Sample Preparation

Sample Preparation Product Guide

Find Effective Solutions Fast

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RESTEK Pure Chromatography www.restek.com

At Restek, we believe that the foundation for separation is preparation. A perfect chromatographic method can still be compromised by a sample preparation approach that does not properly match the sample. The matrix that the analytes of interest are in can present real problems, but overdoing sample preparation procedures can introduce other issues. The key is striking a balance so that you get the sample just clean or concentrated enough to successfully perform your work between scheduled maintenance events without investing more time and money into the sample preparation process than is necessary–or worse yet, losing analytes during the sample prep process and affecting the accuracy of the results!

Knowing how important sample preparation is to chromatographic analyses, Restek offers a wide variety of sample preparation products to make sure that your sample is ready to be separated, identified, and quantified successfully. This sample preparation product guide will explain the basics of each technique and help you quickly identify the best one for your sample matrix.

Solid Phase Extraction

SPE is a common sample preparation technique used to clean up and/or concentrate samples prior to GC or LC separation and detection. Even though SPE is a step before the analytical chromatography, it's helpful to remember that SPE basically is chromatography. The principles that separate compounds in an analytical GC or LC column are the same ones that will separate unwanted matrix components from analytes of interest prior to analysis using an SPE product. Keeping this in mind will help you navigate the wide variety of SPE products that are available.

Picking an SPE Sorbent (the Stationary Phase)

With your sample in mind, select an SPE sorbent with characteristics that will be successful at separating the matrix from your analytes. To best do that, it's helpful to know certain properties of your analytes and the matrix they are in. Are the target compounds polar or nonpolar? Are they (or can they be) in a charged state? Are they strong or weak organic acids or bases? Are they planar? The answer to each of those questions will help direct you to a family of products that is covered in this sample preparation product guide. Below is a brief description of the types of SPE products divided into broad separation mechanism categories.

- Primarily Reversed-Phase Sorbents (preferentially retain nonpolar compounds and elute polar compounds)
    - C8 and C18 Bonded Phases are classic reversed-phase sorbents with the degree of nonpolar retention increasing with carbon chain length (C18 is typically more retentive of nonpolar compounds than C8 is). When the polarity distinction between compounds to be separated is clear, a C8 or C18 is a standard choice.
    - Styrene-divinylbenzene (SDVB) is a very nonpolar polymeric SPE sorbent that has found particular application in the analysis of pesticides in polar matrices (e.g., water samples and many food commodities).
- Primarily Normal Phase Sorbents (preferentially retain polar compounds and elute nonpolar compounds)
    - Unbonded Silica Phases are widely used for the retention of polar compounds and have been available for decades. Silica surfaces are typically slightly acidic, in contrast to the more basic alumina normal phase sorbent (see below), so it will preferentially retain basic compounds over acidic compounds. Strong hydrogen bonding interactions with surface silanol groups provide a significant retention mechanism, but secondary interactions are also possible with other constituents in the silica.
    - Alumina sorbents are porous forms of aluminum oxide. Its native state is pH ≈ 10, but it can be treated to create neutral (pH ≈ 7.5) or acidic (pH ≈ 4) varieties. Alumina is another commonly used sorbent for a wide variety of matrices, including food, soil, and petroleum samples.
    - Florisil is a polar magnesium-silicate sorbent that is commonly used to separate polar analytes from nonpolar matrices. It is routinely used for the analysis of pesticides in a wide variety of environmental samples.
- Multifunctional Sorbents (capable of acting in both reversed-phase or normal phase modes–or even ion exchange, depending on conditions)
    - Diol is primarily a polar sorbent, capable of hydrogen bonding with analytes because of the two alcohol groups at the end of the ligand. However, the hydrocarbon chain connecting the diol functional group to the silica lends this sorbent a nonpolar characteristic capable of retaining hydrophobic analytes.
    - Amino (NH2) phases use ligands bonded to silica particles, and they have a very versatile set of potential retention mechanisms. Primarily used to retain polar species, like the diol phase, the amino ligand also has some nonpolar characteristic for the retention of hydrocarbons. Amino sorbents have a weak anion-exchange potential, so they can be used to retain strongly anionic species like sulfonic acids.

- Primary/Secondary Amine (PSA) sorbents are similar to amino sorbents, except they have two types of amine groups, a primary and a secondary amine. They are generally less polar than traditional amino phases, but PSA sorbents also typically have a higher ion-exchange potential than amino phases. This will result in less retention of polar compounds than the amino phase but a stronger retention of anions than the amino phase, providing another option when fine-tuning a sample preparation method to a given sample.
- Carbon-based sorbents (e.g., CarboPrep Plus products) are versatile in their ability to retain a wide range of compounds based on experimental conditions. CarboPrep Plus SPE cartridges are designed specifically to replace Florisil products (which are traditionally used to clean up environmental samples for organochlorine pesticides analysis) because of their ability to retain low-volatility matrix compounds that can contaminate instruments and result in unscheduled maintenance.

- Ion-Exchange Sorbents (capable of retaining charged species)
  - Anion-exchange sorbents are capable of retaining negatively charged species (anions) in a sample, eluting neutral or positively charged species.
  - Cation-exchange sorbents are used to retain positively charged species (cations) in a sample, eluting neutral or negatively charged species.
  - Weak ion-exchange sorbents (anion and cation) are only charged under certain experimental conditions and are used to attract strongly ionic species in a sample. Their charged state can be neutralized with a change in conditions, resulting in the elution of the previously retained strongly ionic species. Remember, always pair "weak" with "strong," (i.e., a weak ion-exchange sorbent should be paired with a strongly ionic species in a sample.)
  - Strong ion-exchange sorbents (anion and cation) are permanently charged sorbents that are used to retain weakly ionic species in a sample. When strong ion-exchange sorbents are used, experimental conditions are changed to "turn off" the charge state of the analyte, allowing it to be eluted.
- Method-Specific Products
  - Restek also offers a wide array of method-specific products that are tailored to fit the requirements of particular applications (e.g., Resprep EPH cartridges, phospholipid removal products like Resprep PLR cartridges and well plates, and protein removal products like Resprep PPT3 well plates). Visit **www.restek.com/SPE** and filter by "Application Specific" under "Application" in the sidebar to view our wide variety of targeted SPE products.

Versatile, Clean, and Compatible – Restek SPE Vacuum Manifolds

Whether you are developing a method for SPE cartridges or 96-well plates, Restek's reliable, clean, and configurable vacuum manifolds offer you a complete SPE workflow solution. Visit **www.restek.com** to see our manifold options.

QuEChERS

Quick, Easy, Cheap, Effective, Rugged, and Safe–that's QuEChERS (pronounced "catchers")! The QuEChERS approach to sample preparation has become the technique of choice for the analysis of pesticides in a wide variety of food commodities. QuEChERS is a two-step process that starts with the use of specially formulated packages of extraction salts to partition target analytes from the sample matrix into an organic solvent (commonly acetonitrile). Extraction is followed by a quick cleanup using a technique called dispersive solid phase extraction (dSPE).

Extraction Salt Selection

The first choice to make when picking an extraction salt product is whether or not your target analytes need the final extract pH to be within a certain range to be stable. If so, one of the two buffered varieties of extraction salts would be a good place to start. The biggest difference between these two choices, which are identified by the methods that were developed using them (AOAC or EN), is the final pH range. AOAC salts buffer the final extract to a pH range just below 5, whereas the EN salt packages buffer to a range of pH 5-5.5. Unless you have analytes that would be better under one set of conditions or the other, either is a good starting place for pH-sensitive compounds. If your analytes are insensitive to final pH, the original "unbuffered" extraction salts would work just as well.

dSPE Cleanup Products

There are a wide range of dSPE products to choose from, but just like more conventional solid phase extraction, targeting the correct product for your application comes down to determining the nature and severity of the matrix components that need to be removed before analysis. These considerations will inform the type and quantity of sorbent used.

For More Information About QuEChERS

Restek has the products and technical know-how to help support your existing QuEChERS methods or develop new ones at **www.restek.com/quechers**

Supported Liquid Extraction (SLE)

At first glance, SLE products look a lot like SPE products. They come in cartridges and 96-well plate formats, just like SPE, but instead of relying on adsorption onto a solid sorbent surface like SPE, SLE is a miniaturized, efficient form of liquid-liquid extraction. A highly porous diatomaceous earth is used as a support material in SLE. An aqueous sample is loaded on the SLE product and allowed to sit and diffuse throughout the high surface area support. After that wait period, a water-immiscible elution solvent is passed through the SLE product, and the analytes partition from the aqueous solution into the elution solvent and are then collected.

SLE or SPE?

SLE is quick and easy and may be just enough of a sample cleanup step to eliminate matrix components from interfering with your analysis or your instrument. SLE is great at removing salts, phospholipids, and other polar impurities while the analytes partition to the water-immiscible solvent and are collected for analysis. As we've discussed, SPE is chromatography in a cartridge or well-plate, so if your sample is particularly complex or contains matrix compounds that are just as likely to partition into the SLE elution solvent as your analytes, SPE is likely the answer.

Visit Our Sample Preparation FAQ

Check out the answers to our SPE, SLE, and sample preparation frequently asked questions at **www.restek.com/resource-hub** (search for **Sample Prearation FAQ**).

Sample Filtration

One of the most convenient ways to filter a sample is to do the filtration in the autosampler vial, which can easily be done with Thomson SINGLE StEP filter vials. With a wide variety of filter membrane porosity and materials, all color coded for easy identification, the Thomson SINGLE StEP filter vial offers effective and efficient filtration for a wide variety of samples. Details on Thomson filter vial solvent compatibility can be found by visiting **www.restek.com/SingleStep** and selecting a SINGLE StEP product.

In addition to the Thomson SINGLE StEP filter vials and the protein precipitation Resprep PPT3 96-well plates already mentioned above, Restek also offers an extensive array of syringe filters with luer type connectors with different filter materials, porosities, and sizes, all color coded to make it easy to tell one type of syringe filter from another.

Guidelines for selecting the correct syringe filter for your application as well as filter compatibility charts are available by visiting **www.restek.com/SyringeFilters**

Solid Phase Microextraction (SPME)

SPME is an automated sample preparation technique that is popular in environmental, food, and clinical laboratories. Restek is proud to offer our rugged approach to SPME–the Restek PAL Smart SPME Arrow. The new Smart technology offers the same application, performance, and lifetime as the products you've come to rely on with the added feature of a smart chip that can keep track of parameters, ranges, and usage history.

The robust, reproducible, and extremely sensitive Restek PAL Smart SPME Arrow allows you to quickly concentrate target analytes using a sorbent-coated fiber, which can then be analyzed directly via GC. With a growing selection of sorbents to choose from, the SPME Smart Arrow offers solutions for a wide range of volatile and semivolatile analytes in a variety of sample matrices.

Learn more about the performance of Smart SPME Arrow by visiting **www.restek.com/SPME** and selecting the SPME Arrow.

While the SPME Smart Arrow is a more rugged option due to its protective sheath, if you're happy with the performance of traditional SPME fibers, Restek still has you covered with a wide range of sorbents to choose from. Our SPME fibers are also available with Smart technology.

Accelerated Solvent Extraction (ASE)

When it comes to supporting accelerated solvent extraction (ASE) methods, Restek offers extraction cells and accessories for a variety of ASE models. Visit **www.restek.com/ASE** and filter the products by "Instrument Model" to restock your ASE consumables and replacement parts.

