

Welchrom™ Solid Phase Extraction (SPE) Products From Welch Materials, Inc.



I. Solid Phase Extraction Cartridge

Sample preparation is one of the most important key steps for the entire analysis process as over 60% of the entire analysis process time and over 30% of the analysis errors are from the sample preparation. Over the last twenty years, SPE has become the most powerful technique prior to analytical chromatography for the cleanup, purification, and concentration of samples from various matrices, including urine, blood, water, beverages, soil, and animal tissue. Solid phase extraction is a form of digital (step-wise) chromatography designed to extract, partition, and/or adsorb one or more components from a liquid phase (sample) onto stationary phase (sorbent or resin). SPE extends a chromatographic system's lifetime, improves qualitative and quantitative analysis, and by changing an analyte of interest's original matrix environment to a simpler matrix more suitable for subsequent analysis, the demand placed on an analytical instrument is considerably lessened.

Use SPE for Samples that:

- Contain particulate matter causing system clogging and high back-pressure
- Contain components that cause high background, misleading peaks, and/or poor sensitivity

- Require cleanup, trace enrichment/concentration, or purification
- Require sample matrix or solvent exchange

Benefits of SPE:

- Switch sample matrices to a form more compatible with chromatographic analyses
- Concentrate analytes for increased sensitivity
- Remove interferences to simplify chromatography and improve quantitation
- Protect the analytical column from contaminants

Common SPE Applications:

- Pharmaceutical compounds and metabolites in biological fluids
- Drugs of abuse in biological fluids
- Environmental pollutants in drinking and wastewater
- Pesticides and antibiotics in food/agricultural matrices
- Desalting of proteins and peptides
- Fractionation of lipids
- Water and fat soluble vitamins

Introduction of Welchrom™ SPE products

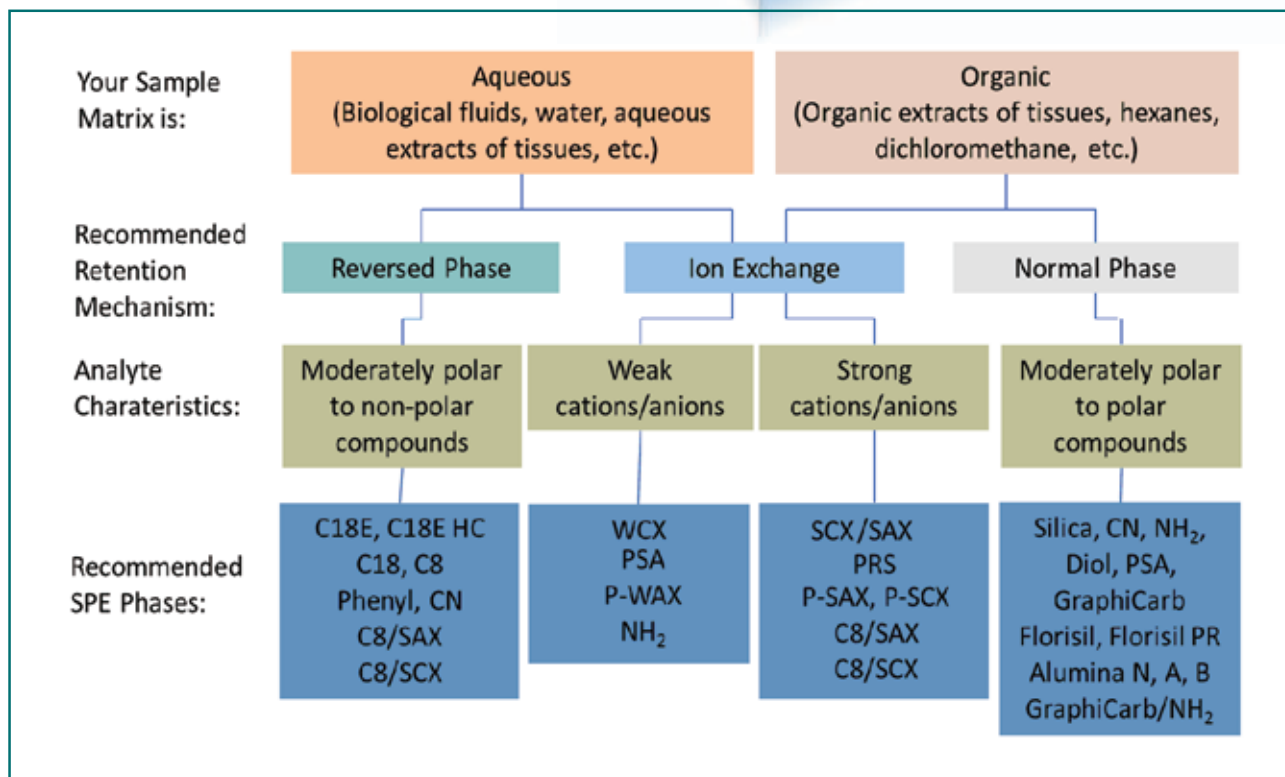
Since 2005, Welch Materials, Inc. has launched Ultisil® (also called Ultisil® in China market), Xtimate™, and Topsil™ series of HPLC chromatography column packing and products into the China market, with excellent chromatographic performance, competitive price and the best professional services. Those products have won the trust from the majority of users. With several years of increased market share, Welch Materials now has become one of the top several major suppliers of HPLC column product line in China.

