



Cannabis

Growing Analytical Solutions for Hemp and Cannabis Analysis

- Cannabinoids Potency
- Residual Solvents
- Residual Solvent Gases
- Terpenes Profiling
- Pesticides Residue
- Mycotoxins

Featuring New
Cannabinoid 11
Standard



RESTEK

Pure Chromatography

www.restek.com



A Restek Solution for Hemp and Cannabis Analysis

The landscape of hemp and cannabis testing continues to grow around the world, yet the needs of analytical labs stay the same no matter where you are. You need fast, accurate, and dependable products supported by personalized advice and expert technical service.

Restek has developed industry-leading GC and LC columns; comprehensive certified reference materials (CRMs); and innovative sample preparation products designed for hemp and cannabis analysis. As an employee-owned, independent chromatography company, we focus on building the best solutions for your lab regardless of the instrument and techniques you use. We know you need to work with people who understand the challenges of your market and can support you with tailored solutions and superior customer service. We're ready to help.

Contact your local Restek representative today at www.restek.com/contact-us





NEW!

The Missing Piece to Your Cannabinoid Workflow: One Standard, Eleven Cannabinoids

Restek's new Multicomponent Cannabinoid 11 Standard is a streamlined solution for quantifying routinely analyzed cannabinoids with greater efficiency and accuracy. Our latest mix offers the perfect middle ground between our cannabinoid singles and the larger Neutrals 9 and Acids 7 mixes—ideal for both method development and routine analysis.

- Simplify calibration curve preparation.
- Improve accuracy and consistency.
- Available at 250 µg/mL and 1000 µg/mL concentrations for your unique testing needs.
- Easily customize with Restek Singles to meet state-specific requirements.

Cannabidiol (CBD) (13956-29-1)
Cannabidiolic Acid (CBDA) (1244-58-2)
Cannabichromene (CBC) (20675-51-8)
Cannabidivarin (CBDV) (24274-48-4)

Cannabigerol (CBG) (25654-31-3)
Cannabigerolic Acid (CBGA) (25555-57-1)
Cannabinol (CBN) (521-35-7)
d8-Tetrahydrocannabinol (d8-THC) (5957-75-5)

d9-Tetrahydrocannabinol (d9-THC) (1972-08-3)
Tetrahydrocannabivarin (THCV) (31262-37-0)
Tetrahydrocannabinolic Acid (THCA-A) (23978-85-0)

Conc. in Solvent	CRM?	DEA Status	Canadian Test Kit Registration	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
*250 µg/mL, Acetonitrile/DIPEA/Ascorbic Acid (98.95:1:0.05), 1 mL/ampul	Yes	Exempt	C.T.K.# 003-029	6 months	24 months	On Ice	-20 °C or colder	ea.	34156
1000 µg/mL, Acetonitrile/DIPEA/Ascorbic Acid (98.95:1:0.05), 0.5 mL/ampul	Yes	Exempt	C.T.K.# 003-028	6 months	24 months	On Ice	-20 °C or colder	ea.	34157

*Second independent lot availability helps you meet your requirements without needing to source another supplier.

Cannabinoids Potency Testing

Achieve high-throughput cannabinoids potency testing without the cost of new equipment by using specially designed Restek LC and GC columns. Our Raptor ARC-18 LC column combines the speed of a superficially porous particle with the separation power of optimized phase chemistry. For GC applications, our Rxi-35Sil MS column provides superior cannabinoid separation. Our comprehensive catalog of cannabinoid certified reference materials (CRMs) and extensive sample preparation products provide a complete Restek solution for your cannabinoids' potency testing.

Columns



Raptor ARC-18 LC Columns (USP L1)

- Ideal for high-throughput LC-MS/MS applications with minimal sample preparation.
- Well-balanced retention profile for better detection and integration of large, multiclass analyte lists.
- Sterically protected to endure low-pH mobile phases without sacrificing retention or peak quality.
- Part of Restek's Raptor LC column line featuring 1.8 and 2.7 μm SPP core-shell silica.

ID	Length	qty.	cat.#
1.8 μm Particles			
3.0 mm	100 mm	ea.	931421E
2.7 μm Particles			
4.6 mm	150 mm	ea.	9314A65
3.0 mm	150 mm	ea.	9314A6E
2.1 mm	150 mm	ea.	9314A62



Rxi-35Sil MS Columns (fused silica)

midpolarity Crossbond phase

- Special selectivity and excellent inertness for substituted polar compounds, such as drugs, pesticides, herbicides, PCBs, phenols, etc.
- Provides superior separation for cannabinoids.
- Very low-bleed phase for GC-MS analysis.
- Extended temperature range: 50 $^{\circ}\text{C}$ up to 360 $^{\circ}\text{C}$.

ID	df	Length	Temp. Limits	qty.	Similar to Part #	cat.#
0.25 mm	0.25 μm	15 m	50 to 340/360 $^{\circ}\text{C}$	ea.	Grace 12588, 8635113	13820

Do you need a specific column dimension?

View our extensive range of GC and LC columns at
discover.restek.com/industries-application/cannabis

Column Accessories

Topaz 4.0 mm ID Precision Inlet Liner w/ Wool

for Agilent GCs equipped with split/splitless inlets

ID x OD x Length	Packing	qty	Similar to Part #	cat.#
4.0 mm x 6.3 mm x 78.5 mm	Quartz Wool	5-pk.	Agilent 210-4004-5	23305



Raptor EXP Guard Column Cartridges

To help protect your investment and further extend the life of our already-rugged LC columns, Restek offers the patent-pending guard column hardware developed by Optimize Technologies. A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other minimal sample preparation techniques.

Description	Particle Size	Size	qty.	cat.#
Raptor ARC-18 EXP Guard Column Cartridge	5 µm	5 x 4.6 mm	3-pk.	931450250
	5 µm	5 x 2.1 mm	3-pk.	931450252
	5 µm	5 x 3.0 mm	3-pk.	931450253
	2.7 µm	5 x 4.6 mm	3-pk.	9314A0250
	2.7 µm	5 x 2.1 mm	3-pk.	9314A0252
	2.7 µm	5 x 3.0 mm	3-pk.	9314A0253
	UHPLC	5 x 2.1 mm	3-pk.	9314U0252
	UHPLC	5 x 3.0 mm	3-pk.	9314U0253

Maximum cartridge pressure: 1034 bar/15,000 psi* (UHPLC); 600 bar/8700 psi (2.7 µm); 400 bar/5800 psi (5 µm).

* For maximum lifetime, recommended maximum pressure for UHPLC particles is 830 bar/12,000 psi.

Intellectual Property: optimizetech.com/patents

Raptor
LC Columns



EXP Direct Connect Holder

A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other minimal sample preparation techniques.

Description	qty.	cat.#
EXP Direct Connect Holder for EXP Guard Cartridges (includes hex-head fitting & 2 ferrules)	ea.	25808

Maximum holder pressure: 20,000 psi (1400 bar)

Intellectual Property: optimizetech.com/patents



UltraShield UHPLC PreColumn Filter

- Cost-effective protection for UHPLC systems.
- Reliable way to filter out particulates and extend column lifetime.
- Minimize extra column volume and maximize UHPLC sample throughput vs. guard cartridges.
- Connects easily to any column with Parker-style ports; not compatible with Waters columns.
- Leak tight to 15,000 psi (1034 bar).
- 0.5 µm or 0.2 µm stainless-steel frit in a stainless-steel body with PEEK ferrule.

Description	Porosity	qty.	cat.#
UltraShield UHPLC PreColumn Filter	0.5 µm frit	ea.	24995
	0.5 µm frit	5-pk.	24996
	0.5 µm frit	10-pk.	24997
	0.2 µm frit	ea.	25809
	0.2 µm frit	5-pk.	25810
	0.2 µm frit	10-pk.	25811



Reference Standards

Multicomponent Mixes

Cannabinoids Acids 7 Standard

(7 components)

- Comprehensive acids blend contains seven of the most frequently analyzed cannabinoid acids.
- Reduces the time, expense, and error associated with in-house preparation of mixed standards from single-compound solutions.
- High-concentration formulation maximizes flexibility; simplifies potency testing and method development for a wide range of cannabinoids and sample types.

U.S. DEA-exempted formulation—no additional customer permits or licensing are required to purchase within the U.S.

Cannabichromenic Acid (CBCA) (185505-15-1)
Cannabidiolic Acid (CBDA) (1244-58-2)
Cannabidivarinic Acid (CBDVA) (31932-13-5)

Cannabigerolic Acid (CBGA) (25555-57-1)
Cannabinolic Acid (CBNA) (2808-39-1)
Tetrahydrocannabinolic Acid (THCA-A) (23978-85-0)

Tetrahydrocannabivarinic Acid (THCVA) (39986-26-0)

Conc. in Solvent	CRM?	DEA Status	Canadian Test Kit Registration	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
1000 µg/mL, Acetonitrile with 1% DIPEA and 0.05% Ascorbic Acid, 1 mL/ampul	Yes	Exempt	C.T.K.# 003-015	6 months	15 months	On Ice	–20 °C or colder	ea.	34144

Cannabinoids Neutrals 9 Standard

(9 components)

- Nine-component mix simplifies calibration complexity—saving time and reducing cost.
- High concentration of 1000 µg/mL adds additional flexibility in constructing calibration curves.
- Verified composition and stability.
- Two independently produced lots available.

U.S. DEA-exempted formulation—no additional customer permits or licensing are required to purchase within the U.S.

Cannabichromene (CBC) (20675-51-8)
Cannabicyclol (CBL) (21366-63-2)
Cannabidiol (CBD) (13956-29-1)

Cannabidivarin (CBDV) (24274-48-4)
Cannabigerol (CBG) (25654-31-3)
Cannabinol (CBN) (521-35-7)

d8-Tetrahydrocannabinol (d8-THC) (5957-75-5)
d9-Tetrahydrocannabinol (d9-THC) (1972-08-3)
Tetrahydrocannabivarin (THCV) (31262-37-0)

Conc. in Solvent	CRM?	DEA Status	Canadian Test Kit Registration	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
1000 µg/mL, P&T Methanol, 1 mL/ampul	Yes	Exempt	C.T.K.# 003-004	6 months	36 months	On Ice	–20 °C or colder	ea.	34132

Cannabinoids Standard

(3 components)

U.S. DEA-exempted formulation—no additional customer permits or licensing are required to purchase within the U.S.

Cannabidiol (CBD) (13956-29-1)
Cannabinol (CBN) (521-35-7)

d9-Tetrahydrocannabinol (d9-THC) (1972-08-3)

Conc. in Solvent	CRM?	DEA Status	Canadian Test Kit Registration	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
1000 µg/mL each in P&T methanol, 1 mL/ampul	Yes	Exempt	T.K.# 71-048	6 months	36 months	On Ice	–20 °C or colder	ea.	34014