In-Line Sample Preparation (ILSP)

Revive in-line sample preparation (ILSP) products integrate sample cleanup directly into the analytical flow path. A sample extract is injected into an HPLC and passes through an ILSP cartridge, which retains matrix components while eluting analytes onto an analytical column for separation and detection. Once the analytes have cleared the ILSP cartridge, a six-port valve and isocratic pump switch the flow so that a wash solvent can backflush the ILSP cartridge during the analysis, preparing it for the next sample injection. Primarily targeting the analysis of pesticides in food commodities, Restek's Revive in-line sample preparation products offer an alternative to the traditional QuEChERS approach. You can find out more about ILSP at **www.restek.com/Revive**

Vials and Well Plates

Every sample needs a place to live and, as detailed in this sample preparation product guide, Restek offers a wide range of sample vials, well plates, inserts, and racks to contain all manner of samples for both storage and analysis.

Vials

Autosampler Vials: These are some of our most popular products because a vast majority of chromatographic samples will eventually end up in one! Whether your sample is a liquid headed for a 2 mL autosampler vial, or a solid, liquid, or gas destined to inhabit a headspace vial, we have options for you. Some of the most common choices you will make when selecting a vial are below:

- What kind of closure do you need?
    - Will snap-on or screw-on caps be sufficient, or does your sample or method call for a cap that is crimped on?
    - Watch out! Not all caps will fit on all types of vials, so make sure you're matching your caps and vials correctly.
- What type of vial cap septum is compatible with your sample and syringe?
    - A wide variety of septum materials are available, from silicon to natural rubber to just a simple perforated PTFE closure that doesn't reseal at all. Make sure that the septum material you choose is compatible with your sample; otherwise, you may find that sample solvents can extract septum compounds, creating extraneous peaks, or the sample may even attack the septum, reducing its ability to seal properly, potentially allowing evaporation.
- Clear or amber?
    - If your sample is light sensitive, look for amber-colored vials to protect your sample from unwanted photodegradation.
- Do you want more out of your vial than just storage?
    - Vials like the Thomson SINGLE StEP filter vials are also able to filter your sample in the vial itself, saving you a sample preparation step!
- Do you need to use a limited-volume insert in your vial?
    - Sometimes you have a limited quantity of a sample, and adding 100 µL of a sample to a typical 2 mL autosampler vial won't fill the vial enough for an autosampler syringe to reliably aspirate the sample for analysis. In these cases, a special insert can be used, but making sure the insert fits into the vial is important.
- Vial racks
    - All those little vials need a place to hang out while they are being prepared and awaiting their day on the instrument, so don't forget to pick up vial racks to make handling the vials during preparation and storage easy.

As you browse our selection of vials, you'll find that they come in a wide variety of shapes, sizes, and materials with an almost equally wide range of caps to choose from. If you ever have any questions about what type of vial and cap you should use, don't hesitate to reach out to your Restek sales representative, who will be happy to make sure you get the right vial and cap for the job.

Well Plates

For many customers, handling samples in individual vials just isn't an option. For analysts dealing with large numbers of samples, the standard 96-well plate format is a staple. Restek offers a variety of 96-well plate products from empty collection plates and sealing mats to more application-specific products, such as our specially designed protein precipitation plates (Resprep PPT3 96-well plates), to our targeted phospholipid removal plates (Resprep PLR 96-well plates). Some SPE phases and our SLE products are also available in 96-well plate format.

Syringes

Restek offers a comprehensive line of manual and autosampler syringes. Whether you are using syringes to inject a microliter of your sample into your chromatograph or have a heftier task requiring a 2000 milliliter SGE jumbo syringe, you can find the right product for your application.

Restek now offers Smart syringes. Each Smart Syringe is equipped with its own read/write chip with preset parameters, ranges, usage tracking, and a unique ID. The Smart syringe is automatically recognized by the PAL System—all important parameters are loaded to secure the highest precision and process safety.

There are a few things to keep in mind when selecting your syringe:

- Try to use the smallest volume syringe for your application. For instance, if you are injecting 1 µL volumes as part of your GC method, use a 5 µL syringe instead of a 10 µL or greater volume syringe. The 10 µL syringe will work, but you'll have greater accuracy and precision with the syringe whose total volume is closer to your required volume. Just make sure you have the correct syringe volume identified in your instrument software if you use autosampler syringes! Having a 10 µL syringe configured in the software but a 5 µL syringe installed in the actual autosampler will typically result in an incorrect volume being aspirated.
- Keep your syringes clean and ready for the next injection, but don't forget that they are consumables and ought to be inspected and replaced when necessary. Keeping materials compatibility in mind (especially when using syringes with cemented needles), make sure your syringes get good solvent washes after use to keep them free from contamination and to maintain a smooth action for the syringe plunger. A bent syringe plunger at the start of a batch of samples queued up on your autosampler will ruin anyone's day!
- Syringes have a coded language all their own when it comes to their point styles, needle dimensions, and barrel termination types. The good news is that there is help available if you need a good resource covering syringe designations and fundamentals at **www.restek.com/SyringeBasics**

Conclusion

Restek's foundation is chromatography, but we also appreciate that the foundation of chromatographic separations is sample preparation. So, to help ensure the most accurate and precise chromatography, we offer the wide range of products covered in this sample preparation product guide in addition to our industry-leading GC and LC columns, accessories, and certified reference materials.

Solid Phase Extraction (SPE)

Primarily Reversed Phase Sorbents

Resprep C8 SPE Cartridges

- High-quality, silica-based hydrophobic adsorbents.
- Used for common sample matrices such as food, soil, and water.
- Ideal when less retention than a C18 is needed.
- Stable over the pH range (2 – 8).

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Packing	Volume	qty.	cat.#
Resprep C8 SPE Cartridges	C8	6 mL, 500 mg	30-pk.	28968

ordering notes

Certificates of analysis for this product are provided electronically. To view and download your certificate, simply visit www.restek.com/documentation

Resprep C18 SPE Cartridges

- High-quality, silica-based hydrophobic adsorbents.
- Used to extract hydrophobic analytes from polar matrices, such as water (e.g., pesticides from water).
- Stable over the pH range (2 – 8).
- C18 silica is end-capped.

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Material	Packing	Volume	Note	qty.	cat.#
Resprep C18 SPE Cartridges	Polypropylene tubes with polyethylene frits	C18 (trifunctional, high-load)	6 mL, 1000 mg	Recommended for EPA Method 525.	30-pk.	24051
	Polypropylene tubes with polyethylene frits	C18 (trifunctional, high-load)	1 mL, 100 mg		100-pk.	26030
	Polypropylene tubes with polyethylene frits	C18 (monofunctional, mid-load)	20 mL, 5 g		20-pk.	26034
	Polypropylene tubes with polyethylene frits	C18 (monofunctional, mid-load)	3 mL, 200 mg		50-pk.	28959
	Polypropylene tubes with polyethylene frits	C18 (monofunctional, mid-load)	3 mL, 500 mg		50-pk.	28960
	Polypropylene tubes with polyethylene frits	C18 (monofunctional, mid-load)	6 mL, 500 mg		30-pk.	28961
	Polypropylene tubes with polyethylene frits	C18 (monofunctional, mid-load)	6 mL, 1000 mg	Not recommended for EPA Method 525.	30-pk.	28963
	Polypropylene tubes with polyethylene frits	C18 (monofunctional, mid-load)	60 mL, 10 g		16-pk.	28964

ordering notes

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Resprep Resin SPE Disks

- 47 mm glass fiber disks embedded with styrene/DVB resin.
- For chlorinated, benzidine-containing, or nitrogen-containing pesticides.
- Meet requirements of EPA Methods 515.2 and 553.

Description	qty.	cat.#
Resprep Resin SPE Disks	20-pk.	26023

26023

Resprep Oil & Grease SPE Disks

- 47 mm glass fiber disks embedded with specialty bonded silica.
- Meet requirements for EPA Method 1664.*
- Reduce emulsion formation and amount of solvent required by previous EPA methods.
- No chlorofluorocarbons needed.

Description	qty.	cat.#
Resprep Oil & Grease SPE Disks	20-pk.	26022

*A sodium sulfate drying tube and a 0.45 µm PTFE syringe filter (cat.# 26145) also may be used.

26022

Resprep S-DVB SPE Cartridge

- High-purity material with highest reproducibility and lowest blank values due to an optimized manufacturing process.
- Excellent recovery rates, especially for the enrichment of pharmaceuticals and active ingredients, due to the spherical particle shape, homogeneous surface, and optimized pore structure.
- Hydrophobic styrene-divinylbenzene (SDVB) copolymer, pH stability 1–14.
- Unique polypropylene locking ring helps prevent frit movement common to S-DVB sorbent.
- Recommended analytes: PFAS in drinking water; pharmaceuticals/active ingredients from tablets, creams, and water/wastewater; drugs from blood, plasma, serum, and urine; trace analysis of herbicides, pesticides, PAHs, PCBs; and phenols from water.
- Ideal for EPA Method 537.1 PFAS in drinking water; meets method performance requirements.

Description	Packing	Volume	qty.	cat.#
Resprep S-DVB	500 mg spherical styrene-divinylbenzene (SDVB) copolymer	6 mL	30-pk.	28937

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Primarily Normal Phase Sorbents

ordering notes

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Resprep Silica SPE Cartridges

- High-quality, silica-based hydrophilic adsorbents.
- Used to extract hydrophilic analytes from nonpolar matrices, such as organic solvents (e.g., polar contaminants from sample extracts).

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Material	Packing	Volume	qty.	cat.#
Resprep Silica SPE Cartridges	Polypropylene tubes with polyethylene frits	Silica	3 mL, 500 mg	50-pk.	28978
	Polypropylene tubes with polyethylene frits	Silica	6 mL, 1000 mg	30-pk.	28980

ordering notes

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Resprep Alumina SPE Cartridges

- Porous aluminum oxide adsorbent.
- Used for common sample matrices such as food, soil, and petroleum.
- Resprep Alumina is available in three versions:
  - (A) Acidic (pH ~4)
  - (B) Basic (pH ~10)
  - (N) Neutral (pH ~7.5)

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Packing	Volume	qty.	cat.#
Resprep Alumina SPE Cartridges	Alumina A	3 mL, 500 mg	50-pk.	28940
	Alumina B	6 mL, 1000 mg	30-pk.	28942
	Alumina N	3 mL, 500 mg	50-pk.	28943
	Alumina N	6 mL, 1000 mg	30-pk.	28944

ordering notes

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Resprep Florisil SPE Cartridges

- High-quality, silica-based hydrophilic adsorbents.
- Used to extract hydrophilic analytes from nonpolar matrices, such as organic solvents (e.g., polar contaminants from sample extracts).

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Material	Packing	Volume	qty.	cat.#
Resprep Florisil SPE Cartridges	Polypropylene tubes with polyethylene frits	Florisil	3 mL, 500 mg	50-pk.	28990
	Polypropylene tubes with polyethylene frits	Florisil	6 mL, 500 mg	30-pk.	28992
	Polypropylene tubes with polyethylene frits	Florisil	6 mL, 1000 mg	30-pk.	28993
	Polypropylene tubes with polyethylene frits	Florisil	15 mL, 2000 mg	15-pk.	28995

Multifunctional Sorbents

Resprep Diol SPE Cartridges

- High-quality, silica-based adsorbents.
- Used for common sample matrices such as food and water.
- Stable over the pH range (2 – 8).

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Packing	Volume	qty.	cat.#
Resprep Diol SPE Cartridges	Diol	6 mL, 500 mg	30-pk.	28987
	Diol	6 mL, 1000 mg	30-pk.	28988

ordering notes

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Resprep Amino (NH2) SPE Cartridges

- High-quality, silica-based adsorbents.
- Used for common sample matrices such as food, soil, and petroleum.
- Stable over the pH range (2 – 8).

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Packing	Volume	qty.	cat.#
Resprep Amino (NH2) SPE Cartridges	Amino (NH2)	6 mL, 500 mg	30-pk.	28948
	Amino (NH2)	6 mL, 1000 mg	30-pk.	28949

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Resprep PSA SPE Cartridges

- High-quality, silica-based adsorbents.
- Used for common sample matrices such as food, soil, water, and petroleum.
- PSA - primary secondary amine.
- PSA has a higher ion-exchange capacity than NH2.
- Stable over the pH range (2 – 9).