Based on our core chromatographic packing technology and strong new product development ability, Welch Materials also developed a series of Welchrom™ SPE products (Welchrom™ is a registered trade mark of Welch Materials), including silica-based, polymer-based products, and other inorganicsorbent, and specialty and mixed phases.

Welchrom™ SPE products are manufactured using state-of-the-art automation to guarantee quality and consistency. We have high standards of a series of quality assurance measurements to characterize raw materials and semi-finished packing, such as pore size, pore volume, surface area and the carbon loading, to ensure Welchrom™ SPE products excellent batch-to-batch reproducibility and high extraction efficiency.



Welchrom™ SPE Selection Guide



Base Material	Phase	Category	Bonded Functional Group	Endcapped	Carbon Loading (%)	Surface Area (m ² /g)	Particle Size (μm)	Pore Size (Å)
Silica-Based	C18E	Non-polar	C18	Yes	17	480	45	60
	C18E HC	Non-polar	C18	Yes	25	480	45	60
	C18	Non-polar	C18	No	24	480	45	60
	C8	Non-polar/polar	C8	Yes	9	480	45	60
	Phenyl	Polar/Non-polar	Phenyl	Yes	7	480	45	60
	CN	Polar	CN	No	7	480	45	60
	Diol	Polar	Diol	No	7	480	45	60
	NH ₂	Polar	Aminopropyl	No	7	480	45	60
	PSA	Polar/Weak anion exchange	Ethylenediamine-n-propyl	No	8	480	45	60
	Silica	Polar	Silica	N/A	N/A	480	45	60
	SAX	Polar/Anion exchange	Trimethylaminopropyl	No	8	480	45	60
	SCX	Cation exchange	Benzenesulfonic acid	No	11	480	45	60
	WCX	Weak cation exchange	Carboxylic acid	Yes	7	480	45	60
	PRS	Cation exchange	Propylsulfonic acid	No	2	480	45	60
Non-silica Inorganic-based	Florisil	Polar	Florisil	N/A	N/A		75-150	N/A
	Florisil PR	Polar	Florisil/Na ₂ SO ₄	N/A	N/A		150-250	N/A
	Alumina-A	Alumina acidic		N/A	N/A		50-200	N/A
	Alumina-B	Alumina basic		N/A	N/A		50-200	N/A
	Alumina-N	Alumina neutral		N/A	N/A		50-200	N/A
	Celite	Polar		N/A	N/A		75-100	N/A
Polymer-Based	BRP	non-polar/Polar		N/A	N/A	850	45	N/A
	P-SAX	Anion exchange /Polar	SAX functionalized	N/A	N/A	850	45	80
	P-SCX	Cation exchange/ Polar/	SCX functionalized	N/A	N/A	850	45	80
	P-WAX	Weak cation exchange/ Polar	WAX functionalized	N/A	N/A	850	45	80
	PS/DVB	Polar/non-polar		N/A	N/A	850	45	80
Specialty and Mixed Mode	GraphiCarb	Strongly non-polar/Anion exchange	Graphitized carbon	N/A	N/A	100	120-400	N/A
	GraphiCarb/NH ₂	Non-polar/ Polar/ Anion exchange	Graphitized carbon/ aminopropyl	No	N/A	480	45	60
	C8/SCX	Non-polar/ Cation exchange	C8/SCX	No	N/A	480	45	60
	C8/SAX	Non-polar/ Anion exchange	C8/SAX	No	N/A	480	45	60

1) Silica-Based SPE:

The sorbent currently most commonly used in SPE is still the silica gel or bonded silica gel, and its pH scope of application is pH 2-8. Welchrom™ SPE silica products are based on high-quality high-purity amorphous silica with the average particle size of 45 μm, the average pore size of 60Å, the pore volume of 0.80 cm³/g, and the specific surface area of 480 m²/g. Also we apply Welch's unique surface treatment technology and bonding chemistry on SPE silica, to ensure high extraction efficiency of the analytes. Silica-based Welchrom™ SPE phases include C18E (endcapped), C18E HC (endcapped), C18 (not endcapped), C8, CN, NH₂, PSA (diamine), Phenyl, SCX, SAX, WCX, PRS (sulfonic acid), Silica, Diol, and other 13 kinds of packing.

2) Non-Silica Inorganic SPE:

Non-silica inorganic Welchrom™ SPE sorbents include six normal phase adsorbents: Florisil, Florisil PR, Alumina-N (neutral alumina), Alumina-A (acidic alumina), Alumina-B (basic alumina) and Celite. They have different polarity and basicity, and provide different selectivity and adsorption than normal phase silica gel for the cleanup and analysis of complex matrix samples.