Singles

Description	CAS #	Conc. in Solvent	CRM?	DEA Status	Canadian Test Kit Registration	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat. #
(±)11-nor-9-carboxy-D9-THC	104874-50-2	100 µg/mL in methanol, 1 mL/ampul	No	Not Controlled	T.K.# 71-050	6 months	24 months	On Ice	10 °C or colder	ea.	34068
Cannabichromene (CBC)	20675-51-8	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Not Controlled	T.K.# 71-053	6 months	36 months	On Ice	10 °C or colder	ea.	34092
Cannabicyclol (CBL)	21366-63-2	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 3-003	6 months	36 months	On Ice	-20 °C or colder	ea.	34130
Cannabidiol (CBD)	13956-29-1	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Not Controlled	T.K.# 71-047	6 months	36 months	On Ice	-20 °C or colder	ea.	34011
Cannabidiolic Acid (CBDA)	1244-58-2	1000 µg/mL in acetonitrile, 1 mL/ampul	Yes	Not Controlled	T.K.# 71-055	6 months	18 months	On Ice	-20 °C or colder	ea.	34094
Cannabidivarin (CBDV)	24274-48-4	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 3-001	6 months	36 months	On Ice	-20 °C or colder	ea.	34123
Cannabidivarinic Acid (CBDVA)	31932-13-5	1000 µg/mL in acetonitrile, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 003-005	6 months	18 months	On Ice	-20 °C or colder	ea.	34134
Cannabigerol (CBG)	25654-31-3	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Not Controlled	T.K.# 71-052	6 months	36 months	On Ice	10 °C or colder	ea.	34091
Cannabigerolic Acid (CBGA)	25555-57-1	1000 µg/mL in acetonitrile, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 003-006	6 months	18 months	On Ice	-20 °C or colder	ea.	34135
Cannabinol (CBN)	521-35-7	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Not Controlled	T.K.# 71-046	6 months	36 months	On Ice	-20 °C or colder	ea.	34010
d8-Tetrahydrocannabinol (d8-THC)	5957-75-5	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Exempt	T.K.# 71-051	6 months	36 months	On Ice	-20 °C or colder	ea.	34090
d9-Tetrahydrocannabinol (d9-THC)	1972-08-3	1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Exempt	T.K.# 71-049	6 months	36 months	On Ice	-20 °C or colder	ea.	34067
d9-Tetrahydrocannabinolic acid A (THCA-A)	23978-85-0	1000 µg/mL in acetonitrile, 1 mL/ampul	Yes	Exempt	C.T.K.# 002-011	6 months	36 months	On Ice	-20 °C or colder	ea.	34111
Tetrahydrocannabivarin (THCV)	31262-37-0	1000 µg/mL in methanol, 1 mL/ampul	Yes	Exempt	T.K.# 85-010	6 months	36 months	On Ice	-20 °C ± 10 °C	ea.	34100
Tetrahydrocannabivarinic Acid (THCVA) Standard	39986-26-0	1000 µg/mL, Acetonitrile with 1% DIPEA and 0.05% Ascorbic Acid, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 003-012	6 months	24 months	On Ice	-20 °C or colder	ea.	34139
Cannabicyclol Acid (CBLA) Standard	40524-99-0	500 µg/mL, Acetonitrile with 1% DIPEA and 0.05% Ascorbic Acid, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 003-014	6 months	24 months	On Ice	-20 °C or colder	ea.	34136
Cannabichromenic Acid (CBCA) Standard	185505-15-1	1000 µg/mL, Acetonitrile with 1% DIPEA and 0.05% Ascorbic Acid, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 003-010	6 months	24 months	On Ice	-20 °C or colder	ea.	34137
Cannabinolic Acid (CBNA) Standard	2808-39-1	1000 µg/mL, Acetonitrile with 1% DIPEA and 0.05% Ascorbic Acid, 1 mL/ampul	Yes	Not Controlled	C.T.K.# 003-011	6 months	24 months	On Ice	-20 °C or colder	ea.	34138
(6aR,9R)-Δ10-THC Standard	95543-62-7	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Exempt	CTK-003-016	6 months	24 months	On Ice	-20 °C or colder	ea.	34145
(6aR,9S)-Δ10-THC Standard	95588-87-7	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Not Controlled	CTK-003-017	6 months	24 months	On Ice	-20 °C or colder	ea.	34146
Exo-THC Standard	27179-28-8	1000 µg/mL, Methanol, 1 mL/ampul	Yes	Exempt	CTK-003-018	6 months	24 months	On Ice	-20 °C or colder	ea.	34147
9R-HHC Standard	36403-90-4	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Exempt	CTK-003-019	6 months	24 months	On Ice	-20 °C or colder	ea.	34148
9S-HHC Standard	36403-91-5	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Exempt	CTK-003-020	6 months	24 months	On Ice	-20 °C or colder	ea.	34149
9(R)-Δ6a,10a-THC Standard	95720-01-7	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Not Controlled	CTK-003-021	6 months	24 months	On Ice	-20 °C or colder	ea.	34150
9(S)-Δ6a,10a-THC Standard	95720-02-8	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Exempt	CTK-003-022	6 months	24 months	On Ice	-20 °C or colder	ea.	34151
Δ8-THC-O-Acetate Standard	23050-54-6	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Exempt	CTK-003-024	6 months	24 months	On Ice	-20 °C or colder	ea.	34153
Δ9-THC-O-Acetate Standard	23132-17-4	1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	Exempt	CTK-003-025	6 months	24 months	On Ice	-20 °C or colder	ea.	34154

Not Controlled = Excluded from U.S. DEA Controlled Substances Act (CSA) regulatory controls—no customer permits or licensing required to purchase within the U.S.
Exempt = U.S. DEA-exempted formulation—no additional customer permits or licensing are required to purchase within the U.S.

Internal Standards for Cannabinoids Potency

Prazepam

Note: Stressed shipping studies indicate that this product remains stable after being continuously exposed to an elevated temperature of 40 °C for seven days. Ground freight is the default shipping method for this product; expedited methods are available upon request.

Prazepam (2955-38-6)

Conc. in Solvent	CRM?	DEA Status	Canadian Test Kit Registration	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Exempt	T.K.# 71-057	6 months	24 months	Ambient	10 °C or colder	ea.	34055

Phencyclidine

Note: Stressed shipping studies indicate that this product remains stable after being continuously exposed to an elevated temperature of 40 °C for seven days.

Phencyclidine (956-90-1)

Conc. in Solvent	CRM?	DEA Status	Canadian Test Kit Registration	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
1000 µg/mL in P&T methanol, 1 mL/ampul	Yes	Exempt	T.K.# 71-056	6 months	24 months	Ambient	10 °C or colder	ea.	34027

For more information

Access technical articles, chromatograms, and products for cannabinoids potency testing: discover.restek.com/industries-application/cannabis



Residual Solvents Analysis

As the popularity of cannabis and hemp grows, so does concern over the safety of the formulated products derived from these plants. Cannabis concentrates can contain residual solvents left over from manufacturing that can be harmful to human health. Because of this risk, many states will require residual solvent testing of cannabis concentrates. Due to their high volatility, residual solvents are best analyzed using headspace-GC techniques. Restek's Rxi-624Sil MS GC column, with its highly selective G43 phase, is suited for volatile organics and residual solvents analysis. Our comprehensive selection of certified reference materials (CRMs) offers a complete solution for your residual solvents analysis.

Columns

Rxi-624Sil MS Columns (fused silica)
midpolarity Crossbond phase

- Low-bleed, high-thermal stability column—maximum temperatures up to 300–320 °C.
- Inert—excellent peak shape for a wide range of compounds.
- Selective—G43 phase highly selective for volatile organics and residual solvents, great choice for USP<467>.
- Manufactured for column-to-column reproducibility—well suited for validated methods.

ID	df	Length	Temp. Limits	qty.	Similar to Part #	cat.#
0.25 mm	1.40 µm	30 m	-20 to 300/320 °C	ea.	Agilent 122-1334; Grace 13754, 8635239; Phenomenex THG-G005-27	13868



Do you need a specific column dimension?

View our complete selection of GC and LC columns at
discover.restek.com/industries-application/cannabis

Column Accessories

Topaz 1.8 mm ID Straight/SPME Inlet Liner

for Agilent GCs equipped with split/splitless inlets

ID x OD x Length	qty	cat.#
1.8 mm x 6.5 mm x 78.5 mm	5-pk.	23280



Reference Standards

Residual Solvents #1

(20 components)

- Designed for cannabis labs testing residual solvents at different threshold limits by headspace GC.
- Contains 20 commonly analyzed solvents in one convenient solution.

Acetone (67-64-1)	(C6) n-Hexane (110-54-3)
Acetonitrile (75-05-8)	Methanol (67-56-1)
Benzene (71-43-2)	Methylene chloride (75-09-2)
Chloroform (67-66-3)	(C5) n-Pentane (109-66-0)
Cyclohexane (110-82-7)	2-Propanol (isopropanol) (67-63-0)
1,2-Dichloroethane (107-06-2)	Toluene (108-88-3)
Diethyl ether (ethyl ether) (60-29-7)	Trichloroethene (trichloroethylene) (79-01-6)
Ethanol (64-17-5)	m-Xylene (108-38-3)
Ethyl acetate (141-78-6)	o-Xylene (95-47-6)
(C7) n-Heptane (142-82-5)	p-Xylene (106-42-3)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
3000 µg/mL in N,N-Dimethylacetamide, 1 mL/ampul	Yes	6 months	45 months	Ambient	10 °C or colder	ea.	34105





Ethylene Oxide

Ethylene oxide (75-21-8)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
50 mg/mL in methylene chloride, 1 mL/ampul	Yes	6 months	18 months	Ambient	0 °C or colder	ea.	30620
500 µg/mL in dimethyl sulfoxide, 1 mL/ampul	Yes	6 months	60 months	Ambient	10 °C or colder	ea.	36005

Michigan/Missouri Residual Solvents Standards

- Formulated for cannabis labs following Michigan or Missouri state-specific residual solvents methods.
- Second independent lots are available to help meet your requirements without needing to source another supplier.
- Kit includes all gas and liquid compounds listed in the state method.

All compounds are 5000 µg/mL unless noted.

Cat. # 36027: Michigan/Missouri Residual Solvents Standard (24 components)

Benzene (71-43-2) 500 µg/mL
 1,2-Dichloroethane (107-06-2) 500 µg/mL
 Chloroform (67-66-3) 500 µg/mL
 Trichloroethylene (1,1,2-Trichloroethylene) (79-01-6) 500 µg/mL
 n-Hexane (110-54-3)
 2-methylpentane (107-83-5)
 3-methylpentane (96-14-0)
 2,2-dimethylbutane (75-83-2)
 2,3-dimethylbutane (79-29-8)
 Acetonitrile (75-05-8)
 Dichloromethane (Methylene chloride) (75-09-2)
 Toluene (108-88-3)
 1,2-dimethylbenzene (ortho-) (95-47-6)

1,3-dimethylbenzene (meta-) (108-38-3)
 1,4-dimethylbenzene (para-) (106-42-3)
 Methanol (Methyl Alcohol) (67-56-1)
 Ethyl Acetate (Acetic Acid Ethyl Ester) (141-78-6)
 Heptane (n-Heptane) (142-82-5)
 Isopropyl Alcohol (2-Propanol, Isopropanol, IPA) (67-63-0)
 Ethyl Ether (Diethyl Ether, 1,1'-Oxybisethane) (60-29-7)
 Acetone (67-64-1)
 n-Pentane (109-66-0)
 iso-Pentane (78-78-4)
 Ethanol (Ethyl Alcohol) (64-17-5)

Cat. # 36029: Ethylene Oxide Standard

Ethylene Oxide (75-21-8)

Cat. # 36024: Residual Solvents Gases Standard Mix (4 components)

n-Butane (C₄) (106-97-8)
 2,2-Dimethylpropane (Neopentane) (463-82-1)
 2-Methylpropane (Isobutane) (75-28-5)
 n-Propane (C₃) (74-98-6)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
Michigan/Missouri Residual Solvents Kit							
500/5000 µg/mL, 1,2,4-trimethylbenzene, one 2 mL/ampul and two 1 mL/ampuls (3 ampuls total)	Yes	6 months	18/45/60 months	Ambient	0 °C or colder	ea.	36030
<i>Note: The Michigan/Missouri Residual Solvents Kit contains cat.#s 36027, 36029, and 36024. Each ampul may also be purchased individually.</i>							
Michigan/Missouri Residual Solvents Standard							
500/5000 µg/mL, 1,2,4-trimethylbenzene, 1 mL/ampul	Yes	6 months	45 months	Ambient	0 °C or colder	ea.	36027
Ethylene Oxide Standard							
500 µg/mL, 1,2,4-trimethylbenzene, 1 mL/ampul	Yes	6 months	18 months	Ambient	0 °C or colder	ea.	36029
Residual Solvent Gases Mix							
5000 µg/mL, 1,2,4-trimethylbenzene, 2 mL/ampul	Yes	6 months	60 months	Ambient	0 °C or colder	ea.	36024



New York Residual Solvents Standards

- Formulated for cannabis labs following New York state-specific residual solvents methods.
- Second independent lots are available to help meet your requirements without needing to source another supplier.
- Kit includes all gas and liquid compounds listed in the state method.



All compounds are 5000 µg/mL unless noted.

Cat. # 36028: New York Residual Solvents Standard (25 components)

Benzene (71-43-2) 500 µg/mL
1,2-Dichloroethane (107-06-2) 500 µg/mL
Chloroform (67-66-3) 500 µg/mL
n-Hexane (110-54-3)
2-methylpentane (107-83-5)
3-methylpentane (96-14-0)
2,2-dimethylbutane (75-83-2)
2,3-dimethylbutane (79-29-8)
Acetonitrile (75-05-8)
Dichloromethane (Methylene chloride) (75-09-2)
Toluene (108-88-3)
1,1,1-Trichloroethane (Methylchloroform) (71-55-6)

1,2-dimethylbenzene (ortho-) (95-47-6)
1,3-dimethylbenzene (meta-) (108-38-3)
1,4-dimethylbenzene (para-) (106-42-3)
Methanol (Methyl Alcohol) (67-56-1)
Ethyl Acetate (Acetic Acid Ethyl Ester) (141-78-6)
Heptane (n-Heptane) (142-82-5)
Isopropyl Alcohol (2-Propanol, Isopropanol, IPA) (67-63-0)
Ethyl Ether (Diethyl Ether, 1,1'-Oxybisethane) (60-29-7)
Acetone (67-64-1)
n-Pentane (109-66-0)
Ethanol (Ethyl Alcohol) (64-17-5)
iso-Pentane (78-78-4)
Dimethyl sulfoxide (DMSO) (67-68-5)

Cat. # 36032: 1,1,1,2-Tetrafluoroethane (CFC-134a)

1,1,1,2-Tetrafluoroethane (CFC-134a) (811-97-2) 1000 µg/mL

Cat. # 36024: Residual Solvents Gases Standard Mix (4 components)

n-Butane (C₄) (106-97-8)
2,2-Dimethylpropane (Neopentane) (463-82-1)
2-Methylpropane (Isobutane) (75-28-5)
n-Propane (C₃) (74-98-6)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
New York Residual Solvents Kit							
500/1000/5000 µg/mL, 1,2,4-trimethylbenzene, one 2 mL/ampul and two 1 mL/ampuls (3 ampuls total)	Yes	6 months	45/60 months	Ambient	0 °C or colder	ea.	36031
<i>Note: The New York Residual Solvents Kit contains cat.#s 36028, 36032, and 36024. Each ampul may also be purchased individually.</i>							
New York Residual Solvents Standard							
500/5000 µg/mL, 1,2,4-trimethylbenzene, 1 mL/ampul	Yes	6 months	45 months	Ambient	0 °C or colder	ea.	36028
1,1,1,2-Tetrafluoroethane (CFC-134a) Standard							
1000 µg/mL, 1,2,4-trimethylbenzene, 1 mL/ampul	Yes	6 months	60 months	Ambient	0 °C or colder	ea.	36032
Residual Solvent Gases Mix							
5000 µg/mL, 1,2,4-trimethylbenzene, 2 mL/ampul	Yes	6 months	60 months	Ambient	0 °C or colder	ea.	36024



Sample Preparation

Headspace Crimp Vials, 20 mm



Description	Type	Volume	Color	Size	qty.	Similar to Part #	cat.#
Headspace Vial, Flat Bottom	20 mm Crimp-Top	27 mL	Clear	30 x 60 mm	100-pk.		21160
	20 mm Crimp-Top	27 mL	Clear	30 x 60 mm	1000-pk.		21161
	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	100-pk.		21162
Headspace Vial, Rounded Bottom	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	1000-pk.		21163
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	100-pk.		21164
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	1000-pk.		21165
Headspace Vial, Rounded Bottom, Deactivated	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	1000-pk.		21165-221
	20 mm Crimp-Top	6 mL	Clear	22 x 38 mm	100-pk.		21166
	20 mm Crimp-Top	6 mL	Clear	22 x 38 mm	1000-pk.		21167
Headspace Vial, Flat Bottom	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	100-pk.	Agilent 8010-0029	24683
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	1000-pk.		24684
	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	100-pk.	Agilent 8010-0033	24685
	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	1000-pk.		24686

Vial-to-instrument compatibility is designated in instrument reference chart.