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Packing	Volume	qty.	cat.#
Resprep PSA SPE Cartridges	PSA	6 mL, 500 mg	30-pk.	28970

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26091

Excellent for Pesticide Residue Cleanup!

ordering notes

Certificates of analysis for this product are provided electronically. To view and download your certificate, simply visit www.restek.com/documentation

Resprep CarboPrep SPE Cartridges

- Improved recovery of sulfonylurea herbicides, phenols, carbamates, and triazine herbicides, compared to C18 and C8 cartridges.
- Wide range of selectivity for both analytes and their metabolites or degradation products.
- Rapid sampling flow rates; uncompromised recoveries.
- Maximum capacity for contaminant cleanup.
- Controlled manufacturing improves cleanliness and ensures reproducible performance.
- Excellent performance removing pigments from samples.

CarboPrep cartridges are manufactured from chromatographic-grade, nonporous, graphitized carbon. Our manufacturing process minimizes variability and improves recovery and cleanup procedures. CarboPrep 90 has a surface area of approximately 90 m^2/g and has higher capacity than silica-based packings for a variety of compounds.

CarboPrep cartridges can be used for sample extraction of organic compounds and extract cleanup to remove matrix interferences, including highly pigmented materials.

Description	Packing	Volume	qty.	cat.#
Resprep SPE Cartridge	CarboPrep 90	3 mL, 250 mg	50-pk.	26091
	CarboPrep 90	6 mL, 500 mg	30-pk.	26092

Resprep CarboPrep Plus SPE Cartridges

- Designed specifically for the cleanup of sample extracts for organochlorine pesticides analysis.
- Excellent alternative to Florisil products, especially for the removal of nonvolatile matrix components that contaminate GC inlets and columns.
- Proprietary treatment renders the carbon consistent and clean, ensuring the same selectivity tube to tube and lot to lot with no interfering background.
- Uses the same hardware, solvents, and solvent volumes as traditional Florisil cleanup, so switching is simple.

Keep your organochlorine pesticide GCs up and running by protecting them against matrix components with superior sample cleanup. Resprep CarboPrep Plus SPE cartridges surpass traditional Florisil products in cleanup power for sample matrix compounds that cause active sites in GC inlets and columns, degrading pesticides and interrupting work due to failed calibration checks. For CarboPrep Plus cartridges, Restek uses a proprietary treatment to create an exceptionally clean carbon that exhibits consistent selectivity. The end result is a reliable sample preparation product that does not contribute interfering background signal and does not need to be evaluated lot to lot to see if elution volumes need to be adjusted. In addition, CarboPrep Plus cartridges are designed to use the same equipment, solvents, and solvent volumes as a traditional Florisil cleanup procedure, minimizing the impact of switching on sample prep labs while maximizing the performance benefit to analytical labs.

Description	Packing	Volume	qty.	cat.#
Resprep CarboPrep Plus SPE Cartridges	CarboPrep Plus	3 mL, 95 mg	30-pk.	25845

25845

25845

ordering notes

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Resprep Polymeric SPE Cartridges and 96-Well Plates

- Silica-free, bonded polymeric material—no unwanted secondary silica interactions, even with basic compounds.
- High surface area—higher loading capacity compared to silica-based sorbents.
- Stable over a wide pH range (0–14)—won't hydrolyze under extreme conditions.
- Water-wettable—streamlined conditioning and equilibration steps drastically reduce solvent usage and sample prep time.
- No flow-rate dependence—maintains retention and capacity after conditioning, even if dried out from vacuum or positive pressure flows.
- Choose cartridges for high loading capacity; 96-well plates for high throughput and automation.

Description	Packing	Particle Size	Recommended Analytes	Volume	qty.	cat.#
Resprep Polymeric SPE 96-Well Plate	HLB	30 µm	General-purpose for acids, bases, or neutrals; high capacity for polar compounds.	10 mg	ea.	28453
	HLB	30 µm	General-purpose for acids, bases, or neutrals; high capacity for polar compounds.	30 mg	ea.	28454
Resprep Polymeric SPE Cartridge	HLB	30 µm	General-purpose for acids, bases, or neutrals; high capacity for polar compounds.	1 mL, 30 mg	100-pk.	28449
	HLB	60 µm	General-purpose for acids, bases, or neutrals; high capacity for polar compounds.	3 mL, 60 mg	50-pk.	28450
	HLB	60 µm	General-purpose for acids, bases, or neutrals; high capacity for polar compounds.	6 mL, 200 mg	30-pk.	28264
	HLB	60 µm	General-purpose for acids, bases, or neutrals; high capacity for polar compounds.	6 mL, 500 mg	30-pk.	28265
Resprep Polymeric SPE 96-Well Plate	MAX	30 µm	Acids	10 mg	ea.	28459
	MAX	30 µm	Acids	30 mg	ea.	28460
Resprep Polymeric SPE Cartridge	MAX	30 µm	Acids	1 mL, 30 mg	100-pk.	28455
	MAX	60 µm	Acids	3 mL, 60 mg	50-pk.	28456
	MAX	60 µm	Acids	6 mL, 150 mg	30-pk.	28457
	MAX	60 µm	Acids	6 mL, 500 mg	30-pk.	28458
Resprep Polymeric SPE 96-Well Plate	MCX	30 µm	Bases	10 mg	ea.	28465
	MCX	30 µm	Bases	30 mg	ea.	28466
Resprep Polymeric SPE Cartridge	MCX	30 µm	Bases	1 mL, 30 mg	100-pk.	28461
	MCX	60 µm	Bases	3 mL, 60 mg	50-pk.	28462
	MCX	60 µm	Bases	6 mL, 150 mg	30-pk.	28463
	MCX	60 µm	Bases	6 mL, 500 mg	30-pk.	28464
Resprep Polymeric SPE 96-Well Plate	WAX	30 µm	Strong acids	10 mg	ea.	28471
	WAX	30 µm	Strong acids	30 mg	ea.	28472
Resprep Polymeric SPE Cartridge	WAX	30 µm	Strong acids	1 mL, 30 mg	100-pk.	28467
	WAX	30 µm	Strong acids	3 mL, 60 mg	50-pk.	28468
	WAX	30 µm	Strong acids	6 mL, 150 mg	30-pk.	28469
	WAX	30 µm	Strong acids	6 mL, 200 mg	30-pk.	28292
	WAX	30 µm	Strong acids	6 mL, 500 mg	30-pk.	28268
	WAX	60 µm	Strong acids	6 mL, 500 mg	30-pk.	28470
Resprep Polymeric SPE 96-Well Plate	WCX	30 µm	Strong bases	10 mg	ea.	28477
	WCX	30 µm	Strong bases	30 mg	ea.	28478
Resprep Polymeric SPE Cartridge	WCX	30 µm	Strong bases	1 mL, 30 mg	100-pk.	28473
	WCX	60 µm	Strong bases	3 mL, 60 mg	50-pk.	28474
	WCX	60 µm	Strong bases	6 mL, 200 mg	30-pk.	28475
	WCX	60 µm	Strong bases	6 mL, 500 mg	30-pk.	28476

HLB – Hydrophilic-Lipophilic Balance
MAX – Mixed-Mode, Strong Anion Exchange
MCX – Mixed-Mode, Strong Cation Exchange
WAX – Mixed-Mode, Weak Anion Exchange
WCX – Mixed-Mode, Weak Cation Exchange

Resprep SAX (Silica Based) SPE Cartridges

- High-quality, silica-based hydrophilic adsorbents.
- Used for common sample matrices such as food, soil, and water.
- SAX – strong anion exchange.
- Stable over the pH range (2 – 9).

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Packing	Volume	qty.	cat.#
Resprep SAX (Silica Based) SPE Cartridges	SAX (Silica Based)	6 mL, 500 mg	30-pk.	28973

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Method Specific SPE Cartridges

These cartridges have been specifically designed to provide consistent and reproducible results for the method or application stated.

All cartridges are manufactured using polypropylene and have polyethylene frits unless otherwise noted.
Cartridges may be processed by any one or all of these techniques: positive pressure, sidearm flask, centrifuge, or vacuum manifold.

Description	Method	Packing	Volume	qty.	cat.#
Method Specific SPE Cartridge	Organotin: High-capacity cleanup of butyl and phenyl tin compounds from soil, water, and biota.	Mixed bed.	60 mL	16-pk.	24049
	Ultra Quat SPE: For use in HPLC analysis of para-quat/diquat, as an alternative to EPA 549.2.		6 mL, 500 mg	30-pk.	25499
	EPA Method 521: Nitrosamines in Drinking Water and EPA Method 522 for 1,4-Dioxane in Drinking Water.	Activated charcoal packing.	6 mL, 2 g	30-pk.	26032
	EPA Method 548.1: Extraction of endothall from aqueous samples.	Weak anion exchange resin (Bio-Rex 5) packing.	6 mL	30-pk.	26063
	RDX: Extraction of explosive compounds (similar to EPA Method 8095 and 8330 list) from water samples.		6 mL, 500 mg	30-pk.	26093

Pesticide Residue Cleanup SPE Cartridges

- Convenient, multiple adsorbent beds in a single cartridge.
- For use in multiresidue pesticide analysis to remove matrix interferences.
- Excellent for cleanup of dietary supplement extracts.
- M. Shafrir, D. Avisar, Development method for extracting and analyzing antibiotic and hormone residues from treated wastewater sludge and composted biosolids, Water, Air Soil Pollut 223 (5) (2012) 2571-2587. http://link.springer.com/article/10.1007/s11270-011-1049-5

Description	Packing	qty.	cat.#
6 mL Combo SPE Cartridge	200 mg CarboPrep 200 and 400 mg PSA, PTFE Frits	30-pk.	26127
	250 mg CarboPrep 200 and 500 mg PSA, PTFE Frits	30-pk.	26128
	500 mg CarboPrep 200 and 500 mg PSA, PTFE Frits	30-pk.	26129
	500 mg CarboPrep 90/500 mg Aminopropyl, Polyethylene Frits	30-pk.	26193
	500 mg CarboPrep 90/500 mg PSA, Polyethylene Frits	30-pk.	26194

PSA–primary and secondary amine

Resprep EPH Fractionation SPE Cartridge

- Method-specific performance for extractable petroleum hydrocarbon (EPH) analysis of soil and water samples.
- Complete separation of aliphatic and aromatic compounds into distinct fractions.
- Guaranteed background level under the strict reporting limits of MA and NJ EPH methods.
- Superior lot-to-lot reproducibility and storage stability ensured by rigorous QC testing and moisture-resistant packaging.
- Choose 5 g cartridges for higher loading capacity; use 2 g cartridges for automated systems, time-saving, and solvent reduction.

Restek EPH cartridges have a sample concentration loading capacity of 5000 ppm per gram silica for 5 g cartridges (total 25000 ppm) and 4250 ppm per gram of silica for 2 g cartridges (total of 8500 ppm), per instructions. However, to ensure satisfactory fractionation and avoid breakthrough, actual elution volumes should be determined empirically prior to sample analysis. The procedure in Restek's product instruction sheet is suitable for MA and NJ method QC levels; however, high-concentration samples may require dilution or modified solvent volumes.

Description	Method	Packing	Volume	qty.	cat.#
Resprep EPH Fractionation SPE Cartridge	EPH Fractionation: Complete separation of aliphatic and aromatic hydrocarbons into distinct extract fractions. Guaranteed background level under MA and NJ EPH method limits.	Silica packing.	15 mL, 5 g	15-pk.	23240
	EPH Fractionation: Complete separation of aliphatic and aromatic hydrocarbons into distinct extract fractions. Guaranteed background level under MA and NJ EPH method limits.	Silica packing.	6 mL, 2 g	30-pk.	25999

ordering notes

Free samples of Resprep solid phase extraction (SPE) tubes are available! Contact us or your local Restek representative.