3) Polymeric SPE:

Polymeric SPE have been in rising trend year by year. Welchrom™ polymer –based SPE is made from monodisperse

polymer beads, and currently includes five different sorbents to meet your needs: BRP, P-SCX, P-SAX, PS/DVB, and P-WAX. Polymeric Welchrom™ SPE sorbents have the following advantages over silica sorbents:

- A wide pH range (0-14); suitable for most organic solvents
- No active surface silanols; no loss of basic compounds due to the secondary adsorption
- High binding capacity, high recovery rate, and better consistence
- Low the detection limit, good for trace amount analysis;
- No hydrolysis of the bonded phase like silica substrate; no contamination
- Spherical particles and narrow particle size distribution, to ensure reproducibility of results
- Easy to use; if accidentally dried in the process, the cartridge is still usable, and there is no risk of losing the analyte or the result
- Superior retention with a wide pH range for a wide pKa range of compounds

4) Specialty and Mixed Mode SPE:

Welchrom™ SPE has four kinds of specialty and mixed adsorbents: GraphiCarb, GraphiCarb/NH₂, C8/SCX, C8/SAX, and C18E/SiO₂



1. Welchrom™ Silica Based SPE

Welchrom™ C18E

- Extremely retentive for non-polar compounds
- Effective for desalting aqueous mixtures
- The most popular SPE C18 sorbent
- The least selective phase: retain most organic analytes from aqueous matrices
- Beneficial for extracting numerous analytes diverse in structure from the same sample
- Typical applications include herbicides, fungicides, pesticides and other aqueous hazardous waste materials

Welchrom™ C18E (endcapped C18) is very hydrophobic and the most popular SPE sorbent in Welchrom™ SPE products because of its extreme retentive nature for non-polar compounds. C18 is generally regarded as having the broadest spectrum of retention among bonded silica sorbents, since it retains most organic analytes from aqueous matrices. When analyzing small to intermediate molecules, Welchrom™ C18E can be used for desalting aqueous matrices prior to ion exchange, as salts pass through the sorbent unretained. Because of its strong binding ability, it has less selectivity for non-polar organic compounds, so it is often used for separation of compounds with big difference in structure and polarity.

Welchrom™ C18E HC

- The most retentive for non-polar compounds in Welchrom™ SPE C18
- Use for organic compounds which typically couldn't be retained by other C18
- The most hydrophobic, bonded silica sorbent; 25% carbon loading

Welchrom™ C18E HC is the most hydrophobic, bonded silica sorbent. It is similar to Welchrom™ C18E, but contains even higher carbon content, up to 25% carbon. Such high carbon loading helps to further enhance the retention of very polar compounds that typically couldn't be retained by other SPE C18.

Welchrom™ C18E ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00501-11001
100mg/3ml	50	00501-11002
150mg/3ml	50	00501-11003
200mg/3ml	50	00501-11004
500mg/3ml	50	00501-11005
500mg/6ml	30	00501-11006
1000mg/6ml	30	00501-11007
2g/10ml	20	00501-11008
10g / bottle		00501-11017
100g / bottle		00501-11018



Welchrom™ C18E HC ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00502-11001
100mg/3ml	50	00502-11002
150mg/3ml	50	00502-11003
200mg/3ml	50	00502-11004
500mg/3ml	50	00502-11005
500mg/6ml	30	00502-11006
1000mg/6ml	30	00502-11007
2g/10ml	20	00502-11008
10g / bottle		00502-11017
100g / bottle		00502-11018

Welchrom™ C18

- Very retentive for non-polar compounds
- Silanol activity permits metabolite fractionation
- Enhanced retention for polar and basic compounds

Welchrom™ C18 is a non-encapped version of Welchrom™ C18E HC, leaving more active residual surface silanols that provide additional polar-polar interactions, permit the fractionation of metabolites, and enhance retention of polar and basic compounds compared to an encapped C18. Its performance is equivalent to BondElute C18 OH.

Welchrom™ C8

- Excellent for strong retained non-polar compounds
- Less retentive than C18
- Some polar interaction, but not significant
- Used to elute very large hydrophobic molecules too strongly retained on Welchrom™ C18E
- Use this less retentive phase for the rapid release of hydrophobic molecules using weaker organic

Welchrom™ C8 has a very similar property to C18, but is less retentive for non-polar compounds due to its shorter carbon chain. At the same time, the analytes access more to C8 silica surface silanols than to C18. Therefore, C8 have more polar interaction for polar compounds than C18, but not significant. Welchrom™ C8 is a good replacement when the analyte is irreversibly retained on C18. Experiments show that C8 adsorbent can extract both fat-soluble and water-soluble vitamins in human blood.

Welchrom™ Phenyl

- Similar polarity to C8
- Additional polar secondary π - π interactions enhanced retention of aromatic compounds
- Different selectivity compared with the C18 and C8 phases when both aromatic and non-aromatic compounds are being extracted

Welchrom™ Phenyl is commonly used to extract non-polar compounds. Its polarity is similar to C8, but because of unique aromatic π - π polar interaction, conjugated compounds have strong retention. Welchrom™ Phenyl has the best selectivity for a mixture of aromatic compounds and non-aromatic compounds.

Welchrom™ C18 ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00504-11001
200mg/3ml	50	00504-11004
500mg/3ml	50	00504-11005
500mg/6ml	30	00504-11006
1000mg/6ml	30	00504-11007
2g/10ml	20	00504-11008
10g / bottle		00504-11017
100g / bottle		00504-11018

Welchrom™ C8 ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00505-11001
200mg/3ml	50	00505-11004
500mg/3ml	50	00505-11005
500mg/6ml	30	00505-11006
1000mg/6ml	30	00505-11007
2g/10ml	20	00505-11008
10g / bottle		00505-11017
100g / bottle		00505-11018

Welchrom™ Phenyl ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00506-11001
200mg/3ml	50	00506-11004
500mg/3ml	50	00506-11005
500mg/6ml	30	00506-11006
1000mg/6ml	30	00506-11007
10g / bottle		00506-11017
100g / bottle		00506-11018

Welchrom™ Silica

- Unbonded acid washed high purity silica, ideal for normal-phase SPE and other modified flash techniques
- Considered the most polar normal-phase sorbent available
- Highly polar sorbent to retain polar compounds from non-polar matrices
- Separating compounds with very similar structure

Welchrom™ Silica is generally regarded as the most polar SPE sorbent available. Its retention is mainly due to hydrogen bonds. Welchrom™ Silica is particularly effective at separating compounds with a very similar structure. It also exhibits a character of weak acids; at the mid pH conditions, silica surface silanols can be ionized.

