quality packing sorbents. This makes transfer of methods from one design to another straightforward and predictable.

Sep-Pak® Plus Cartridges for Maximum Versatility

Sep-Pak® Plus cartridges are designed for both convenient manual use and compatibility with automated instruments. They come in short body and long body configurations and are constructed from high purity polyethylene with female and male Luer outlets. They can be connected to many different types of devices such as positive flow pumps and syringes, vacuum manifolds, and automated sample processors.

Sep-Pak® Classic Cartridges

Sep-Pak® Classic cartridges were the original SPE cartridges introduced 25 years ago. They contain the same amount of sorbent as the Sep-Pak® Plus cartridge. This means that you can convert existing methods easily to the more convenient Plus configuration. Both the Sep-Pak® Plus and Classic designs have two different sizes (short and long body) depending on the type of sorbent.

Sep-Pak® C₁₈ Environmental Cartridges

This is a special “long body” Plus cartridge design containing approximately 1 gram of the monofunctional C₁₈ or the trifunctional C₁₈ sorbent. These cartridges are especially useful in trace enrichment applications.

Sep-Pak® Light Cartridges for Limited Sample Volumes/Lower Solvent Consumption

Sep-Pak® Light cartridges look similar to the short-body Sep-Pak® Plus cartridges, except for the distinctive “finned” outer body. The functional difference is the reduced internal diameter which results in bed volumes about one-third that of the corresponding Plus cartridge.

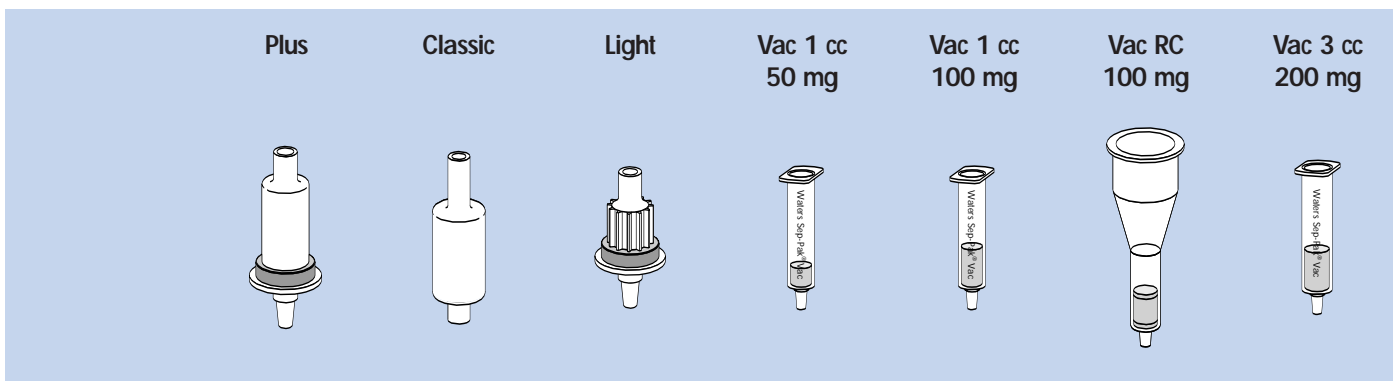
Sep-Pak® Vac Cartridges

Sep-Pak® Vac cartridges provide you with the most common format of sample preparation. The cartridges use molded polypropylene “syringe-barrel” bodies and two polyethylene filters to contain the packing material.

Sep-Pak® Vac RC Cartridges for Manual or Robotic Sample Preparation

These cartridges feature a 20 cc “funnel” shape design containing 100 or 500 mg of sorbent. They can be used with robotic sample preparation equipment or with vacuum manifolds.

Sep-Pak® Cartridge Selection Guide



Sorbent Chemistries

	Box of 50	Box of 50	Box of 50	Box of 100	Box of 100	Box of 50	Box of 50
C ₁₈	WAT020515	WAT051910	WAT023501	WAT054955	WAT023590	WAT036935	WAT054945
tC ₁₈	WAT036810	N/A	WAT036805	WAT054960	WAT036820	WAT043410	WAT054925
C ₈	WAT036775	N/A	WAT036770	WAT054965	WAT036785	WAT043415	WAT054940
tC ₂	WAT052720	N/A	WAT052725	N/A	WAT052710	N/A	N/A
Silica	WAT020520	WAT051900	WAT023537	WAT054980	WAT023595	WAT036940	WAT054930
Florisil®	WAT020525	WAT051960	WAT023543	WAT054985	WAT023600	N/A	N/A
Accell™ Plus CM	WAT020550	WAT010910	WAT023531	N/A	WAT023625	N/A	N/A
Accell™ Plus QMA	WAT020545	WAT010835	WAT023525	N/A	WAT023620	WAT043460	N/A
Alumina A	WAT020500	WAT051800	WAT023549	N/A	WAT023575	N/A	N/A
Alumina B	WAT020505	WAT051820	WAT023555	N/A	WAT023580	N/A	N/A
Alumina N	WAT020510	WAT051810	WAT023561	N/A	WAT023585	N/A	N/A
Amino Propyl (NH ₂)	WAT020535	WAT010830	WAT023513	N/A	WAT023610	WAT043475	N/A
Cyano Propyl (CN)	WAT020540	WAT010823	WAT023507	WAT054975	WAT023615	WAT043470	WAT054935
Diol	WAT020530	WAT010818	WAT023519	N/A	WAT023605	WAT043480	N/A