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Manifolds

Resprep Quick-Replace SPE Vacuum Manifolds (12- or 24-Port)

- Disposable, quick-replace valve liners ensure a clean flow path and eliminate cross-contamination of samples extracted on the same port.
- Individual screw-type valves in each SPE port provide precise flow control.
- Easily modified sample collection rack supports a wide variety of collection vessels.
- Solvent-resistant vacuum gauge and bleed valve offer better sealing and vacuum control.
- Valves are compatible with any standard male luer end SPE cartridge.

Resprep QR-12 and QR-24 Quick-Replace vacuum manifolds enable analysts using solid phase extraction (SPE) cartridges to simultaneously prepare up to 12 or 24 samples. These manifolds are designed to eliminate the risk of contamination when consecutive samples are extracted in a manifold port. They are equipped with integral flow control valves, and each valve has an inexpensive, disposable PTFE liner/solvent guide running through its length. This guide acts as a liner so that all surfaces that come in contact with a sample can be discarded and replaced following each extraction. A luer hub attached to the PTFE liner fits snugly into a matching slot on the flow control valve stem. As the SPE cartridge is rotated on its axis, the valve pinches or releases the liner, stopping or starting the flow.

Description	Includes	Size	qty.	cat.#
Resprep QR-12 Quick-Replace vacuum manifold	Cover with flow control valves & gasket (cat.# 28316-VM); Collection Rack (cat.# 28318-VM); Plate for 16 mm test tubes (cat.# 28319-VM); 100-pk. Quick Replace liners, PTFE (cat.# 28310-VM); 12-pk. Liner guide (cat.# 28312-VM); 12-pk. Test tubes (cat.# 28315-VM)	12-port	kit	28298-VM
Resprep QR-24 Quick-Replace vacuum manifold	Cover with flow control valves & gasket (cat.# 28323-VM); Collection Rack (cat.# 28325-VM); Plate for 16 mm test tubes (cat.# 28326-VM); 100-pk. Quick Replace liners, PTFE (cat.# 28310-VM); 2, 12-pk. Liner guides (cat.# 28312-VM); 2, 12-pk. Test tubes (cat.# 28315-VM)	24-port	kit	28299-VM

25858

Resprep VM-96 Vacuum Manifold for 96-Well Plates

- Heavy-duty, stainless-steel and aluminum body stays in place and does not slide like lighter models.
- Viewing window allows easy observation of plate height and drip rate.
- Durable O-ring and gaskets resist solvent damage and provide leak-free seals time after time.
- Precision-manufactured parts assemble quickly and easily with perfect alignment of well plate and collection plate.
- Customize plate height to your exact requirements: precision height adaptor and five shims in a range of thicknesses allow easy, accurate configuration.
- Works with any manufacturer's well plates and collection plates for solid phase extraction (SPE), supported liquid extraction (SLE), protein precipitation (PPT), and filtration.

Description	qty.	cat.#
Resprep VM-96 vacuum manifold	ea.	25858

QuEChERS

ordering notes

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Q-sep QuEChERS Extraction Salts

- Free-flowing salts transfer easily and completely.
- Easy-open packets eliminate the need for a second empty tube for salt transfer.
- Convenient slim packets fit perfectly into tubes to prevent spills.
- Ready-to-use tubes, no glassware required.
- Pre-weighed, ultra-pure extraction salts.
- Ideal for original unbuffered, AOAC (2007.01), and European (EN 15662) QuEChERS methods.

QuEChERS methods are fast, easy, and cost-effective, and Restek Q-sep products make QuEChERS procedures even easier. No specialized glassware is required when you're using Q-sep extraction packets and tubes. Free-flowing extraction salts and salt packets that fit easily into the extraction tubes make transferring the salts to your sample mess-free and easy.

Description	Material	Method	qty.	cat.#
Q-sep QuEChERS Extraction Salt Packets Only	4 g $MgSO_4$, 1 g NaCl	Original unbuffered	50 packets	25847
Q-sep QuEChERS Extraction Kit	4 g $MgSO_4$, 1 g NaCl with 50 mL Centrifuge Tube	Original unbuffered	50 packets & 50 tubes	25848
Q-sep QuEChERS Extraction Salt Packets Only	4 g $MgSO_4$, 1 g NaCl, 1 g TSCD, 0.5 g DHS	European EN 15662	50 packets	25849
Q-sep QuEChERS Extraction Kit	4 g $MgSO_4$, 1 g NaCl, 1 g TSCD, 0.5 g DHS with 50 mL Centrifuge Tube	European EN 15662	50 packets & 50 tubes	25850
Q-sep QuEChERS Extraction Salt Packets Only	6 g $MgSO_4$, 1.5 g NaOAc	AOAC 2007.01	50 packets	25851
Q-sep QuEChERS Extraction Kit	6 g $MgSO_4$, 1.5 g NaOAc with 50 mL Centrifuge Tube	AOAC 2007.01	50 packets & 50 tubes	25852

DHS – disodium hydrogen citrate sesquihydrate; $MgSO_4$ – magnesium sulfate; NaCl – sodium chloride; NaOAc – sodium acetate; TSCD – trisodium citrate dihydrate

Q-sep QuEChERS dSPE Tubes for Extract Cleanup

Fast, Simple Sample Prep for Multiresidue Pesticide Analysis

- Packaged in foil subpacks of 10 for enhanced protection and storage stability.
- Ready-to-use tubes, no glassware required.
- Pre-weighed, ultra-pure sorbents.
- Support original unbuffered, AOAC (2007.01), European (EN 15662), and mini-multiresidue QuEChERS methods.

QuEChERS methods are fast, easy, and cost-effective, and Restek Q-sep products make QuEChERS procedures even simpler. All extraction salts, sorbents, and sample tubes are included—no specialized equipment or glassware is required. Prepare samples more efficiently with a complete line of QuEChERS supplies from Restek.

Multiple sorbents are used to extract different types of interferences.
$MgSO_4$—removes excess water.
PSA (primary and secondary amine)—removes sugars, fatty acids, organic acids, and anthocyanine pigments.
C18-EC (end-capped)—removes nonpolar interferences.
GCB (graphitized carbon black)—removes pigments, sterols, and nonpolar interferences.

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Material	Method	Type	Volume	qty.	Similar to Part #	cat.#
Foodstuffs with fats and waxes (e.g., cereals, avocado, nuts, seeds, and dairy)						
150 mg $MgSO_4$, 50 mg PSA, 50 mg C18-EC	AOAC 2007.01	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26125
150 mg $MgSO_4$, 25 mg PSA, 25 mg C18-EC	Mini-multiresidue	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.	Agilent 5982-5121	26216
1200 mg $MgSO_4$, 400 mg PSA, 400 mg C18-EC	AOAC 2007.01	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.	Agilent 5982-5158	26221
900 mg $MgSO_4$, 150 mg PSA, 150 mg C18-EC	—	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26226
150 mg $MgSO_4$, 50 mg C18-EC	—	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26242
1200 mg $MgSO_4$, 400 mg C18-EC	—	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26244
General fruits and vegetables (e.g., celery, head lettuce, cucumber, melon)						
150 mg $MgSO_4$, 50 mg PSA	AOAC 2007.01	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26124
150 mg $MgSO_4$, 25 mg PSA	Original unbuffered, EN 15662, mini-multiresidue	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.	Agilent 5982-5021	26215
1200 mg $MgSO_4$, 400 mg PSA	AOAC 2007.01	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26220
900 mg $MgSO_4$, 150 mg PSA	Original unbuffered, EN 15662	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.	Agilent 5982-5056	26223
General purpose (wide variety of sample types, including fatty and pigmented fruits and vegetables)						
150 mg $MgSO_4$, 50 mg PSA, 50 mg C18-EC, 7.5 mg GCB	—	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26243
900 mg $MgSO_4$, 300 mg PSA, 300 mg C18-EC, 45 mg GCB	—	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26245
Highly pigmented fruits and vegetables (e.g., red peppers, spinach, blueberries)						
900 mg $MgSO_4$, 300 mg PSA, 150 mg GCB	—	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26126
150 mg $MgSO_4$, 25 mg PSA, 7.5 mg GCB	Mini-multiresidue, EN 15662	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26218
150 mg $MgSO_4$, 50 mg PSA, 50 mg C18-EC, 50 mg GCB	AOAC 2007.01	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26219
900 mg $MgSO_4$, 150 mg PSA, 45 mg GCB	EN 15662	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26225
Pigmented fruits and vegetables (e.g., strawberries, sweet potatoes, and tomatoes)						
150 mg $MgSO_4$, 50 mg PSA, 50 mg GCB	AOAC 2007.01	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26123
150 mg $MgSO_4$, 25 mg PSA, 2.5 mg GCB	Mini-multiresidue, EN 15662	2 mL Micro-Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (1 mL Extract)	2 mL	100-pk.		26217
1200 mg $MgSO_4$, 400 mg PSA, 400 mg C18-EC, 400 mg GCB	AOAC 2007.01	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26222
900 mg $MgSO_4$, 150 mg PSA, 15 mg GCB	EN 15662	15 mL Centrifuge Tubes Prefilled with dSPE Materials for Cleanup (6 mL and 8 mL Extract)	15 mL	50-pk.		26224

Note: No entry in the Method column refers to dSPE formulations not specifically included in one of the cited references. These products can be used to accommodate the various needs of specific matrices not directly met by the cited references.

Q-sep Multispeed Centrifuge for QuEChERS

- Program 10 custom cycles for time; braking; and speed or g-force (up to 4500 rpm or 3450 xg).
- QuEChERS-specific presets for AOAC and EN methods make consistent operation quick and simple.
- Convenient lid lighting indicates at a glance if unit is ready, running, or done.
- Control panel can be temporarily locked on one cycle for error-free reproducibility.
- Cool-Flow design prevents samples from overheating by maintaining unit at room temperature.
- Tube holders are carbon fiber for high strength, durability, and years of trouble-free use.
- Clear lid permits safe observation of samples and optical calibration of speed.

The Q-sep centrifuge is a continuous-duty, electronically controlled, horizontal laboratory centrifuge with a lid safety interlock system. The unit is controlled by an electronic push-button timer that is variable from one to 30 minutes for precise spin times and ease of use. Samples can be safely viewed through the transparent lid. The imbalance detection system safely terminates a run cycle in the event that a load is severely imbalanced. Entry into the machine is restricted during operation by the safety interlock system. The Q-sep centrifuge features a lighted control panel that displays the status of the machine, easily viewable from a distance. The unit comes with presets for AOAC and EN methods or up to 10 custom cycles can be programmed with full control of time, braking, and speed or g-force (up to 4500 rpm or 3450 xg).

Specifications

Tube Capacity	6 x 50 mL tubes 18 x 15 mL tubes 24 x 2 mL tubes
Dimensions (H x W x D)	9 in x 14.5 in x 17 in (23 cm x 37 cm x 43 cm)
Weight	39 lb (17 kg)
Sound Level	64 dB A
Environmental Range	16–32 °C
Voltage	95–253 VAC
Frequency	50/60 Hz
Power Requirement	220 Watts
Centrifuge Motor	½ H.P. Brushless DC
Max g-Force	3450 xg
Max Speed	4500 RPM
Cycle Time	30 sec to 99 min, 59 sec (±2%)

Intended Use

General-purpose laboratory centrifuge intended for safe and rapid density-based separation of fluids, including physiologic fluids, in approved specimen receptacles for qualitative or quantitative test procedures. As a general-purpose laboratory centrifuge, it is designed to also run other approved containers filled with chemicals (nonflammable, nonexplosive, nonvolatile, and non-highly reactive only), environmental samples, and other nonhuman body samples. This device is intended to be operated by properly trained personnel who have carefully read the operating manual and are familiar with the function of the device.