Welchrom™ CN

- Endcapped cyanopropyl (7% C)
- Ideal for extracting aqueous analytes
- Retention in aqueous and organic matrices
- Behave as either reversed-phase or normal-phase
- Ideal for very hydrophobic analytes that may be irreversibly retained on more hydrophobic sorbents such as Welchrom™ C18E
- Less retentive than Welchrom™ Si or Welchrom™ Diol when used as normal-phase (organic matrices such as hexane or oils)

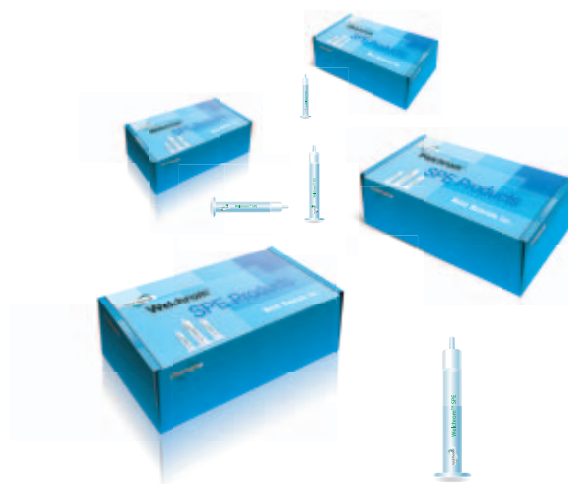
Welchrom™ CN is a cyano bonded polar phase, and can be used in either normal phase or reversed phase mode for polar and non-polar compounds. In the normal phase mode, it is the least to retain polar adsorbent; in reversed phase mode, it is also the least to retain non-polar adsorbent. It can be used as a non-polar sorbent for extraction of both polar and non-polar molecules from aqueous samples, and for extraction of polar molecules from relatively non-polar solvents. It is ideal for applications in which extremely non-polar compounds would be irreversibly retained on high carbon load sorbents such as C8 and C18.

Welchrom™ Silica ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00500-11001
200mg/3ml	50	00500-11004
500mg/3ml	50	00500-11005
500mg/6ml	30	00500-11006
1000mg/6ml	30	00500-11007
10g / bottle		00500-11017
100g / bottle		00500-11018

Welchrom™ CN ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00507-11001
200mg/3ml	50	00507-11004
500mg/3ml	50	00507-11005
500mg/6ml	30	00507-11006
1000mg/6ml	30	00507-11007
10g / bottle		00507-11017
100g / bottle		00507-11018



Welchrom™ NH₂

- Normal phase or anion exchange sorbent
- Weaker anion exchange than SAX
- Amenable to separating structural isomers
- Allows the rapid release of very strong anions such as sulfonic acids that may be retained irreversibly on SAX (a quarternary amine sorbent that is always positively charged)

Welchrom™ NH₂ is anaminopropyl bonded sorbent for polar compounds. This dual purpose sorbent can act either as a polar phase or weak anion exchanger. When using non-polar solvent such as n-hexane as eluting solvent, it can be used for compounds containing -OH, -NH or -SH group by hydrogen bonding. Because of its pKa value of 9.8, in an aqueous environment with pH 7.8 or less, it can function as a weak anion exchanger. Similar to Diol and Silica sorbents, Welchrom™ NH₂ is excellent for the separation of structural isomers.

Welchrom™ PSA

- Alternative choice to Welchrom™ NH₂ for polar compounds
- Higher ionic capacity than Welchrom™ NH₂
- Chelating sorbent

Welchrom™ PSA is an ethylene diamine-N-propyl bonded sorbent, and is similar to Welchrom™ NH₂. In reversed phase condition, its polarity is between C18 and silica. It has excellent selectivity for a broad range of polar and medium-polar compounds. It is also can be used as a weak anion exchange cartridge. Welchrom™ PSA has two amino groups (pKa values of 10.1 and 10.9), providing a higher ion exchange capacity. Welchrom™ PSA can effectively remove fatty acids in the pesticide residues in food (including oleic acid, palmitic acid, linoleic acid, etc.), organic acids, some polar pigments, sugars, and other matrices. It can also be used as a metal ion chelating agent by two amino groups.