Application Specific Sep-Pak® Cartridges

Sep-Pak® DNPH-Silica Cartridges—for analysis of airborne aldehydes and keytones based on their reaction with 2,4-dinitrophenylhydrazine and subsequent analysis of the hydrazone derivatives by HPLC. Sep-Pak® DNPH-Silica cartridges meet the requirements for **EPA Method TO-11A and ASTM-D-5197**.

Waters XPoSure™ Aldehyde Sampler Cartridge—an extension of our DNPH coating technology, these cartridges are made with larger particles and higher porosity frits resulting in lower pressure drop for use with personal sampling pumps.

Sep-Pak® Ozone Scrubber Cartridge—ozone interferes with the analysis of carbonyl compounds in air samples that have been drawn through Sep-Pak® DNPH-Silica Cartridges or Waters XPoSure™ Aldehyde Sampler Cartridge. Ozone Scrubber Cartridge is designed to remove this interference.

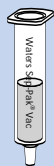
Sep-Pak® RDX Extraction Cartridge—for the analysis of explosives in surface and ground waters. This cartridge is designed to meet or exceed **EPA Method 8330**.

Sep-Pak® Dry SPE Cartridges—these cartridges are packed with 2.85 g of anhydrous sodium sulfate, designed to remove residual water from SPE extracts.

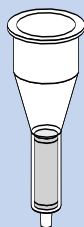
Application Specific

Description	Qty	Part Number
Sep-Pak® DNPH-Silica Cartridge	Box of 20	WAT037500
Sep-Pak® DNPH-Silica Long Body Cartridge	Box of 20	WAT039550
Waters XPoSure™ Aldehyde Sampler Cartridge	Box of 20	WAT047205
Ozone Scrubber	Box of 20	WAT054420
Porapak® Rdx Cartridges	Box of 30	WAT047220
Sep-Pak® Dry SPE Cartridges	Box of 50	WAT54265

Vac 3 cc
500 mg



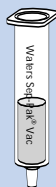
Vac RC
500 mg



Vac 6 cc
500 mg



Vac 6 cc
1 gram



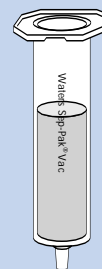
Vac 12 cc
2 gram



Vac 20 cc
5 gram



Vac 35 cc
10 gram



Sorbent Chemistries

Box of 50	Box of 50	Box of 30	Box of 30	Box of 20	Box of 20	Box of 10	
WAT020805	WAT036945	WAT043395	WAT036905	WAT036915	WAT036925	WAT043345	C ₁₈
WAT036815	WAT043425	WAT036790	WAT036795	WAT043380	WAT043365	WAT043350	tC ₁₈
WAT036780	WAT043430	WAT054525	WAT054570	WAT054615	WAT054660	WAT054700	C ₈
WAT052715	N/A	N/A	WAT052705	N/A	N/A	N/A	tC ₂
WAT020810	WAT036950	WAT043400	WAT036910	WAT036920	WAT036930	WAT043355	Silica
WAT020815	WAT043435	WAT043405	WAT043390	WAT043385	WAT043370	WAT043360	Florisil®
WAT020855	WAT054505	WAT054545	WAT054590	WAT054635	WAT054675	WAT054720	Accell™ Plus CM
WAT020850	WAT054500	WAT054550	WAT054595	WAT054640	WAT054680	WAT054725	Accell™ Plus QMA
WAT020820	N/A	WAT054535	WAT054580	WAT054620	WAT054670	WAT054710	Alumina A
WAT020825	N/A	WAT054540	WAT054585	WAT054625	WAT054665	WAT054715	Alumina B
WAT020830	WAT043485	WAT054530	WAT054575	WAT054630	WAT043375	WAT054705	Alumina N
WAT020840	WAT054515	WAT054560	WAT054605	WAT054650	WAT054695	WAT054740	Amino Propyl (NH ₂)
WAT020835	N/A	WAT054555	WAT054600	WAT054645	WAT054685	WAT054730	Cyano Propyl (CN)
WAT020845	WAT054520	WAT054565	WAT054610	WAT054655	WAT054690	WAT054735	Diol

mg = nominal weight of sorbent in milligrams.