Headspace Screw-Thread Vials, 18 mm

Description	Type	Volume	Color	Size	qty.	cat.#
Headspace Vial, Rounded Bottom	18-425 Screw-Thread	20 mL	Clear	22 x 75 mm	100-pk.	23082
	18-425 Screw-Thread	20 mL	Clear	22 x 75 mm	1000-pk.	23083
	18-425 Screw-Thread	10 mL	Clear	22 x 45 mm	100-pk.	23084
	18-425 Screw-Thread	10 mL	Clear	22 x 45 mm	1000-pk.	23085
	18-425 Screw-Thread	20 mL	Amber	22 x 75 mm	100-pk.	23086
	18-425 Screw-Thread	20 mL	Amber	22 x 75 mm	1000-pk.	23087
	18-425 Screw-Thread	10 mL	Amber	22 x 45 mm	100-pk.	23088
	18-425 Screw-Thread	10 mL	Amber	22 x 45 mm	1000-pk.	23089

Caps not included (sold separately).

For more information

Access technical articles, chromatograms, and products for residual solvents analysis: discover.restek.com/industries-application/cannabis

Residual Solvents Gases

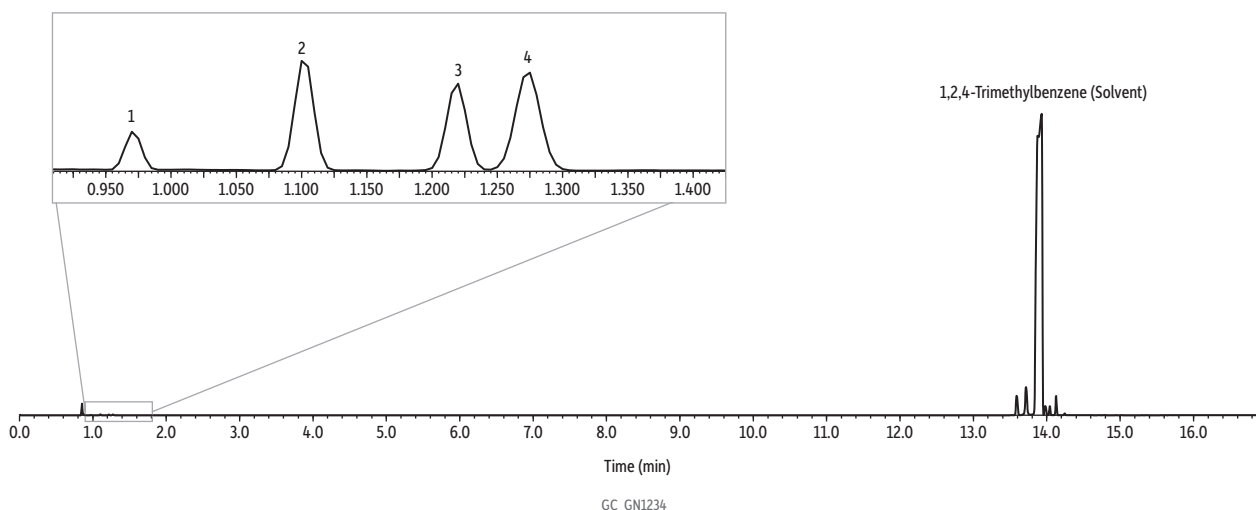
NEW!

Though difficulties with accuracy, reproducibility, and stability are well-known frustrations for labs analyzing for residual solvent gases across the cannabis industry, we've taken measures to overcome these pain points in testing and to help ensure the lot-to-lot and ampul-to-ampul reproducibility scientists need. With data showing superior chromatographic performance and reproducibility and a highly-controlled manufacturing process, we are confident in our residual solvent gases standards. These highly consistent standards offer a solution to cannabis laboratories struggling with reproducibility in residual solvent gases analysis. See our sales sheet at www.restek.com/residualsolventgases for additional information, data, and chromatograms.

Care & Handling of Residual Solvents Gases

We understand the pain points in testing for residual solvents gases, and while starting with standards you can trust is important, proper care and handling of these volatile gases is equally significant in ensuring their integrity. To help guarantee the reliability of your standards and to make sure you have all the tools you need, we've put together a comprehensive **Volatile Standards Handling Guide** that covers everything from ensuring your analytes are in solution prior to opening the ampul to recommendations for the best tools in constructing calibration solutions. View our Volatile Standard Handling guide at www.restek.com/volatilestandardhandling

Figure 1: Overcome the Frustrations of Residual Solvent Gases Testing with Our Exceptionally Reliable Standards



Peaks	tr (min)	Conc. (µg/mL)
1. n-Propane	0.970	125
2. Isobutane	1.100	125
3. n-Butane	1.220	125
4. Neopentane	1.275	125

Column: Rxi-624Sil MS, 30 m, 0.25 mm ID, 1.40 µm (cat.# 13868); **Standard/Sample:** Residual Solvent Gases Standard (cat.# 36024); **Diluent:** 1,2,4-Trimethylbenzene; **Conc.:** 125 µg/mL; **Injection:** ; Inj. Vol.: 250 µL headspace-syringe split (split ratio 10:1); **Liner:** Topaz, straight/SPME inlet liner, 1.8 mm x 5.0 x 95 (cat.# 23279); **Inj. Temp.:** 280 °C; **Headspace-Syringe:** ; **Instrument:** AOC-6000 Plus; **Syringe Temp.:** 150 °C; **Sample Temp.:** 80 °C; **Sample Equil. Time:** 45 min; **Inj. Speed:** 25 mL/min; **Inj. Dwell:** 0.05; **Inj. Temp.:** 280 °C; **Oven:** ; **Oven Temp.:** 30 °C (hold 6 min) to 85 °C at 15 °C/min (hold 2 min) to 250 °C at 35 °C/min (hold 1 min); **Carrier Gas:** He, constant flow; **Flow Rate:** 2 mL/min; **Detector:** QP2020 NX MS; **Scan Program:** Group 1; **Start Time:** 0 min; **Scan Range:** 35-350 amu; **Scan Rate:** 1111 scans/sec; **Transfer Line Temp.:** 250 °C; **Analyzer Type:** Quadrupole; **Source Temp.:** 200 °C; **Solvent Delay Time:** 0 min; **Tune Type:** PFTBA; **Ionization Mode:** EI; **Instrument:** Shimadzu GC 2030; **Sample Preparation:** A Residual Solvents Gases (cat# 36024) working standard was prepared at 125 µg/mL. 50 µL of that working solution was added to a 20 mL headspace vial, then tested using HS-Syringe-GC-MS.; **Notes:** Conditions were optimized for an expanded list of residual solvents, similar to GC_GN1198.; This chromatogram was generated with our residual solvent gases standard mix (cat #36024). We also offer single solutions of each analyte. Please see the following catalog numbers for reference.: Cat.# 36020 (Propane Standard); Cat.# 36021 (Isobutane Standard); Cat.# 36022 (Butane Standard); Cat.# 36023 (Neopentane Standard)

Reference Standards

Residual Solvent Gases Standards

- Designed for cannabis labs testing residual solvents gases at different threshold limits by headspace GC.
- Our proprietary manufacturing process was optimized to ensure standards are accurate, reproducible, and stable.
- High analyte concentrations allow for flexible calibration curves.
- Second independent lots available to ensure you can meet your requirements without needing to source another supplier.
- Verified composition and stability.



Residual Solvent Gases Mix

Contains each following compounds at a concentration of 5000 µg/mL:

n-Butane (C₄) (106-97-8) 2-Methylpropane (Isobutane) (75-28-5)
2,2-Dimethylpropane (Neopentane) (463-82-1) n-Propane (C₃) (74-98-6)

Concentration in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp	Volume	Cat.#
5000 µg/mL in 1,2,4-Trimethylbenzene	Yes	6 months	60 months	Ambient	0 °C or colder	2.0 mL	36024

Residual Solvent Gases Singles

Product	Concentration in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp	Volume	Cat.#
Propane Standard	5000 µg/mL in 1,2,4-Trimethylbenzene	Yes	6 months	60 months	Ambient	0 °C or colder	2.0 mL	36020
2-Methylpropane (Isobutane) Standard	5000 µg/mL in 1,2,4-Trimethylbenzene	Yes	6 months	60 months	Ambient	0 °C or colder	2.0 mL	36021
n-Butane Standard	5000 µg/mL in 1,2,4-Trimethylbenzene	Yes	6 months	60 months	Ambient	0 °C or colder	2.0 mL	36022
2,2-Dimethylpropane (Neopentane) Standard	5000 µg/mL in 1,2,4-Trimethylbenzene	Yes	6 months	60 months	Ambient	0 °C or colder	2.0 mL	36023



Columns

Rxi-624Sil MS GC Capillary Column

- Low-bleed, high-thermal stability column—maximum temperatures up to 300–320 °C.
- Inert—excellent peak shape for a wide range of compounds.
- Selective—G43 phase highly selective for volatile organics, terpenes, and residual solvents, great choice for USP<467>.
- Temperature range: -20 °C to 320 °C.

Product Name	df (Film Thickness)	Internal Diameter (ID)	Length	cat.#
Rxi-624Sil MS GC Capillary Column	1.0 µm	0.18 mm	20 m	13865



Column Accessories

Topaz, Straight/SPME Inlet Liner

Topaz GC inlet liners feature revolutionary technology and inertness to deliver you the next level of True Blue Performance:

- Deactivation—unbelievably low breakdown for accurate and precise low-level GC analyses.
- Reproducibility—unbeatable manufacturing controls and QC testing for superior reliability across compound classes.
- Productivity—unparalleled cleanliness for maximized GC uptime and lab throughput.
- 100% Satisfaction—if a liner doesn't perform to your expectations, we will replace it or credit your account.

Patented

Product Name	Material	Volume	Cat.#
Topaz, Straight/SPME Inlet Liner, 1.8 mm x 6.5 x 78.5, for Agilent GCs, Premium Deactivation, 5-pk.	Borosilicate Glass	0.246 mL	23280



Sample Preparation



Headspace Vials

Product Name	Color	Modification	Size	Type	Units	Volume	Cat.#
Headspace Crimp-Top Vials, 20 mm	Clear	Rounded Bottom	23 x 75 mm	20 mm Crimp-Top	100-pk.	20 mL	21162
Headspace Crimp-Top Vials, 20 mm	Clear	Rounded Bottom	23 x 75 mm	20 mm Crimp-Top	1000-pk.	20 mL	21163
Headspace Screw-Thread Vials, 18 mm	Clear	Rounded Bottom	22 x 75 mm	18-425 Screw-Thread	100-pk.	20 mL	23082
Headspace Screw-Thread Vials, 18 mm	Clear	Rounded Bottom	22 x 75 mm	18-425 Screw-Thread	1000-pk.	20 mL	23083



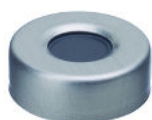
Screw-Thread Headspace Caps

Product Name	Cap Size	Septa Material	Thickness	Units	Cat.#
Magnetic Screw-Thread Headspace Caps, 18 mm	18-425	Red PTFE/Silicone	1.9 mm	100-pk.	23092
Magnetic Screw-Thread Headspace Caps, 18 mm	18-425	PTFE/Red Chlorobutyl	1.9 mm	100-pk.	23094



Crimp-Top Headspace Caps (Magnetic)

Product Name	Material	Septa Material	Units	Cat.#
Magnetic Crimp-Top Caps, Silver, 20 mm with PTFE/Silicone Septum w/8 mm Hole	steel	PTFE/Silicone	100-pk.	28890



Crimp-Top Headspace Caps (Not Magnetic)

Product Name	Material	Septa Material	Units	Cat.#
Aluminum Crimp-Top Seals with PTFE/Gray Butyl Rubber Septa, Silver, Preassembled, 20 mm	Aluminum	PTFE/Gray Butyl Rubber	100-pk.	21761
Aluminum Crimp-Top Seals with PTFE/Silicone Septa, Silver, Preassembled, 20 mm	Aluminum	PTFE/Silicone	100-pk.	21763

Gas-Tight Syringes

- Suitable for gases or liquids.
- High accuracy of dispensed volumes.
- Interchangeable barrels, plungers, and tips extend performance and increase cost-effectiveness.