Welchrom™ NH₂ ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00509-11001
200mg/3ml	50	00509-11004
500mg/3ml	50	00509-11005
500mg/6ml	30	00509-11006
1000mg/6ml	30	00509-11007
10g/bottle		00509-11017
100g/bottle		00509-11018

Welchrom™ PSA ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00508-11001
200mg/3ml	50	00508-11004
500mg/3ml	50	00508-11005
500mg/6ml	30	00508-11006
1000mg/6ml	30	00508-11007
10g/bottle		00508-11017
100g/bottle		00508-11018

Welchrom™ Diol

- Polymerically bonded, 2,3-Dihydroxypropoxypropyl (7% C)
- Provides polar and non-polar modes
- Strong hydrogen bonding with analytes
- Resembles Welchrom™ Silica in its capabilities

Welchrom™ Diol is a silica-based polar SPE adsorbent bonded with two hydroxyl groups for polar compounds. Depending on the cartridge preparation and sample matrix, this polar bonded sorbent can exhibit both polar and weak non-polar interactions. It is more frequently used to extract polar molecules from relatively non-polar solvents using hydrogen bonding interactions. With appropriate cartridge conditioning, it can be used as a non-polar sorbent to extract relatively non-polar molecules from aqueous samples. It could differentiate among isomers and other structurally similar compounds. It is a better choice than Welchrom™ Silica when used as an adsorbent to extract polar compounds in a polar solvent.

Welchrom™ SCX

- A polymerically bonded, benzene sulfonic acid phase with a H⁺ counter ion
- Very low pKa ligand elicits strong analyte interaction
- Useful for compounds with cationic and non-polar characteristics
- Superior cleanup a single sorbent

Welchrom™ SCX is a strong cation exchanger with a very low pKa. It is used to extract positively charged basic compounds. The presence of the benzene ring in the functional group increases the potential for non-polar interactions. This non-polar characteristic becomes particularly important when conducting ion-exchange from aqueous systems.

Welchrom™ Diol ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00510-11001
200mg/3ml	50	00510-11004
500mg/3ml	50	00510-11005
500mg/6ml	30	00510-11006
1000mg/6ml	30	00510-11007
10g / bottle		00510-11017
100g / bottle		00510-11018

Welchrom™ SCX ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00512-11001
200mg/3ml	50	00512-11004
500mg/3ml	50	00512-11005
500mg/6ml	30	00512-11006
1000mg/6ml	30	00512-11007
10g / bottle		00512-11017
100g / bottle		00512-11018

Welchrom™ SAX

- A polymerically bonded quarternary amine that remains charged at all pH levels
- Retains negatively charged compounds, especially those that elute from weak anion exchange sorbents
- Selectivity can be user-modified for increased flexibility
- Minimal non-polar interactions

Welchrom™ SAX is a silica-based strong anion exchange SPE adsorbent, usually used for extraction of negatively charged substances from water or aqueous solution, especially for the extraction of weak acids such as carboxylic acids, which may not retain effectively on weak anion exchange sorbents.

Welchrom™ WCX

- A moderate polarity sorbent and weak cation exchanger (pKa 4.8)
- Cation exchange with no need for extreme basic conditions
- Wider selectivity range provides more eluent options
- Polar or non-polar depending on matrix or solvent
- Typically used when dealing with very strong cationic (high pKa) compounds that may be irreversibly retained on strong cation exchangers

Welchrom™ WCX is a silica-based weak cation exchange SPE adsorbent, bonded with carboxyl functional groups, commonly used in extraction of the quaternary ammonium compounds or other strong cation.

Welchrom™ PRS (propylsulfonic acid)

- A propylsulfonic acid phase
- Strong cation exchange sorbent, also capable of polar and hydrogen bonding interactions
- Less acidic than Welchrom™ SCX
- No appreciable non-polar interactions
- Unique selectivity properties

It is less acidic than Welchrom™ SCX, so is referred to as Welchrom™ SCX-2. They have slightly different selectivity. Welchrom™ PRS shows less non-polar hydrophobic interaction than Welchrom™ SCX. So in non-polar solvents, PRS is capable of polar and hydrogen bonding interactions. Due to the very low pKa of PRS, it is recommended for sample preparation of weak cation, such as pyridine, etc., with a high recovery rate. It is also widely used for sample preparation of malachite green.

Welchrom™ SAX ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00513-11001
200mg/3ml	50	00513-11004
500mg/3ml	50	00513-11005
500mg/6ml	30	00513-11006
1000mg/6ml	30	00513-11007
10g / bottle		00513-11017
100g / bottle		00513-11018

Welchrom™ WCX ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00514-11001
200mg/3ml	50	00514-11004
500mg/3ml	50	00514-11005
500mg/6ml	30	00514-11006
1000mg/6ml	30	00514-11007
10g / bottle		00514-11017
100g / bottle		00514-11018

Welchrom™ PRS ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00511-11001
200mg/3ml	50	00511-11004
500mg/3ml	50	00511-11005
500mg/6ml	30	00511-11006
1000mg/6ml	30	00511-11007
10g / bottle		00511-11017
100g / bottle		00511-11018

2. Welchrom™ inorganic non-Silica based SPE

Welchrom™ inorganic non-Silica based SPE sorbents are used as normal phase adsorbents. Their polarity, surface acidity and application are different from each other or from silica. They are usually specifically for sample preparation of very complex samples, such as pesticide residues, plant and animal tissue samples in the organic solvents, and Sudan dyes and malachite green in foods.

Like our Welchrom™ silica-based SPE adsorbents, non-Silica SPE adsorbents have been passed through a series of cleaning and activation processes and strict quality control process, to ensure high quality and excellent reproducibility.