Description	Includes	Certification/Compliance	qty.	cat.#
Q-sep Multispeed Centrifuge for QuEChERS	15 mL four-place tube holder (6); 50 mL single-place tube holder (6); 50 mL conical tube insert (6); 2 mL tube adaptors (24); U.S. power cord (1); global/universal power cord (1)	UL61010-1/CSA C22.2 No. 61010-1 and IEC61010-2-020; FDA listed; MET U.S. E112532; CE; RoHS	ea.	28295

Accessories for Q-sep Multispeed and Q-sep 3000 Centrifuges

Description	qty.	cat.#
2 mL tube adaptors	4-pk.	26234
50 mL conical tube insert	6-pk.	26249
15 mL four-place tube holder, carbon-fiber material	2-pk.	28293
50 mL single-place tube holder, carbon-fiber material	2-pk.	28294

Q-sep Bottle Top Solvent Dispenser

- Adjustment knob offers 56 output volume settings from 2.5 mL to 30 mL per stroke (0.5 mL increments)—ideal for QuEChERS methods!
- Base features 30 mm threads and includes five adaptors (28 mm, 32 mm, 36 mm, 40 mm, and 45 mm).
- Individually calibrated in accordance with ISO 8655 standards (certificate included) and can also be recalibrated by the user.
- PTFE, glass, and polypropylene construction for excellent chemical compatibility and 100% autoclavability.
- Integral safety discharge reduces risk of accidental dispensing, and nozzle cap prevents dripping.
- Easy to disassemble for cleaning and servicing.

23990

Accurately and precisely dispense liquids for QuEChERS extractions with this versatile pump. A quick, simple adjustment lets you set the output volume anywhere from 2.5 mL to 30 mL per stroke, and the included adaptors will accommodate most reagent bottles.

Description	qty.	cat.#
Q-sep Bottle Top Solvent Dispenser, 2.5 mL–30 mL	ea.	23990

Q-sep Tube Racks

- Available for 2 mL, 15 mL, and 50 mL tubes.
- Alphanumerical grid reference on top tier for easy identification of samples.
- Easy to assemble; simply fold and snap together securely.

Description	Material	Size	qty.	cat.#
Q-sep Tube Rack for 15 mL Centrifuge Tube	Polypropylene, White	Holds 60	ea.	23993
Q-sep Tube Rack for 50 mL Centrifuge Tube	Polypropylene, White	Holds 24	ea.	23994
Q-sep Tube Rack for 2 mL Centrifuge Tube	Polypropylene, White	Holds 100	ea.	23995

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Supported Liquid Extraction (SLE)

Resprep SLE Cartridges and 96-Well Plates

- Faster and easier than SPE and liquid-liquid extraction: just load, wait 5 minutes, then elute.
- Effective removal of proteins, phospholipids, and salts.
- Quick concentration step increases sensitivity.
- Easy to automate for high-throughput laboratories.
- Suitable for a wide range of sample matrices and analyte pKa values.

Volume guidelines: Selecting an SLE format with sufficient loading capacity (1 mg sorbent to 1µL diluted sample) is very important because the entire sample volume (including 1:1 dilution in buffer) is absorbed into the diatomaceous earth sorbent. For example, a 100 µL sample should be diluted 1:1 with buffer for a total volume of 200 µL, which requires use of a 200 mg SLE product.

Dilute-and-shoot is only effective when you are working with relatively clean matrices—complex biological samples, such as whole blood, require a cleanup step or your results may be inaccurate. Matrix components, such as proteins, phospholipids, and salts, introduce interferences and suppression/enhancement effects that compromise data integrity. Solid phase extraction (SPE) and liquid-liquid extraction are excellent ways to produce clean extracts, but they are time-consuming and not always necessary. Your first step in developing a sample preparation procedure should be supported liquid extraction (SLE); if your samples do not require extensive treatment, SLE cleanup is a quick, efficient, and fully automatable solution.

Description	qty.	cat.#
Resprep SLE cartridges, 200 mg/3 mL cartridge	50-pk.	28302
Resprep SLE cartridges, 400 mg/3 mL cartridge	50-pk.	28303
Resprep SLE 96-well plates, 200 mg/2 mL each well	1-pk.	28304
Resprep SLE 96-well plates, 400 mg/2 mL each well	1-pk.	28305

Easy-to-use vials offer fast sample filtration and require only a squeeze of your fingers.

Sample Filtration

Thomson SINGLE StEP Standard Filter Vials with Screw-Top Caps

- Recommended for samples containing less than 10% solid particulates.
- Minimize sample loss by eliminating multiple transfers.
- Color-coded caps allow easy identification of 0.2 µm or 0.45 µm membranes in PVDF, PTFE, PES, or nylon.
- Preslit PTFE/silicone caps help eliminate broken autosampler needles and cored septa.
- Rugged polypropylene vial houses insert with 450 µL loading capacity and low dead volume (120 µL).
- Fit most standard 12 x 32 mm autosamplers, including UHPLC instruments.

Catalog No.	Cap Color	Material	Porosity	Units
27896	Black	Nylon	0.2 µm	100-pk.
27897	Pink	Nylon	0.45 µm	100-pk.
27895	Gray	PES (polyethersulfone)	0.2 µm	100-pk.
28307	Green	PTFE (polytetrafluoroethylene)	0.2 µm	100-pk.
28306	Blue	PTFE (polytetrafluoroethylene)	0.45 µm	100-pk.
27894	Red	PVDF (polyvinyldifluoride)	0.2 µm	100-pk.
27898	Yellow	PVDF (polyvinyldifluoride)	0.45 µm	100-pk.

Patent No. 7,790,117

Thomson SINGLE StEP Low-Evaporation Filter Vials with Screw-Top Caps

- Enhanced evaporation prevention technology, and no preslit in the cap membrane ensures less than 0.4% evaporation over 24 hours.
- Easy-to-use vials offer fast sample filtration and require only a squeeze of your fingers.
- Color-coded caps allow easy identification of 0.2 µm or 0.45 µm membranes in PVDF, PTFE, or nylon.
- Rugged polypropylene vial houses insert with 450 µL loading capacity and low dead volume (120 µL).
- Fit most standard 12 x 32 mm autosamplers, including UHPLC instruments.

Catalog No.	Cap Color	Material	Porosity	Units
28308	Green	PTFE (polytetrafluoroethylene)	0.2 µm	100-pk.
28309	Blue	PTFE (polytetrafluoroethylene)	0.45 µm	100-pk.
28311	Red	PVDF (polyvinyldifluoride)	0.2 µm	100-pk.
28312	Black	Nylon	0.2 µm	100-pk.
28313	Pink	Nylon	0.45 µm	100-pk.
28315	Yellow	PVDF (polyvinyldifluoride)	0.45 µm	100-pk.

Thomson SINGLE StEP Nano Filter Vials

- Ultra-low dead volume allows you to filter as little as 10 µL of sample and still obtain enough filtrate to make a 2 µL injection.
- Easy-to-use vials offer fast sample filtration and require only a squeeze of your fingers.
- Color-coded caps allow easy identification of 0.2 µm or 0.45 µm membranes in PVDF, PTFE, PES, or nylon.
- Available with either standard or preslit PTFE/silicone caps. Standard caps minimize evaporation and preslit caps help eliminate broken autosampler needles and cored septa.
- Rugged polypropylene vial houses insert with 250 µL loading capacity and extremely low dead volume (8 µL).
- Fit most standard 12 x 32 mm autosamplers, including UHPLC instruments.

Catalog No.	Product Name	Cap Color	Material	Porosity	Units
25862	Thomson SINGLE StEP nano Filter Vials, 0.2 µm, PTFE w/Standard Cap, Green Cap, 100-pk.	Green	PTFE (polytetrafluoroethylene)	0.2 µm	100-pk.
25863	Thomson SINGLE StEP nano Filter Vials, 0.45 µm, PTFE w/Standard Cap, Blue Cap, 100-pk.	Blue	PTFE (polytetrafluoroethylene)	0.45 µm	100-pk.
25864	Thomson SINGLE StEP nano Filter Vials, 0.2 µm, PVDF w/Standard Cap, Red Cap, 100-pk.	Red	PVDF (polyvinyldifluoride)	0.2 µm	100-pk.
25865	Thomson SINGLE StEP nano Filter Vials, 0.45 µm, PVDF w/Standard Cap, Yellow Cap, 100-pk.	Yellow	PVDF (polyvinyldifluoride)	0.45 µm	100-pk.
25866	Thomson SINGLE StEP nano Filter Vials, 0.2 µm, Nylon w/Standard Cap, Black Cap, 100-pk.	Black	Nylon	0.2 µm	100-pk.
25867	Thomson SINGLE StEP nano Filter Vials, 0.2 µm, PES w/Standard Cap, Gray Cap, 100-pk.	Gray	PES (polyethersulfone)	0.2 µm	100-pk.
25882	Thomson SINGLE StEP nano Filter Vials, 0.2 µm, PTFE w/Preslit Cap, Green Cap, 100-pk.	Green	PTFE (polytetrafluoroethylene)	0.2 µm	100-pk.
25883	Thomson SINGLE StEP nano Filter Vials, 0.45 µm, PTFE w/Preslit Cap, Blue Cap, 100-pk.	Blue	PTFE (polytetrafluoroethylene)	0.45 µm	100-pk.
25885	Thomson SINGLE StEP nano Filter Vials, 0.45 µm, PVDF w/Preslit Cap, Yellow Cap, 100-pk.	Yellow	PVDF (polyvinyldifluoride)	0.45 µm	100-pk.
25886	Thomson SINGLE StEP nano Filter Vials, 0.2 µm, Nylon w/Preslit Cap, Black Cap, 100-pk.	Black	Nylon	0.2 µm	100-pk.
25887	Thomson SINGLE StEP nano Filter Vials, 0.2 µm, PES w/Preslit Cap, Gray Cap, 100-pk.	Gray	PES (polyethersulfone)	0.2 µm	100-pk.

Thomson SINGLE StEP eXtreme Filter Vials

- Provide multilayer filtration for viscous samples and samples containing up to 30% solid particulates.
- Allow compounds to be separated from matrix, resulting in both higher signal-to-noise ratios and more differentiated peaks.
- Easy-to-use vials offer fast sample filtration and require only a squeeze of your fingers.
- Color-coded caps allow easy identification of 0.2 µm or 0.45 µm membranes in PVDF, PTFE, or nylon.
- Preslit PTFE/silicone caps help eliminate broken autosampler needles and cored septa.
- Rugged polypropylene vial houses insert with 450 µL loading capacity and low dead volume (120 µL).
- Fit most standard 12 x 32 mm autosamplers, including UHPLC instruments.

Catalog No.	Product Name	Cap Color	Material	Porosity	Units
27899	Thomson SINGLE StEP eXtreme Filter Vials with Screw-Top Caps, 0.2 µm, PTFE w/Preslit Cap, Green Cap, 100-pk.	Green	PTFE (polytetrafluoroethylene)	0.2 µm	100-pk.
27900	Thomson SINGLE StEP eXtreme Filter Vials with Screw-Top Caps, 0.2 µm, PVDF w/Preslit Cap, Red Cap, 100-pk.	Red	PVDF (polyvinyldifluoride)	0.2 µm	100-pk.
27901	Thomson SINGLE StEP eXtreme Filter Vials with Screw-Top Caps, 0.45 µm, Nylon w/Preslit Cap, Pink Cap, 100-pk.	Pink	Nylon	0.45 µm	100-pk.
27902	Thomson SINGLE StEP eXtreme Filter Vials with Screw-Top Caps, 0.45 µm, PTFE w/Preslit Cap, Blue Cap, 100-pk.	Blue	PTFE (polytetrafluoroethylene)	0.45 µm	100-pk.