Note: Additional syringe sizes may be used to accommodate your unique requirements. View all our complete offering of gas-tight syringes at www.restek.com



Product Name	Needle Gauge	Needle Length	Needle Point Style	Needle Termination	Volume	Cat.#/ea.
Syringe, SGE, PTFE Tip, Gas-Tight	25	50 mm	2	F	500 µL	24742
Syringe, Hamilton 1750, PTFE Tip, Gas-Tight	22	51 mm	2	LTN	500 µL	24571
Syringe, SGE, PTFE Tip, Gas-Tight	25	50 mm	2	F	25 µL	24727
Syringe, Hamilton 1702, PTFE Tip, Gas-Tight	22	51 mm	2	N	25 µL	24559
Syringe, SGE, PTFE Tip, Gas-Tight	25	50 mm	2	F	100 µL	24734
Syringe, Hamilton 1710, PTFE Tip, Gas-Tight	22	51 mm	2	N	100 µL	24563

Learn more about our residual solvent gases standards:

For additional information, data, and chromatograms:
www.restek.com/residualsolventgases

For specific care and handling instructions:
www.restek.com/volatilestandardhandling



Terpenes Profiling Analysis

Cannabis chemovars have unique terpene profiles that are responsible for the flavors and fragrances of the plant. Additionally, research has shown that terpenes and cannabinoids work synergistically to increase the therapeutic effects of cannabis. Understanding the complexity of terpenes in hemp and cannabis products has created a growing demand to profile these compounds. Terpenes can be challenging to analyze, but the experts at Restek have developed the Rxi-624Sil MS GC column, terpene reference standards, and sample preparation products to provide a high-quality Restek solution for terpenes profiling analysis.

Columns



Rtx-624 Columns (fused silica)

low- to midpolarity phase

- Application-specific columns for volatile organic pollutants. Recommended in U.S. EPA methods for volatile organic pollutants.
- Temperature range: -20 °C to 240 °C.
- Equivalent to USP G43 phase.
- Some dimensions also available as Integra-Guard columns—a guard and analytical column in one to eliminate connection problems!

ID	df	Length	Temp. Limits	qty.	Similar to Part #	cat.#
0.25 mm	1.40 µm	30 m	-20 to 240 °C	ea.	Agilent 122-1334; Scion/Bruker/Varian CP7412	10968



Rxi-1301Sil MS Columns (fused silica)

midpolarity Crossbond phase

- Highest thermal stability in the industry ensures dependable, accurate MS results and increased uptime.
- Stabilized cyano phase selectivity improves the performance of existing methods. Ideal for solvents, glycols, and other polar compounds.
- Rigorous QC testing ensures inertness and accurate, reliable data for multiple compound classes.
- Maximum temperature: 320 °C.

ID	df	Length	Temp. Limits	qty.	cat.#
0.25 mm	0.25 µm	30 m	-60 to 320 °C	ea.	16094

Do you need a specific column dimension?

View our extensive range of GC and LC columns at
discover.restek.com/industries-application/cannabis

Column Accessories

Direct Liquid Injection

Topaz 4.0 mm ID Precision Inlet Liner w/ Wool

for Agilent GCs equipped with split/splitless inlets

ID x OD x Length	Packing	qty	Similar to Part #	cat.#
4.0 mm x 6.3 mm x 78.5 mm	Quartz Wool	5-pk.	Agilent 210-4004-5	23305



Headspace Analysis

Topaz 1.8 mm ID Straight/SPME Inlet Liner

for Agilent GCs equipped with split/splitless inlets

ID x OD x Length	qty	cat.#
1.8 mm x 6.5 mm x 78.5 mm	5-pk.	23280



100% SATISFACTION GUARANTEE: If your Topaz inlet liner does not perform to your expectations for any reason, simply contact Restek Technical Service or your local Restek representative and provide a sample chromatogram showing the problem. If our GC experts are not able to quickly and completely resolve the issue to your satisfaction, you will be given an account credit or replacement product (same cat.#) along with instructions for returning any unopened product. (Do not return product prior to receiving authorization.) For additional details about Restek's return policy, visit www.restek.com/warranty

Restek's Topaz GC inlet liners feature revolutionary technology and inertness to deliver the next level of:

- Deactivation
- Reproducibility
- Productivity



Learn more and browse all Topaz products today at www.restek.com/Topaz

Reference Standards

Terpenes MegaMix Standard #1

(43 components)

(-)-alpha-Bisabolol (23089-26-1)
(+)-Borneol (464-43-7)
L(-)-Borneol (464-45-9)
Camphene (79-92-5)
3-Carene (498-15-7)
Carvacrol (499-75-2)
beta-Caryophyllene (87-44-5)
Cedrene (11028-42-5)
Cedrol (77-53-2)
1,8-Cineole (Eucalyptol) (470-82-6)
Citronellol (106-22-9)
trans-β-Farnesene (18794-84-8)
Farnesol (4602-84-0)
(1R)-endo-(+)-Fenchyl alcohol (2217-02-9)
Geraniol (106-24-1)

(-)-Guaiol (489-86-1)
alpha-Humulene (6753-98-6)
Isoborneol (124-76-5)
m-Isopropyltoluene (535-77-3)
o-Isopropyltoluene (527-84-4)
p-Isopropyltoluene (p-Cymene) (99-87-6)
(-)-Isopulegol (89-79-2)
d-Limonene (5989-27-5)
Linalool (78-70-6)
Menthyl (89-78-1)
beta-Myrcene (123-35-3)
Nerol (106-25-2)
Nerolidol (7212-44-4)
Ocimene (13877-91-3)
R-(-)-alpha-Phellandrene (4221-98-1)

Phytane (2,6,10,14-Tetramethylhexadecane) (638-36-8)
alpha-Pinene (80-56-8)
(-)-beta-Pinene (18172-67-3)
Sabinene (3387-41-5)
Sabinene Hydrate (546-79-2)
Squalene (111-02-4)
Terpinen-4-ol (562-74-3)
alpha-Terpinene (99-86-5)
gamma-Terpinene (99-85-4)
α-Terpineol (98-55-5)
Terpinolene (586-62-9)
Thymol (89-83-8)
Valencene (4630-07-3)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
2500 µg/mL, Isopropanol, 1 mL/ampul	Yes	6 months	24 months	Ambient	0 °C or colder	ea.	34142

Note: Terpenes MegaMix Standard #1 (cat.# 34142) and Terpenes MegaMix Standard #2 (cat.# 34158) have been formulated in different but compatible GC-amenable solvents for specific product stability purposes.

Terpenes MegaMix Standard #2

(15 components)

Camphor (76-22-2)
(S)-(+)-Carvone (2244-16-8)
(-)-Caryophyllene oxide (1139-30-6)
Citral (5392-40-5)
(1R)-(-)-Fenchone (7787-20-4)

Geranyl acetate (105-87-3)
Isobornyl acetate (125-12-2)
Menthone (10458-14-7)
(+)-Nootkatone (4674-50-4)
Octyl acetate (112-14-1)

Piperitone (89-81-6)
(R)-(+)-Pulegone (89-82-7)
Safranal (116-26-7)
d-Valerolactam (675-20-7)
(-)-Verbenone (1196-01-6)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
2500 µg/mL, Toluene, 1 mL/ampul	Yes	6 months	24 months	Ambient	0 °C or colder	ea.	34158

Note: Terpenes MegaMix Standard #1 (cat.# 34142) and Terpenes MegaMix Standard #2 (cat.# 34158) have been formulated in different but compatible GC-amenable solvents for specific product stability purposes.

Cannabis Terpenes Standard #1

(19 components)

(-)-α-Bisabolol (23089-26-1)
Camphene (79-92-5)
δ-3-Carene (13466-78-9)
β-Caryophyllene (87-44-5)
Geraniol (106-24-1)
(-)-Guaiol (489-86-1)
α-Humulene (6753-98-6)

p-Isopropyltoluene (p-cymene) (99-87-6)
(-)-Isopulegol (89-79-2)
d-Limonene (5989-27-5)
Linalool (78-70-6)
β-Myrcene (123-35-3)
Nerolidol (7212-44-4)
Ocimene (13877-91-3)

α-Pinene (80-56-8)
(-)-β-Pinene (18172-67-3)
α-Terpinene (99-86-5)
γ-Terpinene (99-85-4)
Terpinolene (586-62-9)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
2500 µg/mL each in isopropanol, 1 mL/ampul	Yes	6 months	24 months	Ambient	0 °C or colder	ea.	34095

Cannabis Terpenes Standard #2

(2 components)

(-)-Caryophyllene oxide (1139-30-6)
1,8-Cineole (Eucalyptol) (470-82-6)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
2500 µg/mL each in isopropanol, 1 mL/ampul	Yes	6 months	24 months	Ambient	0 °C or colder	ea.	34096

Sample Preparation

Headspace Crimp Vials, 20 mm

Description	Type	Volume	Color	Size	qty.	Similar to Part #	cat.#
Headspace Vial, Flat Bottom	20 mm Crimp-Top	27 mL	Clear	30 x 60 mm	100-pk.		21160
	20 mm Crimp-Top	27 mL	Clear	30 x 60 mm	1000-pk.		21161
Headspace Vial, Rounded Bottom	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	100-pk.		21162
	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	1000-pk.		21163
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	100-pk.		21164
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	1000-pk.		21165
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	1000-pk.		21165-221
Headspace Vial, Rounded Bottom, Deactivated	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	1000-pk.		21166
	20 mm Crimp-Top	6 mL	Clear	22 x 38 mm	100-pk.		21167
	20 mm Crimp-Top	6 mL	Clear	22 x 38 mm	1000-pk.		21167
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	100-pk.	Agilent 8010-0029	24683
	20 mm Crimp-Top	10 mL	Clear	23 x 46 mm	1000-pk.		24684
	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	100-pk.	Agilent 8010-0033	24685
Headspace Vial, Flat Bottom	20 mm Crimp-Top	20 mL	Clear	23 x 75 mm	1000-pk.		24686

Vial-to-instrument compatibility is designated in instrument reference chart.



Headspace Screw-Thread Vials, 18 mm

Description	Type	Volume	Color	Size	qty.	cat.#
Headspace Vial, Rounded Bottom	18-425 Screw-Thread	20 mL	Clear	22 x 75 mm	100-pk.	23082
	18-425 Screw-Thread	20 mL	Clear	22 x 75 mm	1000-pk.	23083
	18-425 Screw-Thread	10 mL	Clear	22 x 45 mm	100-pk.	23084
	18-425 Screw-Thread	10 mL	Clear	22 x 45 mm	1000-pk.	23085
	18-425 Screw-Thread	20 mL	Amber	22 x 75 mm	100-pk.	23086
	18-425 Screw-Thread	20 mL	Amber	22 x 75 mm	1000-pk.	23087
	18-425 Screw-Thread	10 mL	Amber	22 x 45 mm	100-pk.	23088
	18-425 Screw-Thread	10 mL	Amber	22 x 45 mm	1000-pk.	23089

Caps not included (sold separately).



Vial Rack for Headspace Vials

- Securely holds up to 36 headspace vials (fits 6, 10, or 20 mL vials).
- Vials lock in rack for convenient, one-handed cap removal.
- Openings in the bottom of each well facilitate drainage.
- Alphanumeric indexing on rack simplifies sample identification.
- Easy to clean and fully autoclavable.*
- Stackable—even with vials in place.

Description	Size	qty.	cat.#
Polypropylene Vial Storage Rack for 6, 10, or 20 mL Headspace Vials	36 vial capacity	ea.	22643
	36 vial capacity	5-pk.	22644

*Autoclavable up to 121 °C for 20 minutes.



22643



ordering notes

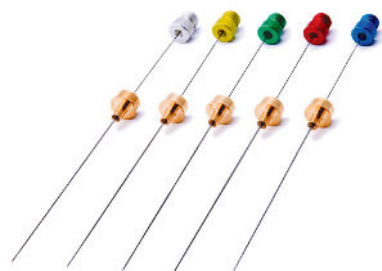
Quantity break discounts may apply. Contact us or your local Restek representative for more information.

Restek PAL 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).