Welchrom™ Florisil

- Particles size is 100-200 mesh
- Fast flow so ideal for viscous samples
- Highly polar material that strongly adsorbs polar compounds from non-polar matrices under normal-phase conditions
- Economical material
- For cleanup of polar impurities from non-polar samples
- Typical applications include alcohols, aldehydes, amines, herbicides, pesticides, PCBs, ketones, nitro compounds, organic acids, and phenols

Welchrom™ Florisil, made from magnesium silicate, is a highly selective SPE sorbent. Similar to silica, it is use for extraction of polar compounds, but is much adsorptive than silica. It is widely use to extracts polar compounds from non-polar solvent. The larger particle size of the sorbent enables fast flow for large sample volumes and therefore can be an attractive alternative to silica if the sample matrix is particularly viscous. Typical applications include organic chlorinated pesticide, PCBs, and PAHs. It is also included in AOAC and EPA methods.

Welchrom™ Florisil ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00515-20001
200mg/3ml	50	00515-20004
500mg/3ml	50	00515-20005
500mg/6ml	30	00515-20006
1000mg/6ml	30	00515-20007
10g / bottle		00515-20017
100g / bottle		00515-20018

Welchrom™ Florisil PR

- Contains Na₂SO₄(upper layer) and Florisil (magnesium silicate; lower layer)
- Bigger particle size- 60/100 mesh (150-200 mm); pesticide grade
- Generally used to retain polar analytes
- Excellent for removing/isolating polar compounds from organic matrices
- A great option when more generally-used sorbents, such as C18, don't perform specifically enough for your particular application

Welchrom™ Florisil PR is a selective synthetic adsorbent of silica, magnesium and sodium sulfate, especially processed to give consistent results when used for cleanup and separation of chlorinated pesticide residues, amines, polychlorinated biphenyls (PCBs), ketones and organic acids prior to identification and measurement of by gas, thin layer, or paper chromatography. It meets the EPA 608 method.

Welchrom™ Florisil PR ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00516-20001
200mg/3ml	50	00516-20004
500mg/3ml	50	00516-20005
500mg/6ml	30	00516-20006
1000mg/6ml	30	00516-20007
10g / bottle		00516-20017
100g / bottle		00516-20018

Welchrom™ Alumina-N

- Neutral polar alumina SPE sorbent (pH 6.5)
- 50 - 200 µm particle size for high extraction efficiency
- Ideal for electron-rich compounds
- Better high pH stability than bare silica

Welchrom™ Alumina-N can adsorb molecules by interaction with the aluminum metal center, or by hydrogen bonding with the surface hydroxyl groups. The neutralized surface allows interaction with compounds whose heteroatoms are electronegative (e.g., N, O, P, S) or with an electron-rich, highly aromatic structure. The alumina surface tends to be slightly more stable under high pH conditions than bare silica. The small particle size range ensures high extraction efficiency. It is widely used in the sample preparation of Sudan and malachite green.

Welchrom™ Alumina-B

- Basic alumina SPE sorbent (pH 8.5)
- 50 - 200 µm particle size for high extraction efficiency
- Ideal for polar and cationic compounds
- Better high pH stability than bare silica

Welchrom™ Alumina-B is washed with basic solution; so its surface is negatively charged. It is ideal for extraction of polar or cationic compounds.

Welchrom™ Alumina-A

- Slightly acidic alumina SPE sorbent (pH = 4.5)
- 50 - 200 µm particle size for high extraction efficiency
- Ideal for polar and anionic compounds
- Better high pH stability than bare silica

Welchrom™ Alumina-A surface is slightly acidic with pH = 4.5. Adsorbent can be used as polar and middle-cation exchanger.

Welchrom™ Alumina-N ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00518-20001
200mg/3ml	50	00518-20004
500mg/3ml	50	00518-20005
500mg/6ml	30	00518-20006
1000mg/6ml	30	00518-20019
10g / bottle		00518-20017
100g / bottle		00518-20018

Welchrom™ Alumina-B ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00520-20001
200mg/3ml	50	00520-20004
500mg/3ml	50	00520-20005
500mg/6ml	30	00520-20006
1000mg/6ml	30	00520-20007
10g / bottle		00520-20017
100g / bottle		00520-20018

Welchrom™ Alumina-A ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00519-20001
200mg/3ml	50	00519-20004
500mg/3ml	50	00519-20005
500mg/6ml	30	00519-20006
1000mg/6ml	30	00519-20007
10g / bottle		00519-20017
100g / bottle		00519-20018

Welchrom™ Celite

- Macroporous (302 Å) with large pore volume
- Chemically inert
- Stable across a broad pH range: 1-13
- 100 – 200 mesh particle size for high extraction efficiency
- Very abroad application

Welchrom™ Celite is a specially treated, chemically inert and pH stable, macroporous diatomite sorbent; It has broad applications, including pre-treatment of urine, whole blood, plasma, serum, gastric juice, amniotic fluid, feces and animal and plant tissue samples, environmental analysis and residual analysis (industrial waste, household waste and hospital waste), drug content analysis, traditional Chinese medicine analysis.