Sep-Pak® Sorbent Properties and Typical Applications

Reversed-Phase

- C₁₈** silica-based bonded phase with strong hydrophobicity; used to adsorb analytes of even weak hydrophobicity from aqueous solutions; typical applications include **drugs and their metabolites in serum, plasma or urine, desalting of peptides, trace organics in environmental water samples, organic acids in beverages**; similar in behavior to reversed-phase HPLC columns
- IC₁₈** silica-based bonded phase with strong hydrophobicity; trifunctional bonding chemistry gives it an increased hydrolytic stability over C₁₈; applications similar to C₁₈
- C₈** silica-based bonded phase with moderate hydrophobicity; use for methods requiring less retention than C₁₈; typical applications include **drugs and their metabolites in serum, plasma or urine, peptides in serum, plasma**
- IC₂** silica-based bonded phase with low hydrophobic character; use for methods requiring less retention than C₈; applications are similar to C₁₈ and C₈
- Porapak™ Rdx** specially cleaned polymeric poly(divinylbenzene-vinylpyrrolidone) resin with hydrophobic character. Can be used as an alternative to octadecyl-bonded silica for preparation of analytes that weakly adsorb to silica-based reversed-phase sorbents. Compatible with sample or eluents at high and low pH. **Specifically designed for the concentration of high explosives in aqueous samples**

Reversed or Normal Phase:

- Amino Propyl (NH₂)** silica-based polar bonded phase with basic character; can be used as a polar sorbent, like silica, with different selectivity for acidic/basic analytes or as weak anion exchanger in aqueous medium; **applications include phenols and phenolic pigments, petroleum fractionation, saccharides and drugs and metabolites**
- Cyano Propyl (CN)** silica-based polar bonded phase; can be used as less polar alternative to silica in normal-phase applications or as less hydrophobic alternative to C₁₈ or C₈ in reversed-phase applications; typical applications include **drugs, drug metabolites and pesticides**
- Diol** silica-based polar bonded phase with neutral character; can be used as an alternative to silica in normal phase applications, where the acidic character of silica is undesirable or as very weakly interacting phase in aqueous applications; applications include **antibiotics from cosmetics; isolation of proteins or peptides by hydrophobic interaction chromatography**

Normal Phase

- Silica** polar sorbent, used primarily to **adsorb analytes from non polar solvents like hydrocarbons, chloro- or fluoro-substituted hydrocarbons or less polar esters and ethers**; elution with more polar solvents like polar esters, ethers, alcohols, acetonitrile or water; the binding mechanism can be hydrogen bonding or dipole-dipole interaction; silica can also be used in aqueous medium as a cation exchanger of intermediate strength.
- Alumina (A, B & N)** similar in use to silica; available in acidic, basic and neutral high activity grades; alumina also exhibits specific interactions with the pi-electrons of aromatic hydrocarbons, making it useful for applications like **crude oil fractionation; acidic and basic grades can also be used as low-capacity ion-exchangers**
- Florisil®** polar, highly active, weakly basic sorbent for adsorption of low to moderate polarity species from nonaqueous solutions; **specifically designed for the adsorption of pesticides using official AOAC and EPA methods; other applications include polychlorinated biphenyls (PCBs) in transformer oil**

Ion-Exchange

- Accell™ Plus QMA** silica-based hydrophilic strong anion-exchanger with large pore-size; extraction of anionic analytes in aqueous and non-aqueous solutions; due to the large pore-size, it is excellent for the isolation of **anionic proteins, e.g., immunoglobulins, enzymes; other applications include the removal of acidic pigments from wines, fruit juices and food extracts, isolation of phenolic compounds, peptide pool fractionations**
- Accell™ Plus CM** silica-based hydrophilic weak cation-exchanger with large pore-size; extraction of cationic analytes in aqueous and non-aqueous solutions; due to the large pore-size, **it is excellent for the isolation of cationic proteins; other applications include pesticides, herbicides, steroids**

Specialty

- DNPH-Silica, XPoSure™** contains acidified dinitrophenylhydrazine reagent coated on a silica sorbent. **Used for the collection of air samples and subsequent quantitation of aldehydes and ketones by reaction to form the hydrazone derivative, and analysis by HPLC. DNPH-Silica is specified in several EPA procedures for the analysis of carbonyl compounds in air**

Waters

www.waters.com

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All other countries: Waters Corporation U.S.A. 508 478 2000/800 252 4752



The quality management system of Waters' manufacturing facilities in Taunton, Massachusetts and Wexford, Ireland complies with the International Standard ISO 9001:2000 Quality Management and Quality Assurance Standards. Waters' quality management system is periodically audited by the registering body to ensure compliance.

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