Color	Diameter	Material	Recommended Analytes	qty.	cat.#
Violet	1.1 mm	120 μ m Divinylbenzene (DVB)/PDMS	Amines and polar compounds, 60–300 g/mol*	ea.	27486
Violet	1.5 mm wide sleeve	120 μ m Divinylbenzene (DVB)/PDMS	Aromatic semivolatile, 60–300 g/mol*	ea.	27878

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



Restek PAL SPME Fibers

- Suitable for a wide range of analyte chemistries and sample matrices.
- Reliable performance meets or exceeds other brands.
- Robust aluminum hub is more durable than plastic.
- Optimized for PAL system autosamplers and compatible with most GC inlets.
- SPME automated sample preparation reduces sample handling and solvent consumption.

Recommended maximum GC inlet pressure is 50 psi or less.

All Restek 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.

Color	Material	Max Temp	Recommended Operating Temp	qty.	Similar to Part #	cat.#
Violet	65 μ m Divinylbenzene (DVB)/PDMS Fiber	300 °C	220–300 °C	ea.	Supelco/Millipore Sigma Hub Color–Blue	27874.1
Violet	65 μ m Divinylbenzene (DVB)/PDMS Fiber	300 °C	220–300 °C	3-pk.	Supelco/Millipore Sigma Hub Color–Blue	27874.3
Violet	65 μ m Divinylbenzene (DVB)/PDMS Fiber	300 °C	220–300 °C	5-pk.	Supelco/Millipore Sigma Hub Color–Blue	27874.5



Ideal for Agilent 7673, 7683, 7693 & other autosamplers that process 12 x 32 mm crimp-top vials. Compare to Target DP, Robo, Sun1, ABC, and R.A.M. Vials.

2.0 mL, 9 mm Short-Cap, Screw-Thread Vials (vial only)

Fit all 2.0 mL, 12 x 32 mm, crimp-top, vial-based autosamplers.

Description	Type	Volume	Color	Size	qty.	Similar to Part #	cat.#
Short-Cap Vial, w/White Graduated Marking Spot	9-425 Screw-Thread	2.0 mL	Clear	12 x 32 mm	100-pk.	Agilent 5182-0715, 8010-0014	21140
	9-425 Screw-Thread	2.0 mL	Clear	12 x 32 mm	1000-pk.	Agilent 5183-2068	21141
	9-425 Screw-Thread	2.0 mL	Amber	12 x 32 mm	100-pk.	Agilent 5182-0716	21142
	9-425 Screw-Thread	2.0 mL	Amber	12 x 32 mm	1000-pk.	Agilent 5183-2069	21143
Short-Cap Vial, without Graduated Marking Spot	9-425 Screw-Thread	2.0 mL	Clear	12 x 32 mm	100-pk.	Agilent 5182-0714	21154
	9-425 Screw-Thread	2.0 mL	Clear	12 x 32 mm	1000-pk.		21155

2.0 mL, 9 mm Short-Cap, Screw-Vial Closures (Polypropylene, preassembled)

Type	Cap Size	Color	Septa Material	qty.	Similar to Part #	cat.#
Ribbed, Screw-Thread	9-425	Blue	PTFE/Silicone, for Agilent 7693A	100-pk.	Agilent 5182-0717	23841
Ribbed, Screw-Thread	9-425	Blue	PTFE/Silicone, for Agilent 7693A	1000-pk.	Agilent 5182-0717	23842
Screw-Thread	9-425	Blue	PTFE/Butyl Rubber	100-pk.		24473
Screw-Thread	9-425	Blue	PTFE/Butyl Rubber	1000-pk.		24474
Screw-Thread	9-425	Blue	PTFE/Silicone	100-pk.	Agilent 5182-0720	24485
Screw-Thread	9-425	Blue	PTFE/Silicone	1000-pk.	Agilent 5185-5820, 5190-1599	24486
Screw-Thread	9-425	Green	PTFE/Silicone	100-pk.		24487
Screw-Thread	9-425	Green	PTFE/Silicone	1000-pk.	Agilent 5185-5864	24488
Screw-Thread	9-425	Yellow	PTFE/Silicone	1000-pk.		24494
Screw-Thread	9-425	Black	PTFE/Silicone/PTFE	100-pk.		24495
Screw-Thread	9-425	Black	PTFE/Silicone/PTFE	1000-pk.		24496
Screw-Thread	9-425	Blue	PTFE/Silicone/PTFE	100-pk.	Agilent 5182-0723	24497
Screw-Thread	9-425	Blue	PTFE/Silicone/PTFE	1000-pk.		24498
Screw-Thread	9-425	Green	PTFE/Silicone/PTFE	100-pk.		24499
Screw-Thread	9-425	Green	PTFE/Silicone/PTFE	1000-pk.		24500
Screw-Thread	9-425	Natural	PTFE/Silicone/PTFE	100-pk.		24501
Screw-Thread	9-425	Natural	PTFE/Silicone/PTFE	1000-pk.		24502
Screw-Thread	9-425	Red	PTFE/Silicone/PTFE	100-pk.		24503
Screw-Thread	9-425	Red	PTFE/Silicone/PTFE	1000-pk.		24504
Screw-Thread	9-425	Yellow	PTFE/Silicone/PTFE	1000-pk.		24506
Screw-Thread	9-425	Mixed	PTFE/Butyl Rubber	500-pk.		24668
Screw-Thread	9-425	Mixed	PTFE/Silicone	500-pk.		24669
Screw-Thread	9-425	Mixed	PTFE/Silicone/PTFE	500-pk.		24670
Screw-Thread	9-425	Black	PTFE/Silicone w/Slit	100-pk.		26572
Screw-Thread	9-425	Black	PTFE/Silicone w/Slit	1000-pk.		26573
Screw-Thread	9-425	Green	PTFE/Silicone w/Slit	1000-pk.		26575
Screw-Thread	9-425	Red	PTFE/Silicone w/Slit	100-pk.		26576
Screw-Thread	9-425	Red	PTFE/Silicone w/Slit	1000-pk.		26577
Screw-Thread	9-425	Blue	PTFE/Silicone w/Slit	100-pk.		26578
Screw-Thread	9-425	Blue	PTFE/Silicone w/Slit	1000-pk.		26579
Screw-Thread	9-425	Yellow	PTFE/Silicone w/Slit	100-pk.		26580
Screw-Thread	9-425	Yellow	PTFE/Silicone w/Slit	1000-pk.		26581



24668

Choose preslit caps (available for some vials) to reduce the risk of needle bending, release vacuum from high-volume injections, and improve injection reproducibility when greater than 20% of vial volume is withdrawn.

For more information

Access technical articles, chromatograms, and products for terpenes profiling analysis: discover.restek.com/industries-application/cannabis

Pesticides Residue Analysis

Cannabis and hemp products can contain residues of pesticides that were applied to cannabis plants during growth to control agricultural pests. These pesticides can be analyzed by LC-MS/MS, GC-MS/MS, and GC-MS. Restek Raptor ARC-18 LC columns and Rxi-5ms GC columns provide the selectivity needed for accurate and reliable multiresidue pesticides analysis. Our sample preparation products allow for fast, easy, and adaptable cleanup of a wide variety of matrices, removing matrix interferences while also recovering the analytes of interest. Restek's extensive selection of pesticide certified reference materials (CRMs) helps guarantee accurate and reliable results for your pesticides residue analysis.



Columns

Rxi-5ms Columns (fused silica)

low-polarity phase; Crossbond diphenyl dimethyl polysiloxane

- General-purpose columns for semivolatiles, phenols, amines, residual solvents, drugs of abuse, pesticides, PCB congeners (e.g., Aroclor mixes), and solvent impurities.
- Most inert column on the market.
- Tested and guaranteed for ultra-low bleed; improved signal-to-noise ratio for better sensitivity and mass spectral integrity.
- Temperature range: -60 °C to 330/350 °C.
- Equivalent to USP G27 and G36 phases.

ID	df	Length	Temp. Limits	qty.	Similar to Part #	cat.#
0.25 mm	0.25 µm	30 m	-60 to 330/350 °C	ea.	Agilent 19091s-433; Grace 15807, 5122087, 8635225; Phenomenex THG-G018-11	13423



Raptor ARC-18 LC Columns (USP L1)

- Ideal for high-throughput LC-MS/MS applications with minimal sample preparation.
- Well-balanced retention profile for better detection and integration of large, multiclass analyte lists.
- Sterically protected to endure low-pH mobile phases without sacrificing retention or peak quality.
- Part of Restek's Raptor LC column line featuring 1.8, 2.7, and 5 µm SPP core-shell silica.

ID	Length	qty.	cat.#
2.7 µm Particles			
2.1 mm	100 mm	ea.	9314A12



Raptor Biphenyl LC Columns (USP L11)

- Ideal for bioanalytical testing applications like drug and metabolite analyses.
- Heightened selectivity and retention for compounds that are hard to resolve or elute early on C18 and other phenyl chemistries.
- Limits ionization suppression and allows simple, MS-friendly mobile phases.
- Part of Restek's Raptor LC column line featuring 1.8, 2.7, and 5 µm SPP core-shell silica.

ID	Length	qty.	cat.#
2.7 µm Particles			
2.1 mm	100 mm	ea.	9309A12

Do you need a specific column dimension?

View our complete selection of GC and LC columns at discover.restek.com/industries-application/cannabis

Column Accessories

Topaz 4.0 mm ID Single Taper Inlet Liner w/ Wool

for Agilent GCs equipped with split/splitless inlets

ID x OD x Length	Packing	qty	Similar to Part #	cat.#
4.0 mm x 6.5 mm x 78.5 mm	Quartz Wool	5-pk.	Agilent 5062-3587 (ea.); 5183-4693 (5-pk.); 5183-4694 (25-pk.); 5190-2293 (ea.); 5190-3163 (5-pk.); 5190-3167 (25-pk.); 5190-3171 (100-pk.)	23303



Raptor EXP Guard Column Cartridges

To help protect your investment and further extend the life of our already-rugged LC columns, Restek offers the patent-pending guard column hardware developed by Optimize Technologies. A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other minimal sample preparation techniques.

Description	Particle Size	Size	qty.	cat.#
Raptor Biphenyl EXP Guard Column Cartridge	5 µm	5 x 4.6 mm	3-pk.	930950250
	5 µm	5 x 2.1 mm	3-pk.	930950252
	5 µm	5 x 3.0 mm	3-pk.	930950253
	2.7 µm	5 x 4.6 mm	3-pk.	9309A0250
	2.7 µm	5 x 2.1 mm	3-pk.	9309A0252
	2.7 µm	5 x 3.0 mm	3-pk.	9309A0253
	UHPLC	5 x 2.1 mm	3-pk.	9309U0252
	UHPLC	5 x 3.0 mm	3-pk.	9309U0253
Raptor ARC-18 EXP Guard Column Cartridge	5 µm	5 x 4.6 mm	3-pk.	931450250
	5 µm	5 x 2.1 mm	3-pk.	931450252
	5 µm	5 x 3.0 mm	3-pk.	931450253
	2.7 µm	5 x 4.6 mm	3-pk.	9314A0250
	2.7 µm	5 x 2.1 mm	3-pk.	9314A0252
	2.7 µm	5 x 3.0 mm	3-pk.	9314A0253
	UHPLC	5 x 2.1 mm	3-pk.	9314U0252
	UHPLC	5 x 3.0 mm	3-pk.	9314U0253

Maximum cartridge pressure: 1034 bar/15,000 psi* (UHPLC); 600 bar/8700 psi (2.7 µm); 400 bar/5800 psi (5 µm).

* For maximum lifetime, recommended maximum pressure for UHPLC particles is 830 bar/12,000 psi.

Intellectual Property: optimizetech.com/patents



EXP Direct Connect Holder

A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other minimal sample preparation techniques.

Description	qty.	cat.#
EXP Direct Connect Holder for EXP Guard Cartridges (includes hex-head fitting & 2 ferrules)	ea.	25808

Maximum holder pressure: 20,000 psi (1400 bar). Intellectual Property: optimizetech.com/patents



UltraShield UHPLC PreColumn Filter

- Cost-effective protection for UHPLC systems.
- Reliable way to filter out particulates and extend column lifetime.
- Minimize extra column volume and maximize UHPLC sample throughput vs. guard cartridges.
- Connects easily to any column with Parker-style ports; not compatible with Waters columns.
- Leak tight to 15,000 psi (1034 bar).
- 0.5 µm or 0.2 µm stainless-steel frit in a stainless-steel body with PEEK ferrule.

Description	Porosity	qty.	cat.#
UltraShield UHPLC PreColumn Filter	0.5 µm frit	ea.	24995
	0.5 µm frit	5-pk.	24996
	0.5 µm frit	10-pk.	24997
	0.2 µm frit	ea.	25809
	0.2 µm frit	5-pk.	25810
	0.2 µm frit	10-pk.	25811





Streamline Your Generation of Calibration Standards and Matrix Spike Solutions with Our New York Cannabis Pesticides Kit



Featuring the 70 compounds needed by cannabis testing laboratories, our New York cannabis pesticides kit eliminates the need for in-house standard preparation. When blended, the kit's eight ampuls are designed to create a high-concentration working standard—giving you greater analytical flexibility for constructing calibration curves and spiking sample matrices.