Accessories for Filter Vials

Description	qty.	cat.#
Toggle Press for eXtreme Filter Vials	ea.	25860
Filter Vial Press, Multi-Use: 8 Positions for 30 mL Filter Vials & 48 Position for Autosampler Ready Filter Vials	ea.	25861

Syringe Filters with Luer Lock Inlet

- Luer lock inlet offers leak-tight syringe connection.
- Variety of filter types, porosities, and diameters.
- Labeled (13, 25, and 30 mm, only) and color coded for easy identification.
- Rugged polypropylene housing.
- Autoclavable to 121 °C for 15 minutes.
- Quantity break pricing for greater savings.

Note: Syringe filters are for laboratory use only.

Description	Color	Diameter	Porosity	qty.	cat.#
Cellulose Acetate					
Syringe Filter	Green	4 mm	0.22 µm	100-pk.	23972
	Blue	4 mm	0.45 µm	100-pk.	23973
	Red	30 mm	0.22 µm	100-pk.	23982
	Red	30 mm	0.45 µm	100-pk.	23983
	Red	13 mm	0.45 µm	100-pk.	26155
	Red	13 mm	0.22 µm	100-pk.	26156
	Red	25 mm	0.45 µm	100-pk.	26157
	Red	25 mm	0.22 µm	100-pk.	26158
Nylon					
Syringe Filter	Yellow	4 mm	0.22 µm	100-pk.	23970
	Pink	4 mm	0.45 µm	100-pk.	23971
	Pink	30 mm	0.22 µm	100-pk.	23980
	Pink	30 mm	0.45 µm	100-pk.	23981
	Pink	13 mm	0.22 µm	100-pk.	26146
	Pink	13 mm	0.45 µm	100-pk.	26147
	Pink	25 mm	0.22 µm	100-pk.	26148
	Pink	25 mm	0.45 µm	100-pk.	26149
PES (polyethersulfone)					
Syringe Filter	Green	13 mm	0.22 µm	100-pk.	23966
	Green	13 mm	0.45 µm	100-pk.	23967
	Green	25 mm	0.22 µm	100-pk.	23968
	Green	25 mm	0.45 µm	100-pk.	23969
	White	4 mm	0.22 µm	100-pk.	23978
	Blue	4 mm	0.45 µm	100-pk.	23979
	Green	30 mm	0.22 µm	100-pk.	23988
	Green	30 mm	0.45 µm	100-pk.	23989
PP (polypropylene)					
Syringe Filter	Blue	25 mm	0.22 µm	100-pk.	28935
	Black	25 mm	0.45 µm	100-pk.	28936
PTFE (polytetrafluoroethylene)					
Syringe Filter	Purple	4 mm	0.22 µm	100-pk.	23974
	Orange	4 mm	0.45 µm	100-pk.	23975
	White	30 mm	0.22 µm	100-pk.	23984
	White	30 mm	0.45 µm	100-pk.	23985
	White	13 mm	0.22 µm	100-pk.	26142
	White	13 mm	0.45 µm	100-pk.	26143
	White	25 mm	0.22 µm	100-pk.	26144
	White	25 mm	0.45 µm	100-pk.	26145
PVDF (polyvinyldifluoride)					
Syringe Filter	Brown	4 mm	0.22 µm	100-pk.	23976
	Red	4 mm	0.45 µm	100-pk.	23977
	Blue	30 mm	0.22 µm	100-pk.	23986
	Blue	30 mm	0.45 µm	100-pk.	23987
	Blue	13 mm	0.22 µm	100-pk.	26150
	Blue	13 mm	0.45 µm	100-pk.	26151
	Blue	25 mm	0.22 µm	100-pk.	26152
	Blue	25 mm	0.45 µm	100-pk.	26153

Cellulose Acetate, Nylon, PES, PP, PVDF—hydrophilic applications
PTFE—hydrophobic applications

Cut costs, not quality!

ordering notes

Price per 100-pack. Price breaks are available for 5 and 10 packs. Your correct price will be reflected on your invoice.

FREE sample packs available. Use these handy packs for method development or to compare with your current brand. Request yours today by adding -248 to the part number. Sample pack orders cannot be placed online—please call. Limit one sample pack per customer.

Solid Phase Microextraction (SPME)

High-Performing SPME Fibers from Restek

PAL SPME fibers are high-performing fibers that meet or exceed the performance of other brands. Our reliable SPME fibers are optimized for PAL system autosamplers and are compatible with most GC inlets. SPME fibers are suitable for a wide range of analyte chemistries and sample matrices.

PAL system compatibility: Non-smart SPME fibers are not compatible with PAL3 series II rails. Smart SPME Fibers are compatible with PAL3 Series I and newer. Check instrument manufacturer requirements. Check instrument manufacturer requirements.

Recommended maximum GC inlet pressure is 50 psi or less.

All PAL SPME fibers are 10 mm in length and are housed in a 23-gauge needle. The phase is bonded onto a fused silica fiber core.

Catalog No.	Product Name	Material	Color	Units
27478-1	PAL SPME Fiber, PA, Fiber Thickness 85 µm, Fiber Length 10 mm, 23 Gauge Needle	85 µm PA (Polyacrylate) Fiber, Polar	Gray	ea.
27478-3	PAL SPME Fiber, PA, Fiber Thickness 85 µm, Fiber Length 10 mm, 23 Gauge Needle	85 µm PA (Polyacrylate) Fiber, Polar	Gray	3-pk.
27478-5	PAL SPME Fiber, PA, Fiber Thickness 85 µm, Fiber Length 10 mm, 23 Gauge Needle	85 µm PA (Polyacrylate) Fiber, Polar	Gray	5-pk.
27479-1	PAL SPME Fiber, Carbon-WR/PDMS, Fiber Thickness 95 µm, Fiber Length 10 mm, 23 Gauge Needle	95 µm Carbon-WR/PDMS (Carbon Wide Range/Polydimethylsiloxane) Fiber	Dark Blue	ea.
27479-3	PAL SPME Fiber, Carbon-WR/PDMS, Fiber Thickness 95 µm, Fiber Length 10 mm, 23 Gauge Needle	95 µm Carbon-WR/PDMS (Carbon Wide Range/Polydimethylsiloxane) Fiber	Dark Blue	3-pk.
27479-5	PAL SPME Fiber, Carbon-WR/PDMS, Fiber Thickness 95 µm, Fiber Length 10 mm, 23 Gauge Needle	95 µm Carbon-WR/PDMS (Carbon Wide Range/Polydimethylsiloxane) Fiber	Dark Blue	5-pk.
27480-1	PAL SPME Fiber, PDMS, Fiber Thickness 100 µm, Fiber Length 10 mm, 23 Gauge Needle	100 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Red	ea.
27480-3	PAL SPME Fiber, PDMS, Fiber Thickness 100 µm, Fiber Length 10 mm, 23 Gauge Needle	100 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Red	3-pk.
27480-5	PAL SPME Fiber, PDMS, Fiber Thickness 100 µm, Fiber Length 10 mm, 23 Gauge Needle	100 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Red	5-pk.
27481-1	PAL SPME Fiber, PDMS, Fiber Thickness 30 µm, Fiber Length 10 mm, 23 Gauge Needle	30 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Golden	ea.
27481-3	PAL SPME Fiber, PDMS, Fiber Thickness 30 µm, Fiber Length 10 mm, 23 Gauge Needle	30 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Golden	3-pk.
27481-5	PAL SPME Fiber, PDMS, Fiber Thickness 30 µm, Fiber Length 10 mm, 23 Gauge Needle	30 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Golden	5-pk.
27482-1	PAL SPME Fiber, PDMS, Fiber Thickness 7 µm, Fiber Length 10 mm, 23 Gauge Needle	7 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Green	ea.
27482-3	PAL SPME Fiber, PDMS, Fiber Thickness 7 µm, Fiber Length 10 mm, 23 Gauge Needle	7 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Green	3-pk.
27482-5	PAL SPME Fiber, PDMS, Fiber Thickness 7 µm, Fiber Length 10 mm, 23 Gauge Needle	7 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Green	5-pk.
27873-3	PAL SPME Fiber, DVB/Carbon-WR/PDMS, Fiber Thickness 50/30 µm, Fiber Length 10 mm	80 µm (50 DVB/30 Carbon-WR)/PDMS Fiber	Dark Gray	3-pk.
27873-5	PAL SPME Fiber, DVB/Carbon-WR/PDMS, Fiber Thickness 50/30 µm, Fiber Length 10 mm	80 µm (50 DVB/30 Carbon-WR)/PDMS Fiber	Dark Gray	5-pk.
27873-1	PAL SPME Fiber, DVB/Carbon-WR/PDMS, Fiber Thickness 50/30 µm, Fiber Length 10 mm	80 µm (50 DVB/30 Carbon-WR)/PDMS Fiber	Dark Gray	ea.
27874-3	PAL SPME Fiber, DVB/PDMS, Fiber Thickness 65 µm, Fiber Length 10 mm	65 µm DVB/PDMS (Divinylbenzene/Polydimethylsiloxane) Fiber	Violet	3-pk.
27874-5	PAL SPME Fiber, DVB/PDMS, Fiber Thickness 65 µm, Fiber Length 10 mm	65 µm DVB/PDMS (Divinylbenzene/Polydimethylsiloxane) Fiber	Violet	5-pk.
27874-1	PAL SPME Fiber, DVB/PDMS, Fiber Thickness 65 µm, Fiber Length 10 mm	65 µm DVB/PDMS (Divinylbenzene/Polydimethylsiloxane) Fiber	Violet	ea.
27483	PAL Method Development SPME Fiber Kit, Fiber Length of 10 mm, 23 gauge needle Includes: one SPME fiber each: PDMS 7 µm, PDMS 30 µm, PDMS 100 µm, PA 85 µm, Carbon-WR/PDMS 95 µm			kit

PAL Smart SPME Fibers now available!

Catalog No.	Product Name	Material	Color	Units
28914-1	PAL Smart SPME Fiber, Carbon-WR/PDMS, Fiber Thickness 95 µm, Fiber Length 10 mm, 23 Gauge Needle	95 µm Carbon-WR/PDMS (Carbon Wide Range/Polydimethylsiloxane) Fiber	Dark Blue	ea.
28914-3	PAL Smart SPME Fiber, Carbon-WR/PDMS, Fiber Thickness 95 µm, Fiber Length 10 mm, 23 Gauge Needle	95 µm Carbon-WR/PDMS (Carbon Wide Range/Polydimethylsiloxane) Fiber	Dark Blue	3-pk.
28915-3	PAL Smart SPME Fiber, DVB/Carbon-WR/PDMS, Fiber Thickness 50/30 µm, Fiber Length 10 mm	80 µm (50 DVB/30 Carbon-WR)/PDMS Fiber	Dark Gray	3-pk.
28915-1	PAL Smart SPME Fiber, DVB/Carbon-WR/PDMS, Fiber Thickness 50/30 µm, Fiber Length 10 mm	80 µm (50 DVB/30 Carbon-WR)/PDMS Fiber	Dark Gray	ea.
28916-3	PAL Smart SPME Fiber, DVB/PDMS, Fiber Thickness 65 µm, Fiber Length 10 mm	65 µm DVB/PDMS (Divinylbenzene/Polydimethylsiloxane) Fiber	Violet	3-pk.
28916-1	PAL Smart SPME Fiber, DVB/PDMS, Fiber Thickness 65 µm, Fiber Length 10 mm	65 µm DVB/PDMS (Divinylbenzene/Polydimethylsiloxane) Fiber	Violet	ea.
28913-3	PAL Smart SPME Fiber, PA, Fiber Thickness 85 µm, Fiber Length 10 mm, 23 Gauge Needle	85 µm PA (Polyacrylate) Fiber, Polar	Gray	3-pk.
28913-1	PAL Smart SPME Fiber, PA, Fiber Thickness 85 µm, Fiber Length 10 mm, 23 Gauge Needle	85 µm PA (Polyacrylate) Fiber, Polar	Gray	ea.
28917-3	PAL Smart SPME Fiber, PDMS, Fiber Thickness 100 µm, Fiber Length 10 mm, 23 Gauge Needle	100 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Red	3-pk.
28917-1	PAL Smart SPME Fiber, PDMS, Fiber Thickness 100 µm, Fiber Length 10 mm, 23 Gauge Needle	100 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Red	ea.
28918-3	PAL Smart SPME Fiber, PDMS, Fiber Thickness 30 µm, Fiber Length 10 mm, 23 Gauge Needle	30 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Golden	3-pk.
28918-1	PAL Smart SPME Fiber, PDMS, Fiber Thickness 30 µm, Fiber Length 10 mm, 23 Gauge Needle	30 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Golden	ea.
28919-3	PAL Smart SPME Fiber, PDMS, Fiber Thickness 7 µm, Fiber Length 10 mm, 23 Gauge Needle	7 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Green	3-pk.
28919-1	PAL Smart SPME Fiber, PDMS, Fiber Thickness 7 µm, Fiber Length 10 mm, 23 Gauge Needle	7 µm PDMS (Polydimethylsiloxane) Fiber, Nonpolar	Green	ea.
28920	PAL Method Development Smart SPME Fiber Kit, Fiber Length of 10 mm, 23 gauge needle Includes: one SPME fiber each: PDMS 7 µm, PDMS 30 µm, PDMS 100 µm, PA 85 µm, Carbon-WR 95 µm			kit
28921	PAL Method Development Smart SPME Fiber Kit, Fiber Length of 10 mm, 23 gauge needle Includes: one SPME fiber each: PDMS 100 µm, DVB 65 µm, Carbon-WR 95 µm, PA 85 µm, DVB/Carbon-WR/PDMS 50/30 µm			kit