Welchrom™ Celite ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00521-20001
200mg/3ml	50	00521-20004
500mg/3ml	50	00521-20005
500mg/6ml	30	00521-20006
1000mg/6ml	30	00521-20007
100g / bottle		00521-20018

3. Welchrom™ Polymer-based SPE

Welchrom™ polymer –based SPE is made from monodisperse polymer beads, which surface is modified by the Welch's unique surface modification and functionalization technology to produce various types of polymer SPE sorbents. Welchrom™ SPE polymer beads have accurate particle size of 40 µm with a high degree of uniformity of particle size and pore size, excellent surface area, and the optimal bonding density of functional groups, which can meet high sensitivity analysis requirement for a wide variety of applications of acidic, neutral and basic compounds. Welchrom™ polymer-based SPE currently includes five different sorbents to meet your needs: BRP, P-SCX, P-SAX, PS/DVB, and P-WAX.

Welchrom™ BRP

- Monodispersed polymer beads
- Balanced hydrophobic and hydrophilic adsorbent surface
- Most versatile SPE option
- Appropriate for a broad range of samples, including weak acids, neutrals, and weak bases
- Equivalent to Waters Oasis HLB, Agilent's OPT, and Phenomenex Strata X

BRP is abbreviation of 'Balanced Reverse Polymer'. Welchrom™ BRP surface is modified by our proprietary surface modification technology. It has balanced hydrophobic and hydrophilic adsorbent surface, and is used to separate polar and non- polar substances. Its extraction capacity is 3-10 times of C18 bonded silica SPE. It is appropriate for a broad range of samples, including weak acids, neutrals, and weak bases, such as naproxen, ibuprofen, fenoprofen, indomethacin, caffeine, theobromine.

Welchrom™ BRP ordering information

Specification	Packing (pcs /bag)	Part No.
30mg/1ml	100	00522-20015
60mg/3ml	50	00522-20009
150mg/3ml	50	00522-20003
200mg/6ml	30	00522-20014
500mg/6ml	30	00522-20006

Welchrom™ P-SCX

- Ideal solid phase extraction for melamine analysis
- Excellent retention for both basic and neutral compounds over a wide range of hydrophilicity
- Inert to a wide variety of solvents
- Equivalent to Waters Oasis MCX, Phenomenex Strata-XC

Welchrom™ P-SCX polymeric resin is a sulfonic acid-modified divinyl benzene polymer with both ion exchange and reverse phase retention properties. As a result, the Welchrom™ P-SCX resin exhibits excellent retention for both basic and neutral compounds over a wide range of hydrophilicity; examples including melamine, amphetamines, chlorpheniramine, and phencyclidine.

Welchrom™ P-SAX

- Excellent retention for both acidic and neutral compounds over a wide range of hydrophilicity
- Inert to a wide variety of solvents

Welchrom™ Strong Anion Exchange (SAX) polymeric resin is a mixed-mode, tertiary amine-modified divinyl benzene polymer that displays both anion exchange and reversed phase behavior. As a result, Welchrom™ P-SAX resin exhibits excellent retention for both acidic and neutral compounds over a wide range of hydrophilicity, typically used for purification of acidic substances, such as tyrosine, estrone, adenine and nucleoside and so on, from alkaline and neutral impurities.

Welchrom™ PS/DVB

- Highly cross-linked polystyrene-divinyl benzene copolymer
- High surface area (800m²/g) and high adsorption capacity; ideal for extracting polar compounds from aqueous solutions
- Large particle size allows fast extraction speeds
- Equivalent to Bond Elute LMS, Bond Elute PPL, SampliQ PS-DVB

Welchrom™ PS/DVB is a highly cross-linked polystyrene/divinyl benzene copolymer resin with high surface area (800m²/g) and high adsorption capacity for rapid adsorption and separation of hydrophobic substances such as phenol, surfactants, non-B pyridine bromide, antibiotics, amino acids and peptides, etc. It is ideal for the extraction of polar analytes that are not adequately retained on a C18 or C8 sorbent. The nonselective characteristic of this sorbent is useful for screening applications where a broad range of analytes is to be extracted.

Welchrom™ P-SCX ordering information

Specification	Packing (pcs /bag)	Part No.
30mg/1ml	100	00523-20015
60mg/3ml	50	00523-20016
150mg/6ml	30	00523-20043

Welchrom™ P-SAX ordering information

Specification	Packing (pcs /bag)	Part No.
30mg/1ml	100	00524-20015
60mg/3ml	50	00524-20016
150mg/6ml	30	00524-20043

Welchrom™ PS/DVB ordering information

Specification	Packing (pcs /bag)	Part No.
30mg/1ml	100	00526-20015
60mg/3ml	50	00526-20009
150mg/6ml	30	00523-20043

Welchrom™ P-WAX

- Exhibits both anion exchange and reversed phase behavior
- Wide pH range: can be ionized or neutral depending on pH of buffer solution

Welchrom™ P-WAX is a weak anion exchange polymer resin with both anion exchange and non-polar hydrophobic properties. It is ideal for purification of acids, such as tyrosine, estrone, adenosine and nucleoside, etc. from basic and neutral matrix.