- A complete kit designed specifically for the New York cannabis pesticide residue list.
- Formulated for optimal stability and usability to ensure your calibration standards are accurate.
- Two independently produced lots available from our ISO-accredited labs help meet your quality control requirements.

New York Pesticide Kit

Cat.# 32606: New York Pesticide Standard #1 (21 components)

Acephate (30560-19-1)
Aldicarb (116-06-3)
Bifenazate (149877-41-8)
Carbaryl (Sevin) (63-25-2)
Carbofuran (1563-66-2)
Chlorpyrifos (2921-88-2)
Coumaphos (56-72-4)
Diazinon (333-41-5)
Dichlorvos (DDVP) (62-73-7)
Dimethoate (60-51-5)
Ethoprophos (13194-48-4)
Fenoxycarb (72490-01-8)
Malathion (121-75-5)
Methiocarb (2032-65-7)
Methomyl (16752-77-5)
Methyl parathion (298-00-0)
Mevinphos (7786-34-7)
Naled (300-76-5)
Oxamyl (23135-22-0)
Phosmet (732-11-6)
Propoxur (Baygon) (114-26-1)

Cat.# 32607: New York Pesticide Standard #2 (11 components)

Abamectin (71751-41-2)
Acequinocyl (57960-19-7)

Bifenthrin (82657-04-3)
Cyfluthrin (68359-37-5)
Cypermethrin (52315-07-8)
Etofenprox (80844-07-1)
Permethrin (cis & trans) (52645-53-1)
Prallethrin (23031-36-9)
Pyrethrins (8003-34-7)
Spinetoram (J&L)* (935545-74-7)
Spinosad† (168316-95-8)

Cat.# 32608: New York Pesticide Standard #3 (15 components)

Acetamiprid (135410-20-7)
Chlordane (57-74-9)
Clofentezine (74115-24-5)
Etoxazole (153233-91-1)
Fipronil (120068-37-3)
Fludioxonil (131341-86-1)
Imazalil (35554-44-0)
Imidacloprid (138261-41-3)
Myclobutanil (88671-89-0)
Paclobutrazol (76738-62-0)
Pentachloronitrobenzene (Quintozene) (82-68-8)
Propiconazole (Tilt) (60207-90-1)
Tebuconazole (107534-96-3)
Thiacloprid (111988-49-9)
Thiamethoxam (153719-23-4)

Cat.# 32609: New York Pesticide Standard #4 (19 components)

Azoxystrobin (131860-33-8)
Boscalid (188425-85-6)
Chlorantraniliprole (500008-45-7)
Chlorfenapyr (122453-73-0)
Daminozide (1596-84-5)
Dimethomorph (110488-70-5)
Fenhexamid (126833-17-8)
Fenpyroximate (111812-58-9)
Fonicamid (158062-67-0)
Hexythiazox (78587-05-0)
Kresoxim methyl (143390-89-0)
Metalaxyl (57837-19-1)
MGK-264 (113-48-4)
Piperonyl butoxide (51-03-6)
Pyridaben (96489-71-3)
Spiromesifen (283594-90-1)
Spirotetramat (203313-25-1)
Spiroxamine (118134-30-8)
Trifloxystrobin (141517-21-7)

Cat.# 32610: Captan Standard

Captan (133-06-2)

Cat.# 32611: Azadirachtin Standard

Azadirachtin (11141-17-6)

Cat.# 32612: 3-Indolebutyric Acid Standard

3-Indolebutyric Acid (133-32-4)

Cat.# 32613: Chlormequat Standard

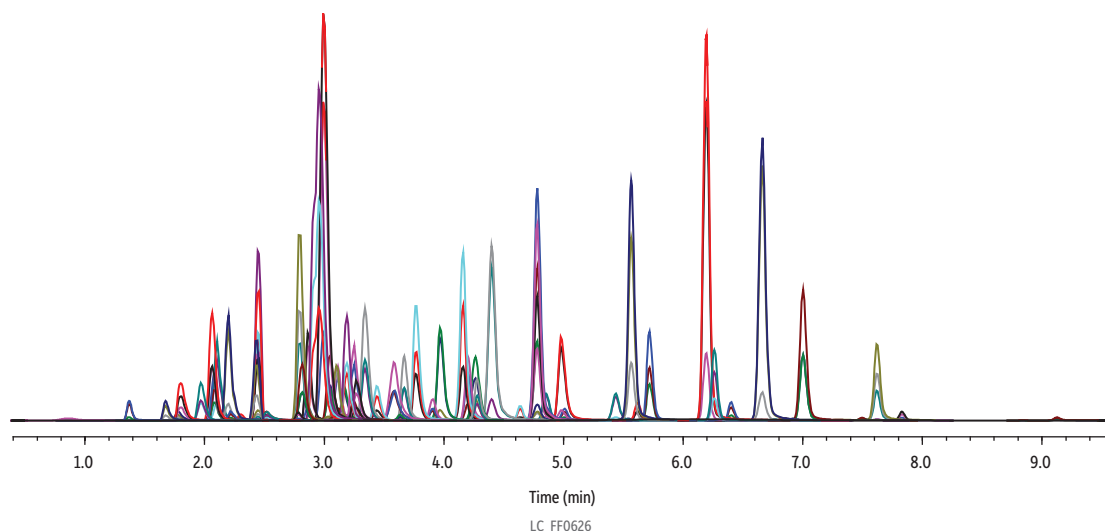
Chlormequat chloride (999-81-5)

*This reference material contains both the Spinetoram J and L isomers (187166-40-1 and 187166-15-0); however, CAS# 935545-74-7 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 935545-74-7 is a blend of Spinetoram J and L, and the ratio of each material isomer are displayed on your certificate of analysis.

†This reference material contains Spinosad A and D isomers (131929-60-7 and 131929-63-0); however, CAS# 168316-95-8 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 168316-95-8 is a blend of Spinosad A and D, and the ratio of each material isomer are displayed on your certificate of analysis.

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
New York Pesticide Kit							
1 mL/ampul, 8 ampuls/kit	No	6 months	14 months	Ambient	-20 °C or colder	kit	32605
<i>Note: The kit contains one ampul of each of the following. Each ampul may also be purchased individually.</i>							
New York Pesticide Standard #1							
500 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	14 months	Ambient	-20 °C or colder	ea.	32606
New York Pesticide Standard #2							
500 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32607
New York Pesticide Standard #3							
500 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32608
New York Pesticide Standard #4							
500 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32609
Captan Standard							
1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	0 °C or colder	ea.	32610
Azadirachtin Standard							
500 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	0 °C or colder	ea.	32611
3-Indolebutyric Acid Standard							
1000 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	0 °C or colder	ea.	32612
Chlormequat Standard							
500 µg/mL, Acetonitrile, 1 mL/ampul	No	6 months	24 months	Ambient	0 °C or colder	ea.	32613

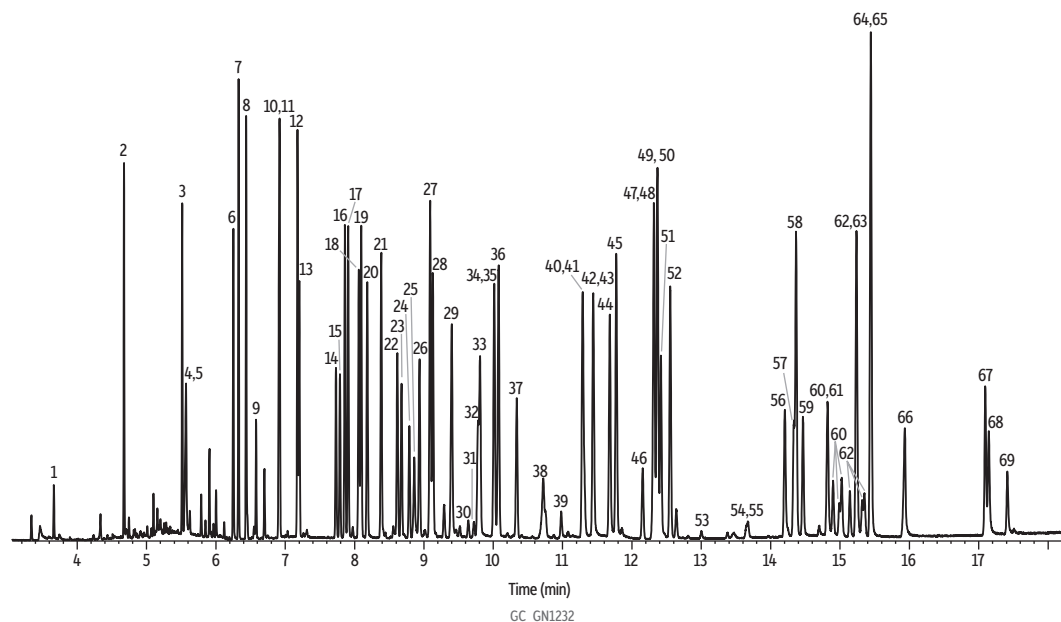
Figure 1: Our New York pesticide 70-compound kit is ideal for labs performing LC analysis of pesticides.



Peaks	tr (min)	Conc. (ng/mL)	Precursor Ion	Product Ion 1	Product Ion 2	Mode	Peaks	tr (min)	Conc. (ng/mL)	Precursor Ion	Product Ion 1	Product Ion 2	Mode
1. Daminozide	0.75	50	161.10	44.10	143.20	+	38. Fipronil	3.61	50	436.80	331.80	251.90	-
2. Acephate	1.26	50	184.00	143.10	95.10	+	39. Ethoprophos	3.69	50	243.10	131.05	97.05	+
3. Oxamyl	1.63	50	237.10	72.10	90.10	+	40. Fenoxycarb	3.74	50	302.10	88.10	116.10	+
4. Flonicamid	1.74	50	230.10	203.10	174.05	+	41. Kresoxim-methyl	3.83	50	314.20	267.15	222.15	+
5. Thiamethoxam	1.75	50	292.00	211.10	181.10	+	42. Tebuconazole	4.00	50	308.10	70.10	125.05	+
6. Chlordane	1.76	50	210.50	181.50	108.25	+	43. Clofentezine	4.19	50	303.00	138.05	102.10	+
7. Methomyl	1.78	50	163.10	88.05	106.10	+	44. Diazinon	4.19	50	305.10	169.15	153.15	+
8. Imidacloprid	1.98	50	256.10	209.05	175.10	+	45. Coumaphos	4.24	50	363.10	227.10	307.05	+
9. Dimethoate	2.03	50	230.00	199.05	125.10	+	46. Propiconazole	4.24	50	342.00	159.00	69.15	+
10. Mevinphos	2.03	50	225.10	127.10	193.15	+	47. Spinosad	4.36	50	732.40	142.15	98.10	+
11. Thiocloprid	2.10	50	253.00	126.00	90.05	+	48. MGK 264	4.51	50	276.00	210.20	98.10	+
12. Acetamiprid	2.12	50	223.00	126.05	56.10	+	49. Trifloxystrobin	4.72	50	409.20	186.10	145.05	+
13. Aldicarb	2.31	50	116.00	89.15	70.20	+	50. Chlorfenapyr	4.79	50	408.50	186.05	145.15	+
14. Propoxur	2.33	50	210.10	111.05	93.10	+	51. Prallethrin	4.79	50	301.20	104.85	123.15	+
15. Imazalil	2.39	50	297.00	159.00	201.00	+	52. Spinosyn D	4.90	50	746.50	142.30	98.35	+
16. Dichlorvos (DDVP)	2.40	50	222.00	123.05	165.15	+	53. Spinosyn J	5.02	50	748.50	142.25	98.30	+
17. Carbaryl	2.41	50	202.10	145.10	127.10	+	54. Pyrethrin II	5.07	50	373.10	161.10	133.15	+
18. Pentachloronitrobenzene	2.45	50	297.70	159.10	201.00	+	55. Piperonyl butoxide	5.43	50	356.30	177.20	119.15	+
19. 3-Indolebutyric acid	2.49	50	203.90	186.00	130.20	+	56. Spinosyn L	5.45	50	760.50	142.20	98.05	+
20. Carbofuran	2.57	50	222.10	123.10	165.15	+	57. Chlorpyrifos	5.55	50	349.90	198.00	97.05	+
21. Naled	2.68	50	397.80	127.10	109.10	+	58. Hexythiazox	5.61	50	353.10	228.10	168.10	+
22. Chlorantraniliprole	2.73	50	483.90	452.90	285.90	+	59. Jasmolin II	5.62	50	374.90	163.20	107.15	+
23. Metalaxyl	2.78	50	280.20	220.20	192.20	+	60. Spiromesifen	6.20	50	273.20	255.20	187.15	+
24. Spiroxamine	2.82	50	298.30	144.20	100.20	+	61. Etoxazole	6.21	50	360.20	141.10	304.15	+
25. Phosmet	2.89	50	318.00	160.10	77.20	+	62. Pyrethrin I	6.40	50	329.20	161.15	105.20	+
26. Cinerin I	2.98	50	317.50	301.15	105.20	+	63. Fenpyroximate	6.63	50	422.20	366.10	138.10	+
27. Fludioxonil	2.98	50	247.00	180.00	126.00	-	64. Cyfluthrin	6.65	50	435.00	192.95	418.05	+
28. Azoxystrobin	3.00	50	404.00	372.10	344.10	+	65. Methyl parathion	6.89	50	263.60	232.00	125.10	+
29. Methiocarb	3.03	50	226.10	169.10	121.10	+	66. Jasmolin I	6.92	50	331.00	163.20	107.10	+
30. Boscalid	3.08	50	342.90	307.05	140.05	+	67. Pyridaben	6.93	50	365.10	309.15	147.20	+
31. Malathion	3.18	50	331.00	99.10	127.15	+	68. Permethrin trans	7.19	50	408.30	183.15	355.10	+
32. Myclobutanil	3.19	50	289.10	70.10	125.10	+	69. Abamectin	7.39	50	890.50	305.35	567.36	+
33. Dimethomorph	3.19	50	388.20	301.15	165.30	+	70. Permethrin cis	7.46	50	408.30	183.15	355.10	+
34. Paclobutrazol	3.24	50	294.30	70.10	125.10	+	71. Etofenprox	7.61	50	394.30	177.20	359.25	+
35. Bifenazate	3.36	50	301.00	198.10	170.15	+	72. Cinerin II	7.72	50	360.50	184.10	183.10	+
36. Fenhexamid	3.39	50	302.10	97.10	55.20	+	73. Bifenthrin	7.76	50	440.00	181.15	166.15	+
37. Spirotetramat	3.55	50	374.20	302.10	216.10	+	74. Acequinocyl	9.21	50	386.00	344.20	189.10	+