Restek PAL Smart SPME Arrow

- Rugged, stainless-steel construction ensures longer lifetimes.
- Faster extraction means higher sample throughput.
- Better sensitivity allows lower LODs.
- Choose format based on sampling technique:
  - 1.1 mm sleeve, if only using headspace sampling.
  - 1.5 mm wide sleeve, if using direct immersion sampling (works for headspace, too).
- Now with Smart technology—each SPME Arrow is equipped with a unique Smart chip containing parameters, ranges, and usage history.

Recommended maximum GC inlet pressure is 50 psi or less.

All PAL SPME Smart Arrows have 20 mm of phase bonded onto stainless steel.

PAL system compatibility: Smart SPME Arrows are fully backwards compatible with any generation of PAL3 Systems. Additional hardware will be also required, including the SPME Arrow Tool, Heatex Stirrer, Arrow Conditioning Module, and Agitator Module with the perforated lid. The SPME Arrow is not supported on the HTS/Combi PAL systems.

Due to the relatively large diameter of PAL Smart SPME Arrows, you must modify the GC inlet using an instrument-specific conversion kit from Restek prior to use. Converted inlets are compatible with all standard injection techniques (SPME Arrow, liquid syringe, headspace, etc.); no need to switch inlets after installation.

Catalog No.	Product Name	Color	Diameter	Material	Recommended Analytes	Units
28901	PAL Smart SPME Arrow Method Development Kit					kit
28903-1	PAL Smart SPME Arrow 1.10 mm: Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Light Blue, ea.	Light Blue	1.1 mm	120 µm Carbon-WR/PDMS (Carbon Wide Range/ Polydimethylsiloxane)	Highly volatile, 30–225 g/mol*	ea.
28903-3	PAL Smart SPME Arrow 1.10 mm: Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Light Blue, 3-pk.	Light Blue	1.1 mm	120 µm Carbon-WR/PDMS (Carbon Wide Range/ Polydimethylsiloxane)	Highly volatile, 30–225 g/mol*	3-pk.
28904-1	PAL Smart SPME Arrow 1.10 mm: DVB/Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Dark Gray, ea.	Dark Gray	1.1 mm	120 µm DVB/Carbon-WR/PDMS (Divinylbenzene/ Carbon Wide Range/Polydimethylsiloxane)	Volatile and semivolatile, 40–275 g/mol*	ea.
28904-3	PAL Smart SPME Arrow 1.10 mm: DVB/Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Dark Gray, 3-pk.	Dark Gray	1.1 mm	120 µm DVB/Carbon-WR/PDMS (Divinylbenzene/ Carbon Wide Range/Polydimethylsiloxane)	Volatile and semivolatile, 40–275 g/mol*	3-pk.
28905-1	PAL Smart SPME Arrow 1.10 mm: DVB/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Violet, ea.	Violet	1.1 mm	120 µm DVB/PDMS (Divinylbenzene/ Polydimethylsiloxane)	Amines and polar compounds, 60–300 g/mol*	ea.
28905-3	PAL Smart SPME Arrow 1.10 mm: DVB/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Violet, 3-pk.	Violet	1.1 mm	120 µm DVB/PDMS (Divinylbenzene/ Polydimethylsiloxane)	Amines and polar compounds, 60–300 g/mol*	3-pk.
28906-1	PAL Smart SPME Arrow 1.10 mm: PDMS, Phase Thickness 100 µm, Phase Length 20 mm, Red, ea.	Red	1.1 mm	100 µm PDMS (Polydimethylsiloxane)	Volatile, 60–275 g/mol*	ea.
28906-3	PAL Smart SPME Arrow 1.10 mm: PDMS, Phase Thickness 100 µm, Phase Length 20 mm, Red, 3-pk.	Red	1.1 mm	100 µm PDMS (Polydimethylsiloxane)	Volatile, 60–275 g/mol*	3-pk.
28902-1	PAL Smart SPME Arrow 1.10 mm: PA, Phase Thickness 100 µm, Phase Length 20 mm, Gray, ea.	Gray	1.1 mm	100 µm PA (Polyacrylate)	Polar, semivolatile, 80–300 g/mol*	ea.
28902-3	PAL Smart SPME Arrow 1.10 mm: PA, Phase Thickness 100 µm, Phase Length 20 mm, Gray, 3-pk	Gray	1.1 mm	100 µm PA (Polyacrylate)	Polar, semivolatile, 80–300 g/mol*	3-pk.
28911-1	PAL Smart SPME Arrow 1.5 mm: PDMS, Phase Thickness 250 µm, Phase Length 20 mm, Black, ea.	Black	1.5 mm	250 µm PDMS (Polydimethylsiloxane)	Volatile, 60–275 g/mol (high capacity)*	ea.
28911-3	PAL Smart SPME Arrow 1.5 mm: PDMS, Phase Thickness 250 µm, Phase Length 20 mm, Black, 3-pk.	Black	1.5 mm	250 µm PDMS (Polydimethylsiloxane)	Volatile, 60–275 g/mol (high capacity)*	3-pk.
28907-1	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Light Blue, ea.	Light Blue	1.5 mm wide sleeve	120 µm Carbon-WR/PDMS (Carbon Wide Range/ Polydimethylsiloxane)	Highly volatile, 30–225 g/mol*	ea.
28907-3	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Light Blue, 3-pk.	Light Blue	1.5 mm wide sleeve	120 µm Carbon-WR/PDMS (Carbon Wide Range/ Polydimethylsiloxane)	Highly volatile, 30–225 g/mol*	3-pk.
28908-1	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: DVB/Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Dark Gray, ea.	Dark Gray	1.5 mm wide sleeve	120 µm DVB/Carbon-WR/PDMS (Divinylbenzene/ Carbon Wide Range/Polydimethylsiloxane)	Volatile and semivolatile, 40–275 g/mol*	ea.
28908-3	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: DVB/Carbon-WR/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Dark Gray, 3-pk.	Dark Gray	1.5 mm wide sleeve	120 µm DVB/Carbon-WR/PDMS (Divinylbenzene/ Carbon Wide Range/Polydimethylsiloxane)	Volatile and semivolatile, 40–275 g/mol*	3-pk.
28909-1	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: DVB/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Violet, ea.	Violet	1.5 mm wide sleeve	120 µm DVB/PDMS (Divinylbenzene/ Polydimethylsiloxane)	Aromatic semivolatile, 60–300 g/mol*	ea.
28909-3	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: DVB/PDMS, Phase Thickness 120 µm, Phase Length 20 mm, Violet, 3-pk.	Violet	1.5 mm wide sleeve	120 µm DVB/PDMS (Divinylbenzene/ Polydimethylsiloxane)	Aromatic semivolatile, 60–300 g/mol*	3-pk.
28910-1	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: PDMS, Phase Thickness 100 µm, Phase Length 20 mm, Red, ea.	Red	1.5 mm wide sleeve	100 µm PDMS (Polydimethylsiloxane)	Volatile, 60–275 g/mol*	ea.
28910-3	PAL Smart SPME Arrow 1.50 mm Wide Sleeve: PDMS, Phase Thickness 100 µm, Phase Length 20 mm, Red, 3-pk.	Red	1.5 mm wide sleeve	100 µm PDMS (Polydimethylsiloxane)	Volatile, 60–275 g/mol*	3-pk.

*These molecular weight ranges are a reasonable approximation; however, end users should verify suitability for their specific application.

Restek PAL SPME Arrow GC-Specific Conversion Kits

Conversion kits designed for use with 1.1 and 1.5 mm Restek PAL SPME Arrows. Compatible with Smart SPME Arrows and non-smart SPME Arrows.

Due to the relatively large diameter of Restek PAL SPME Arrows, you must modify the GC inlet using an instrument-specific conversion kit prior to use. Converted inlets are compatible with all standard injection techniques (SPME Arrow, liquid syringe, headspace, etc.); so there is no need to switch inlets after installation.

Restek PAL SPME Arrow GC-Specific Conversion Kits are easy to install. For the weldment, install according to your instrument's owner's manual.