Welchrom™ P-WAX ordering information

Specification	Packing (pcs /bag)	Part No.
30mg/1ml	100	00525-20015
60mg/3ml	50	00525-20016
150mg/6ml	30	00525-20043

4. Welchrom™ specialty and mixed-mode SPE

Welchrom™ GraphiCarb

- Graphitized carbon black (GCB)
- Surface Area: 100 m²/g; Particle Size: 100/400 mesh
- Generally used to retain polar analytes
- Retention generally decreases as solvent becomes more polar
- High affinity for organic polar and non-polar compounds from both non-polar and polar matrices, when used in reversed phase conditions
- Optimized for pesticide analysis
- A great option when more generally-used sorbents, such as C18, don't perform specifically enough for your particular application

Activated carbon has very adsorption capacity, but adsorption is so strong that it is almost irreversible, so it is not suitable for a SPE adsorbent. Welchrom™ GraphiCarb is Graphitized carbon black (GCB), which overcomes the disadvantage of irreversible adsorption of activated carbon, but also maintained the high adsorption capacity of the polar and non-polar organic compound; as a result, it has advantages of high purification ability, high sample recovery and high reproducibility. It is widely used for sample preparation of pigment and pesticides. In addition, since Welchrom™ GraphiCarb is nonporous, it does not require analyte dispersion into solid phase pores and is able to reach adsorption equilibrium much faster, allowing for rapid processing and the adsorption.

Welchrom™ GraphiCarb ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00517-20001
200mg/3ml	50	00517-20004
250mg/6ml	30	00517-20013
500mg/6ml	30	00517-20006
1000mg/6ml	30	00517-20007
10g / bottle		00517-20017
100g / bottle		00517-20018

Welchrom™ mixed mode SPE

Welchrom™ mixed-mode SPE sorbents consist two mixed stationary phases, and exhibit a variety of interaction mechanism for separation and purification of complex biological matrix, such as basic drugs and pesticide residues, etc., which cannot be easily washed or removed.

Welchrom™ C8/SCX

- A optimized dual retention of both strong cation exchange and reversed phase behavior
- Allow use of stronger washing solvent to remove impurities
- Developed for superior selectivity/sample cleanup when isolating basic compounds from biological fluids
- Dual retention mechanisms broadens retention for a range of neutral, basic, acidic and zwitterionic compounds

Welchrom™ C8/SCX SPE is a C8 alkyl silica stationary phase and a strong cation exchange stationary phase mixed sorbent in optimized ratio, to provide a dual retention mechanism. The strong dual retention between the adsorbent and the analytes allows use of stronger cleaning and washing solvent and conditions to remove the impurities on the adsorbent.

Welchrom™ C8/SAX

- Ideal for non-polar and anionic compounds
- Optimized for acidic drug analysis
- Bimodal, non-polar and strong anion exchange

Welchrom™ C8/SAX was developed specifically for the rapid and effective extraction of acidic drugs and metabolites from urine and other biological matrices. Welchrom™ C8/SAX is a mixed-mode cartridge packed with non-polar C8 and strong anion exchange (SAX) sorbent. It has been optimized for acidic drugs such as 11-nor-delta-9-tetrahydrocannabinol-carboxylic acid, salicylic acid, ibuprofen, acetaminophen and others compounds that possess both non-polar and anionic characteristics.

Welchrom™ GraphiCarb/NH₂

- Graphited carbon black and aminopropyl bonded silica gel mixed sorbent
- Optimized for pesticide analysis

Welchrom™ GraphiCarb/NH₂ is a graphite carbon black and aminopropyl bonded silica gel mixed sorbent, specifically for the pesticide residue analysis and extraction of complex matrix, such as removal of pigments, fatty acids and phenols, and extraction of organic phosphorus from tea.

Welchrom™ C8/SCX ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00556-11001
200mg/3ml	50	00556-11004
500mg/3ml	50	00556-11005
500mg/6ml	30	00556-11006
1000mg/6ml	30	00556-11007

Welchrom™ C8/SAX ordering information

Specification	Packing (pcs /bag)	Part No.
100mg/1ml	100	00557-11001
200mg/3ml	50	00557-11004
500mg/3ml	50	00557-11005
500mg/6ml	30	00557-11006
1000mg/6ml	30	00557-11007

Welchrom™ GraphiCarb/NH₂ ordering information

Specification	Packing (pcs /bag)	Part No.
250mg/250mg/6ml	30	00527-20010
500mg/500mg/6ml	30	00527-20011

II .Welchrom™ Twelve-Port Solid phase Extraction Manifold and Vacuum Pump



Features:

- Compact, durable, cost-effective
- Large capacity
- The standard StopCock valve - precise control of flow rate
- Side gauge air valve design - easy to use
- Easy visual monitoring of glass tank
- Test tube rack height adjustable to meet different needs
- Provide 12 or 24-port solid-phase vacuum extraction manifold

Welchrom™ solid phase extraction device can achieve a continuous sample extraction and filtering, simplifying the complex process of sample preparation and saving time. The entire device consists of a transparent glass tank and lid. The flow through the SPE cartridge can be controlled through the vacuum procedures. The glass tank and lid can accommodate the different sizes of sample collection tubes, glass or plastic tubing, automatic vial, conical flask and bottles, the polypropylene (PP) or stainless steel guide pins, to allow the samples directly into the sample collection tubes without cross contamination.

Welchrom™ solid phase extraction device Optional accessories:

- 1) 1,3,6 ml adapter
- 2) Waste container
- 3) High volume sampler

Ordering information:

NO	Product Description
WEL-VAC	Welchrom™ 12-port Vacuum SPE manifold
WEL-VAC01	Waste Container (liquid pool)
WEL-VAC02	High volume sampler