Column: Raptor ARC-18 (cat.# 9314A12); Dimensions: 100 mm x 2.1 mm ID; Particle Size: 2.7 µm; Pore Size: 90 Å; Temp.: 40 °C; **Sample:** New York pesticide standard #1 (cat.# 32606); New York pesticide standard #2 (cat.# 32607); New York pesticide standard #3 (cat.# 32608); New York pesticide standard #4 (cat.# 32609); Azadirachtin (cat.# 32611); 3-Indolebutyric acid (cat.# 32612); Diluent: 50:50 Water:acetonitrile; Inj. Vol.: 1 µL; **Mobile Phase:** A: Water, 2 mM ammonium formate, 0.1% formic acid; B: Methanol, 2 mM ammonium formate, 0.1% formic acid; **Gradient (%B):** 0.00 min (5% B), 1.50 min (65% B), 8.50 min (95% B), 9.50 min (100% B), 10.50 min (100% B), 10.60 min (5% B), 12.00 min (5% B); **Flow:** 0.5 mL/min; **Detector:** Shimadzu 8060; Ion Source: Electrospray; Ion Mode: ESI+/ESI-; Mode: Scheduled MRM; **Instrument:** Shimadzu Nexera X2; **Sample Preparation:** A 500 ppb stock was prepared by adding 1 µL of each New York pesticide standard, 1 µL of azadirachtin, and 0.5 µL of 3-indolebutyric acid to 994.5 µL of 50:50 water:acetonitrile in a 2.0 mL, amber, short-cap vial (cat.# 21142) and capped with a 9 mm short cap (cat.# 24497). The sample was then briefly vortexed. A 100 µL aliquot was added to 900 µL 50:50 water:acetonitrile for a final concentration of 50 ppb. **Notes:** Cypermethrin and Azadirachtin are not amenable to LC and should be analyzed by GC. New York pesticide standards are also available as a kit: New York pesticide kit (cat.# 32605).

Figure 2: When paired with Restek's Rxi-5ms columns, our New York pesticide standards provide a comprehensive view of pesticides for GC labs.



Peaks	tr (min)	Conc. (ppm)	Mix #	Ions	Peaks	tr (min)	Conc. (ppm)	Mix #	Ions
1. Methomyl	3.664	50	32606	105, 88, 58	35. Myclobutanil	10.013	50	32608	288, 245, 179, 150
2. Dichlorvos (DDVP)	4.675	50	32606	109, 185, 79, 220	36. Kresoxim methyl	10.076	50	32609	116, 131, 206
3. Mevinphos	5.514	50	32606	127, 109, 164, 192	37. Chlorfenapyr	10.338	50	32609	59, 247, 137
4. Acephate	5.569	50	32606	136, 94, 42, 125, 142	38. Jasmolin I	10.719	50	32607	123, 133, 162
5. Daminozide	5.584	50	32609	142, 118, 100, 59	39. Pyrethrin I	10.979	50	32607	123, 133, 162
6. Flonicamid	6.252	50	32609	174, 229, 146, 126	40. Trifloxystrobin	11.288	50	32609	116, 131, 222, 186
7. Propoxur (Baygon)	6.327	50	32606	110, 152, 81	41. Propiconazole 1	11.31	50	32608	259, 191, 173, 69
8. Ethoprophos	6.437	50	32606	158, 200, 242	42. Propiconazole 2	11.438	50	32608	259, 191, 173, 69
9. Naled	6.58	50	32606	109, 145, 301	43. Fenhexamid	11.44	50	32609	301, 266, 177, 97, 55
10. Dimethoate	6.909	50	32606	229, 143, 87, 93	44. Tebuconazole	11.679	50	32608	250, 125, 70
11. Carbofuran	6.919	50	32606	164, 149, 221, 125	45. Piperonyl butoxide	11.772	50	32609	176, 193, 149, 338
12. Diazinon	7.176	50	32606	132, 179, 199, 304	46. Spiromesifen	12.154	50	32609	272, 370, 254, 99
13. Pentachloronitrobenzene (quintozene)	7.203	50	32608	295, 265, 249, 237	47. Acetamidiprid	12.316	50	32608	221, 166, 152, 126
14. Spiroxamine	7.731	50	32609	100, 126	48. Phosmet	12.316	50	32606	160, 317
15. Methyl parathion	7.788	50	32606	109, 125, 263	49. Bifenthrin	12.367	50	32607	181, 165, 166
16. Carbaryl (Sevin)	7.86	50	32606	144, 115, 201	50. Fenoxycarb	12.367	50	32606	116, 88, 186, 301
17. Metalaxyl	7.907	50	32609	206, 249, 279, 132	51. Bifenazate	12.416	50	32606	300, 258, 199, 196
18. Spiroxamine	8.06	50	32609	100, 126, 198	52. Etoxazole	12.551	50	32608	359, 330, 300, 141
19. Methiocarb	8.095	50	32606	168, 153, 225	53. Cinerin II	12.999	50	32607	107, 121, 167
20. Malathion	8.182	50	32606	125, 173, 158	54. Jasmolin II	13.659	50	32607	107, 121, 167
21. Chlorpyrifos	8.384	50	32606	197, 314, 258, 286	55. Pyrethrin II	13.67	50	32607	107, 121, 167
22. MGK-264 1	8.616	50	32609	164, 275, 210, 111	56. cis-Permethrin	14.203	50	32607	183, 163, 165
23. Thiamethoxam	8.676	50	32608	247, 212, 182, 132	57. trans-Permethrin	14.334	50	32607	183, 163, 165
24. MGK-264 2	8.789	50	32609	164, 275, 210, 111	58. Pyridaben	14.365	50	32609	147, 364, 309
25. 3-Indolebutyric acid	8.86	100	32612	203, 143, 130	59. Coumaphos	14.464	50	32606	109, 226, 362
26. Fipronil	8.936	50	32608	367, 351, 213	60. Cyfluthrin	14.82-15.021	50	32607	226, 263, 206
27. Captan	9.089	100	32610	79, 149, 264	61. Spirotetramat	14.82	50	32609	373, 286, 117
28. Prallethrin	9.127	50	32607	123, 105, 134	62. Cypermethrins	15.139-15.445	50	32607	181, 163, 209
29. Paclobutrazol	9.4	50	32608	236, 167, 125	63. Boscalid	15.237	50	32609	140, 342, 112, 167
30. Chlordane	9.639	50	32608	410, 375, 272, 237	64. Etofenprox	15.443	50	32607	163, 183, 135
31. Chlordane	9.718	50	32608	410, 375, 272, 237	65. Acequinocyl	15.444	50	32607	342, 188
32. Imazalil	9.781	50	32608	215, 173, 159, 41	66. Thiacloprid	15.933	50	32608	126, 251, 183, 101
33. Fludioxonil	9.808	50	32608	248, 182, 154, 127	67. Azoxystrobin	17.094	50	32609	344, 388, 372, 403
34. Cinerin I	10.011	50	32607	123, 133, 162	68. Dimethomorph	17.144	50	32609	301, 387, 165
					69. Dimethomorph	17.412	50	32609	301, 387, 165

Column: Rxi-5ms, 30 m, 0.25 mm ID, 0.25 µm (cat.# 13423); **Sample:** New York pesticide standard #1 (cat.# 32606), New York pesticide standard #2 (cat.# 32607), New York pesticide standard #3 (cat.# 32608), New York pesticide standard #4 (cat.# 32609), Captan (cat.# 32610), Azadirachtin (cat.# 32611), 3-Indolebutyric acid (cat.# 32612), Chlormequat (cat.# 32613); **Diluent:** Acetonitrile; **Conc.:** 50-100 µg/mL; **Injection Inj. Vol.:** 1 µL splitless (hold 0.5 min); **Liner:** Topaz 4.0 mm ID single taper inlet liner w/wool (cat.# 23447); **Inj. Temp.:** 250 °C; **Purge Flow:** 5 mL/min; **Oven:** Oven Temp.: 70 °C (hold 1 min) to 220 °C at 30 °C/min to 240 °C at 5 °C/min to 315 °C at 10 °C/min (hold 10 min); **Carrier Gas:** He, constant flow, **Flow Rate:** 1.4 mL/min; **Detector:** MS; **Mode:** Scan; **Scan Program:** Group: 1, **Start Time:** 3, **Scan Range:** 55-550 amu, **Scan Rate:** 10 scans/sec; **Transfer Line Temp.:** 280 °C; **Analyzer Type:** Quadrupole; **Source Temp.:** 230 °C; **Quad Temp.:** 180 °C; **Electron Energy:** 70 eV; **Solvent Delay Time:** 3 min; **Tune Type:** PFTBA Ionization Mode: EI; **Instrument:** Agilent 7890B GC & 5977B MSD; **Sample Preparation:** 100 µL of each standard was combined with 200 µL acetonitrile (final volume 1 mL) for a final concentration of 50-100 ppm. The sample was pipetted into a 2 mL, short-cap, screw-thread vial (cat.# 21143) and capped with a short-cap, screw-vial closure (cat.# 24495). **Notes:** Noninterfering petroleum distillates visible in the 4-6 minutes region won't affect the analysis in XIC, SIM, or SRM mode. Some compounds traditionally analyzed by LC were not GC amenable and/or only fragments were detected. These compounds, and the mixes that contain them, are the following: Aldicarb (32606) Oxamyl (32606) Abamectin (32607) Spinosad (32607) Spinetoram (32607) Clofentezine (32608) Imidacloprid (32608) Chlorantraniliprole (32609) Fenpyroximate (32609) Hexythiazox (32609) Azadirachtin (32611) Chlormequat chloride (32613) New York pesticide standards are also available as a kit: New York pesticide kit (cat.# 32605).

Take Advantage of Simplified Calibration and Sample Spiking with Restek's High-Concentration Arizona Pesticide Standard Kit



Restek's new Arizona pesticide certified reference material (CRM) kit features 58 compounds—each with a concentration aligned with the variable state compound action limits to help you easily meet calibration requirements. When the kit's four ampuls are combined, the concentration of each component is 100 times the action limit—giving you the analytical flexibility for constructing calibration curves and spiking sample matrices.

- A single kit formulated specifically for Arizona cannabis regulations.
- Four-mix set designed for maximum stability—ensuring your calibration standards are accurate.
- Two independently produced lots available from our ISO-accredited labs to meet your quality control requirements.