Description	Includes	Instrument	qty.	cat.#
Restek PAL SPME Arrow Conversion Kit	Topaz 1.8 mm ID straight/SPME inlet liner, 5-pk. (cat.# 23280); Thermolite Plus septa, 3-pk. (cat.# 23864); Split/splitless weldment; large, canister-type filter (cat.# 27502); Septum nut for 6890 split/splitless weldments (cat.# 27503); Injector adaptor cup (cat.# 27496)	for Agilent 6890 Split/ Splitless Injector (for canister-type filters)	kit	27492
Restek PAL SPME Arrow Conversion Kit with 1.1 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23280); 1.1 mm Microseal (cat.# 23232); Split/ Splitless Weldment; Large Canister Type Filter (cat.# 27502); Adaptor Cup (cat.# 27496); Nut (cat.# 23228)	for Agilent 6890 Split/ Splitless Injector (for canister-type filters)	kit	27356
Restek PAL SPME Arrow Conversion Kit with 1.5 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23280); 1.5 mm Microseal (cat.# 23233); Split/Split-less Weldment and Large Canister Type Filter (cat.# 27502); Adaptor Cup (cat.# 27496); Nut (cat.# 23228)	for Agilent 6890 Split/ Splitless Injector (for canister-type filters)	kit	27361
Restek PAL SPME Arrow Conversion Kit	Topaz 1.8 mm ID straight/SPME inlet liner, 5-pk. (cat.# 23280); Thermolite Plus septa, 3-pk. (cat.# 23864); Agilent split/splitless weldment and septum nut (cat.# 27504); Injector adaptor cup (cat.# 27496)	for Agilent 7890 Split/ Splitless Injector	kit	27493
Restek PAL SPME Arrow Conversion Kit with 1.1 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23280); 1.1 mm Microseal (cat.# 23232); Agilent Weldment (cat.# 27504); Adaptor Cup (cat.# 27496); Nut (cat.# 23228)	for Agilent 7890 Split/ Splitless Injector	kit	27357
Restek PAL SPME Arrow Conversion Kit with 1.5 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23280); 1.5 mm Microseal (cat.# 23233); Agilent Weldment (cat.# 27504); Adaptor Cup (cat.# 27496); Nut (cat.# 23228)	for Agilent 7890 Split/ Splitless Injector	kit	27362
Restek PAL SPME Arrow Conversion Kit with 1.1 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23280); 1.1 mm Microseal (cat.# 23232); Agilent Weldment (cat.# 28933); Adaptor Cup (cat.# 27496); Nut (cat.# 23228)	for Agilent 8890 Split/ Splitless Injector	kit	28934
Restek PAL SPME Arrow Conversion Kit	Topaz 1.8 mm ID straight/SPME inlet liner, 5-pk. (cat.# 23279); Thermolite Plus septa, 3 pk. (cat.# 23872); Injection port weldment (cat.# 27500); Needle guide/septum nut (cat.# 27501); Injector adaptor cup (cat.# 27497)	for Shimadzu GC-2010 Split/Splitless Injector (not compatible with SE or Plus models)	kit	27491
Restek PAL SPME Arrow Conversion Kit with 1.1 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23279); 1.1 mm Microseal (cat.# 23232); Port Weldment (cat.# 27500); Adaptor Cup (cat.# 27497); Adaptor Kit (cat.# 23229)	for Shimadzu GC-2010 Split/Splitless Injector (not compatible with SE or Plus models)	kit	27355
Restek PAL SPME Arrow Conversion Kit with 1.5 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23279); 1.5 mm Microseal (cat.# 23233); Port Weldment (cat.# 27500); Adaptor Cup (cat.# 27497); Adaptor Kit (cat.# 23229)	for Shimadzu GC-2010 Split/Splitless Injector (not compatible with SE or Plus models)	kit	27360
Restek PAL SPME Arrow Conversion Kit	Topaz 1.8 mm ID straight/SPME inlet liner, 5-pk. (cat.# 23278); Premium nonstick BTO septa, 3-pk. (cat.# 27090); Septum cap (cat.# 27505); Liner cap/septum holder (cat.# 27506); Injector adaptor cup (cat.# 27498)	for Thermo TRACE 1300/1310, 1600/1610 Split/Splitless Injector	kit	27494
Restek PAL SPME Arrow Conversion Kit with 1.1 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23278); 1.1 mm Microseal (cat.# 23232); Liner Cap/ Septum Holder (cat.# 27506); Adaptor Cup (cat.# 27498); Nut	for Thermo TRACE 1300/1310, 1600/1610 Split/Splitless Injector	kit	27358
Restek PAL SPME Arrow Conversion Kit with 1.5 mm Merlin Microseal	Topaz 1.8 mm ID Straight/SPME inlet liner, 5-pk. (cat.# 23278); 1.5 mm Microseal (cat.# 23233); Liner Cap/ Septum Holder (cat.# 27506); Adaptor Cup (cat.# 27498); Adaptor Kit	for Thermo TRACE 1300/1310, 1600/1610 Split/Splitless Injector	kit	27363
Restek PAL SPME Arrow Conversion Kit	2.0 mm ID straight inlet liner, 5-pk. (cat.# 22267); Premium nonstick BTO septa, 3-pk. (cat.# 27096); Septum holder and support (cat.# 27507); Liner cap (cat.# 27508); Injector adaptor cup (cat.# 27499)	for Thermo TRACE Ultra Split/ Splitless Injector	kit	27495
Restek PAL SPME Arrow Conversion Kit with 1.1 mm Merlin Microseal	2.0 mm ID straight inlet liner, 5-pk. (cat.# 22267); 1.1 mm Microseal (cat.# 23232); Liner Cap (cat.# 27508); Adaptor Cup (cat.# 27499); Adaptor Kit	for Thermo TRACE Ultra Split/ Splitless Injector	kit	27359
Restek PAL SPME Arrow Conversion Kit with 1.5 mm Merlin Microseal	2.0 mm ID straight inlet liner, 5-pk. (cat.# 22267); 1.5 mm Microseal (cat.# 23233); Liner Cap (cat.# 27508); Adaptor Cup (cat.# 27499); Adaptor Kit	for Thermo TRACE Ultra Split/ Splitless Injector	kit	27364

Restek PAL SPME Manual Injection Kits

Designed to house SPME Arrows (1.1 and 1.5 mm) and SPME fibers during extraction and injection steps. Kits available for for non-smart SPME Arrows and Fibers (27490) and Smart SPME Arrows and Fibers (28912).

Description	Includes	qty.	cat.#
PAL SPME Manual Injection Kit	SPME manual holder, SPME manual extraction guide, SPME manual injection guide	kit	27490
PAL Smart SPME Arrow/Fiber Manual Injection Kit	SPME manual holder, SPME manual extraction guide, SPME manual injection guide	kit	28912

Due to the relatively large diameter of Restek PAL SPME Arrows, you must modify the GC inlet using an instrument-specific conversion kit from Restek prior to use.

27490

28912

Accessories for SPME Arrows

Description	Instrument	qty.	cat.#
Injector adaptor cup	for Agilent GC 6890/7890/8890 Split/Splitless Injector	ea.	27496
	for Shimadzu GC 2010 Split/Splitless Injector	ea.	27497
	for Thermo GC TRACE 1300/1310, 1600/1610 Split/Splitless Injector	ea.	27498
	for Thermo GC TRACE Ultra Split/Splitless Injector	ea.	27499
Injection port weldment	for Shimadzu GC 2010 Split/Splitless Injector	ea.	27500
Needle guide/septum nut	for Shimadzu GC 2010 Split/Splitless Injector	ea.	27501
Split/splitless weldment; large, canister-type filter	for Agilent GC 6890 Split/Splitless Injector	ea.	27502
Septum nut for split/splitless weldments	for Agilent GC 6890/7890 Split/Splitless Injector	ea.	27503
Split/splitless weldment and septum nut	for Agilent GC 7890 Split/Splitless Injector	ea.	27504
	for Agilent 8890 Split/Splitless Injector	ea.	28933
Septum cap	for Thermo GC TRACE 1300/1310, 1600/1610 Split/Splitless Injector	ea.	27505
Liner cap/septum holder	for Thermo GC TRACE 1300/1310, 1600/1610 Split/Splitless Injector	ea.	27506
Septum holder and support	for Thermo GC TRACE Ultra Split/Splitless Injector	ea.	27507
Liner cap	for Thermo GC TRACE Ultra Split/Splitless Injector	ea.	27508

Accelerated Solvent Extraction (ASE)

Extraction Cell Bodies

for ASE Systems

- Cell bodies are serialized for easy sample identification.
- Smooth inner surfaces for easier cleaning.

Note: Caps are sold separately.

Accelerated solvent extraction is a common technique for fast, reliable extraction of organic materials from solid matrices using EPA SW-846 Method 3545, Pressurized Fluid Extraction (PFE). Restek offers a wide range of replacement parts to keep your extraction system running smoothly. All parts are economically priced to save you money and are designed to meet or exceed the performance of the original manufacturer's parts.

Description	Instrument	Material	Volume	qty.	Similar to Part #	cat.#
Extraction Cell Body	for ASE 150/350	Stainless Steel	1 mL	ea.	Dionex/Thermo 068261	25993
	for ASE 150/350	Stainless Steel	5 mL	ea.	Dionex/Thermo 068262	25994
	for ASE 150/350	Stainless Steel	10 mL	ea.	Dionex/Thermo 068263	25995
	for ASE 150/350	Stainless Steel	22 mL	ea.	Dionex/Thermo 068264	25996
	for ASE 200	Stainless Steel	22 mL	ea.	Dionex/Thermo 048821	26098
	for ASE 200	Stainless Steel	5 mL	ea.	Dionex/Thermo 054974	26112
	for ASE 200	Stainless Steel	11 mL	ea.	Dionex/Thermo 048820	26114
	for ASE 200	Stainless Steel	33 mL	ea.	Dionex/Thermo 048822	26116
	for ASE 100/300 and 150/350	Stainless Steel	100 mL	ea.	Dionex/Thermo 056693	26132
	for ASE 100/300 and 150/350	Stainless Steel	34 mL	ea.	Dionex/Thermo 056646	26176
	for ASE 100/300 and 150/350	Stainless Steel	66 mL	ea.	Dionex/Thermo 056696	26178

Extraction Cell Caps & Replacement Parts

for ASE Systems

- Smooth inner surfaces for easier cleaning.
- Caps include frit, PEEK washer, PTFE O-ring, threaded insert, and snap ring.
- Caps are serialized for easy sample identification.

Note: Cell bodies also available.

Description	Instrument	Material	qty.	Similar to Part #	cat.#
Replacement Frits	for ASE 200	Stainless Steel	100-pk.	Dionex/Thermo 049453	25959
Replacement Extraction Cell End Caps	for ASE 150/350	Stainless Steel	2-pk.	Dionex/Thermo 068106, 068107	25997
	for ASE 200	Stainless Steel	2-pk.	Dionex/Thermo 049450	26096
Replacement Frits	for ASE 200	Stainless Steel	10-pk.	Dionex/Thermo 049453	26100
Snap Rings	for ASE 100/150/300/350		12-pk.	Dionex/Thermo 056778	26134
Threaded Cap Inserts	for ASE 200	Stainless Steel	2-pk.		26166
Funnel	for ASE 100/150/300/350 (34 mL, 66 mL, and 100 mL cell bodies only)		ea.	Dionex/Thermo 056699	26169
Replacement Frits	for ASE 100/150/300/350	Stainless Steel	6-pk.	Dionex/Thermo 056775, 068260	26174
Snap Rings	for ASE 200		10-pk.	Dionex/Thermo 049456	26184
O-Rings	for ASE 100/150/200/300/350	PTFE (polytetrafluoroethylene)	100-pk.	Dionex/Thermo 049457	26187
	for ASE 100/150/200/300/350	Viton	50-pk.	Dionex/Thermo 056325	26188

In-Line Sample Preparation (ILSP)

Revive In-Line Sample Preparation (ILSP)

- Automated, in-line sample extract cleanup dramatically reduces sample preparation time.
- Simultaneous analysis and ILSP cartridge wash eliminate downtime between samples.
- Fast, simple alternative to QuEChERS or SPE for multiresidue pesticides analysis in foods.
- Minimizes money spent on disposable sample preparation products and associated waste.
- Reduces sources of error and variability related to manual cleanup.

27882

In-line sample preparation (ILSP) uses the power of an LC-MS/MS to streamline and automate sample extract cleanup. Restek's Revive ILSP Pesticides cartridges are an ideal sample preparation alternative for food safety labs seeking to spend less time and money on multiresidue pesticides samples without sacrificing performance. Revive ILSP Pesticides cartridges separate analytes from potentially interfering matrix components just like conventional QuEChERS and SPE methods do, but they replace time-consuming manual procedures with a faster automated cleanup process that occurs on the instrument concurrently with sample analysis.

With a Revive ILSP Pesticides cartridge, six-port valve, and an independent isocratic pump, your instrument can be transformed into an analytical workhorse, combining sample cleanup and analysis in a single, efficient method. Significantly decrease sample preparation time, cut the costs associated with disposable sample prep products, and reduce errors related to manual procedures by integrating Revive ILSP into your current methods for multiresidue pesticides analysis in foods.

Description	qty.	cat.#
Revive ILSP holder for 5 mm cartridge	ea.	27880
Revive ILSP Pesticides cartridge (5 x 2.1 mm)	ea.	27881
Revive ILSP holder and Revive ILSP Pesticides cartridge (5 x 2.1 mm)	kit	27882
Revive ILSP Pesticides cartridges (5 x 2.1 mm)	3-pk.	27883

For More Information About SPE

In addition to this article, online resources are available that cover the fundamentals of SPE or general guidelines for SPE method development:

Articles: **www.restek.com/articles**
Videos: **www.restek.com/videos**
ChromaBLOGraphy: **www.restek.com/blog**

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Questions? Contact us or your local Restek representative (www.restek.com/contact-us).

www.restek.com

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