Arizona Pesticide Kit

Cat. # 32601: Arizona Pesticide Standard #1 (18 components)

Accephate (30560-19-1), 160 µg/mL
Aldicarb (116-06-3), 160 µg/mL
Bifenazate (149877-41-8), 80 µg/mL
Carbaryl (Sevin) (63-25-2), 80 µg/mL
Carbofuran (1563-66-2), 80 µg/mL
Chlorpyrifos (2921-88-2), 80 µg/mL
Dichlorvos (62-73-7), 40 µg/mL
Diazinon (333-41-5), 80 µg/mL
Dimethoate (60-51-5), 80 µg/mL
Ethoprophos (13194-48-4), 80 µg/mL
Fenoxycarb (72490-01-8), 80 µg/mL
Malathion (121-75-5), 80 µg/mL
Methiocarb (2032-65-7), 80 µg/mL
Methomyl (16752-77-5), 160 µg/mL
Naled (300-76-5), 200 µg/mL
Oxamyl (23135-22-0), 400 µg/mL
Phosmet (732-11-6), 80 µg/mL
Propoxur (114-26-1), 80 µg/mL

Cat. # 32602: Arizona Pesticide Standard #2 (10 components)

Abamectin (71751-41-2), 200 µg/mL
Acequinocyl (57960-19-7), 800 µg/mL
Bifenthrin (82657-04-3), 80 µg/mL
Cyfluthrin (68359-37-5), 400 µg/mL
Cypermethrin (52315-07-8), 400 µg/mL
Etofenprox (80844-07-1), 160 µg/mL
Permethrin (cis & trans) (52645-53-1), 80 µg/mL
Prallethrin (23031-36-9), 80 µg/mL
Pyrethrins (8003-34-7), 400 µg/mL
Spinosad (A&D) (168316-95-8)*, 80 µg/mL

Cat. # 32603: Arizona Pesticide Standard #3 (14 components)

Acetamiprid (135410-20-7), 80 µg/mL
Clofentezine (74115-24-5), 80 µg/mL
Etoxazole (153233-91-1), 80 µg/mL
Fipronil (120068-37-3), 160 µg/mL
Fludioxonil (131341-86-1), 160 µg/mL
Imazalil (35554-44-0), 80 µg/mL
Imidacloprid (138261-41-3), 160 µg/mL
Myclobutanil (88671-89-0), 80 µg/mL
Paclobutrazol (76738-62-0), 160 µg/mL
Pendimethalin (40487-42-1), 40 µg/mL
Propiconazole (Tilt) (60207-90-1), 160 µg/mL
Tebuconazole (107534-96-3), 160 µg/mL
Thiacloprid (111988-49-9), 80 µg/mL
Thiamethoxam (153719-23-4), 80 µg/mL

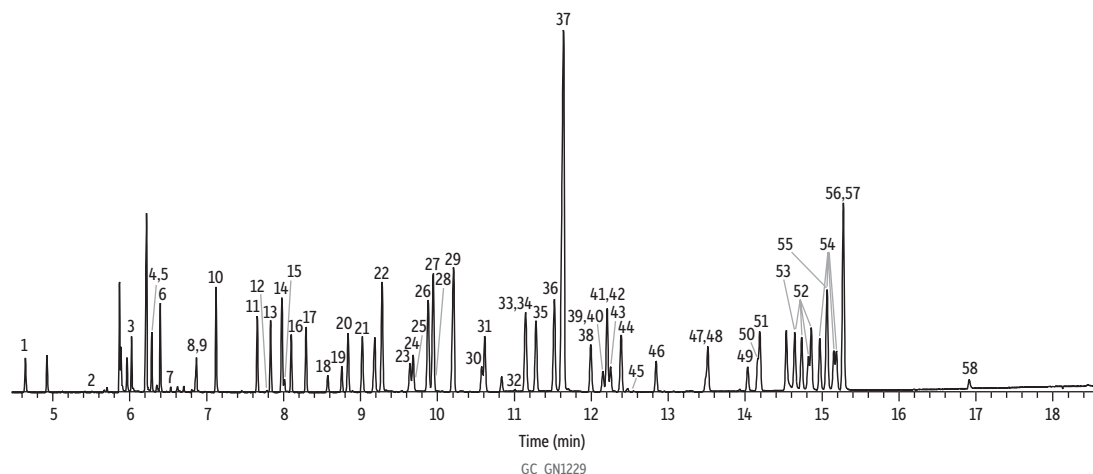
Cat. # 32604: Arizona Pesticide Standard #4 (16 components)

Azoxystrobin (131860-33-8), 80 µg/mL
Boscalid (188425-85-6), 160 µg/mL
Chlorantraniliprole (500008-45-7), 80 µg/mL
Chlorfenapyr (122453-73-0), 400 µg/mL
Daminozide (1596-84-5), 400 µg/mL
(E)-Fenpyroximate (134098-61-6), 160 µg/mL
Flonicamid (158062-67-0), 400 µg/mL
Hexythiazox (78587-05-0), 400 µg/mL
Kresoxim methyl (143390-89-0), 160 µg/mL
Metalaxyl (57837-19-1), 80 µg/mL
Piperonyl butoxide (51-03-6), 800 µg/mL
Pyridaben (96489-71-3), 80 µg/mL
Spiromesifen (283594-90-1), 80 µg/mL
Spirotetramat (203313-25-1), 80 µg/mL
Spiroxamine (118134-30-8), 160 µg/mL
Trifloxystrobin (141517-21-7), 80 µg/mL

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat. #
Arizona Pesticide Kit							
1 mL/ampul, 4 ampuls/kit	Yes	6 months	14 months	Ambient	-20 °C or colder	kit	32600
<i>Note: The kit contains one ampul of each of the following. Each ampul may also be purchased individually.</i>							
Arizona Pesticide Standard #1							
40-400 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	14 months	Ambient	-20 °C or colder	ea.	32601
Arizona Pesticide Standard #2							
80-800 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32602
Arizona Pesticide Standard #3							
40-160 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32603
Arizona Pesticide Standard #4							
80-800 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32604

* This reference material contains Spinosad A and D isomers (131929-60-7 and 131929-63-0); however, CAS# 168316-95-8 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 168316-95-8 is a blend of Spinosad A and D, and the ratio of each material isomer are displayed your certificate of analysis.

Figure 1: Rely on optimized chromatographic conditions for our Arizona pesticide kit to save time with method development for GC analysis.



Peaks	tr (min)	Conc. (µg/mL)	Mix
1. Dichlorvos	4.65	4	32601
2. Acephate	5.55	16	32601
3. Oxamyl	6.02	40	32601
4. Propoxur	6.31	8	32601
5. Flonicamid	6.32	40	32604
6. Ethoprophos	6.40	8	32601
7. Naled	6.54	20	32601
8. Dimethoate	6.87	8	32601
9. Carbofuran	6.88	8	32601
10. Diazinon	7.12	8	32601
11. Spiroxamine 1	7.66	16	32604
12. Carbaryl	7.80	8	32601
13. Metalaxyl	7.83	8	32604
14. Spiroxamine 2	7.98	16	32604
15. Methiocarb	8.01	8	32601
16. Malathion	8.10	8	32601
17. Chlorpyrifos	8.29	8	32601
18. Thiamethoxam	8.57	8	32603
19. Pendimethalin	8.76	4	32603
20. Fipronil	8.84	16	32603
21. Prallethrin	9.02	8	32602
22. Paclobutrazol	9.28	16	32603
23. Imazalil	9.64	8	32603
24. Fludioxonil	9.68	16	32603
25. Imidacloprid	9.74	16	32603
26. Cinerin I	9.88	40	32602
27. Myclobutanil	9.95	8	32603
28. Kresoxim-methyl	10.01	16	32604
29. Chlorfenapyr	10.21	40	32604
30. Jasmodin I	10.58	40	32602
31. Pyrethrin I	10.61	40	32602
32. Pyrethrin I	10.83	40	32602
33. Propiconazole 1	11.14	16	32603
34. Trifloxystrobin	11.14	8	32604
35. Propiconazole 2	11.28	16	32603
36. Tebuconazole	11.52	16	32603
37. Piperonyl butoxide	11.64	80	32604
38. Spiromesifen	12.06	8	32604
39. Fenoxycarb	12.15	8	32601
40. Acetamiprid	12.15	8	32603
41. Bifenthrin	12.21	8	32602
42. Phosmet	12.21	8	32601
43. Bifenazate	12.25	8	32601
44. Etoxazole	12.39	8	32603
45. Chlorantraniliprole fragment	12.52	8	32604
46. Cinerin II	12.84	40	32602
47. Jasmodin II	13.49	40	32602
48. Pyrethrin II	13.51	40	32602
49. cis-Permethrin	14.03	8	32602
50. trans-Permethrin	14.16	8	32602
51. Pyridaben	14.19	8	32604
52. Cyfluthrin	14.64-14.87	40	32602
53. Spirotetramat	14.64	8	32604
54. Cypermethrin	14.98-15.30	40	32602
55. Boscalid	15.06	16	32604
56. Acequinocyl	15.28	80	32602
57. Etofenprox	15.28	16	32602
58. Azoxystrobin	16.91	8	32604

Column
Standard/Sample

Diluent:

Conc.:

Injection

Inj. Vol.:

Liner:

Inj. Temp.:

Purge Flow:

Oven

Oven Temp.:

Carrier Gas

Flow Rate:

Detector

Scan Program:

Rxi-5ms, 30 m, 0.25 mm ID, 0.25 µm (cat.# 13423)

Arizona pesticide standard #1 (cat.# 32601)

Arizona pesticide standard #2 (cat.# 32602)

Arizona pesticide standard #3 (cat.# 32603)

Arizona pesticide standard #4 (cat.# 32604)

Acetonitrile

4-80 µg/mL

1 µL splitless (hold 0.5 min)

Topaz 4.0 mm ID single taper inlet liner w/wool (cat.# 23447)

250 °C

5 mL/min

70 °C (hold 1 min) to 220 °C at 30 °C/min to 240 °C at 5 °C/min to 315 °C at

10 °C/min (hold 10 min)

He, constant flow

1.4 mL/min

Thermo TSQ8000

Scan Program:

Group	Start Time (min)	Scan Range (amu)	Scan Rate (scans/sec)
1	2.5	55-550	10

Transfer Line Temp.:

Analyzer Type:

Source Temp.:

Solvent Delay Time:

Tune Type:

Ionization Mode:

Sample Preparation

Notes

290 °C

Quadrupole

330 °C

2.5 min

PFTBA

El

100 µL of each standard was combined with 600 µL acetonitrile (final volume 1 mL) for a final concentration of 4-80 ppm. The sample was pipetted into a 2 mL short-cap, screw-thread vial (cat.# 21143) and capped with a short-cap, screw-vial closure (cat.# 24495).

Some compounds traditionally analyzed by LC were not GC amenable and/or only fragments were detected. These compounds, and the mixes that contain them, are:

Aldicarb (32601)

Abamectin (32602)

Spinosad (32602)

Clofentezine (32603)

Thiacloprid (32603)

Daminozide (32604)

(E)-Fenpyroximate (32604)

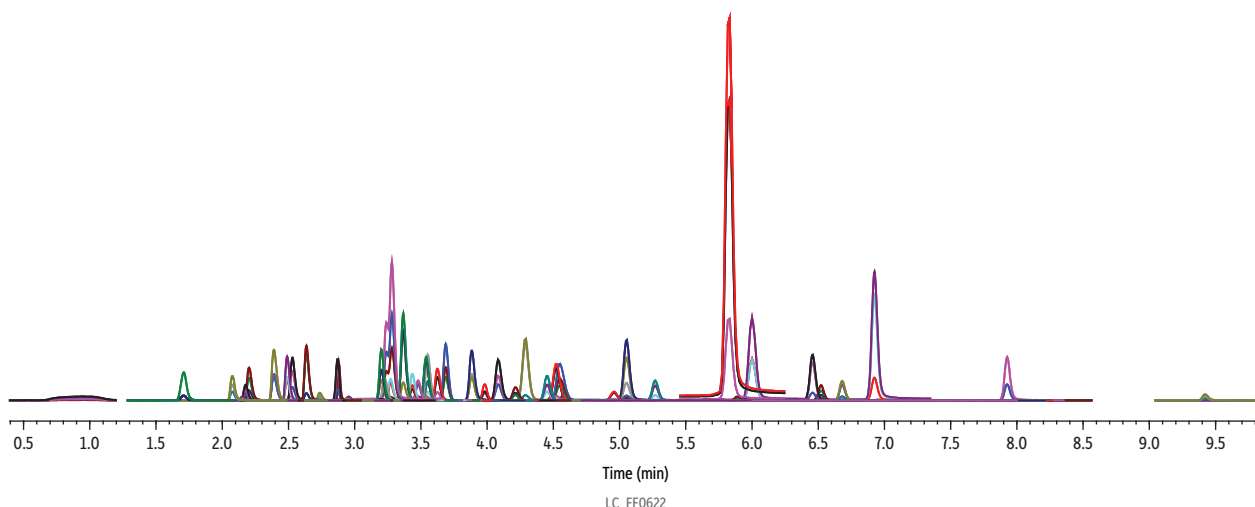
Hexythiazox (32604)

Spiromesifen (32604)

Arizona pesticide standards are also available as a kit:

Arizona pesticide kit (cat.# 32600).

Figure 2: Our Arizona pesticide kit is also ideal for LC labs performing these critical cannabis analyses.



Peaks	tr (min)	Conc. (ng/mL)	Precursor Ion	Product Ion 1	Product Ion 2	Mode	Peaks	tr (min)	Conc. (ng/mL)	Precursor Ion	Product Ion 1	Product Ion 2	Mode
1. Daminozide	0.93	500	161.1	44.1	143.2	+	30. Spirotetramat	3.88	100	374.2	302.1	216.1	+
2. Acephate	1.71	200	184.0	143.1	95.1	+	31. Fipronil	3.97	100	436.8	331.8	251.9	-
3. Oxamyl	2.08	250	237.1	72.1	90.1	+	32. Ethoprophos	3.98	50	243.1	131.1	97.1	+
4. Flonicamid	2.15	200	230.1	203.1	174.1	+	33. Fenoxycarb	4.08	200	302.1	88.1	116.1	+
5. Methomyl	2.18	100	163.1	88.1	106.1	+	34. Kresoxim-methyl	4.22	100	314.2	267.2	222.2	+
6. Thiamethoxam	2.20	100	292.0	211.1	181.1	+	35. Tebuconazole	4.29	200	308.1	70.1	125.1	+
7. Imidacloprid	2.39	500	256.1	209.1	175.1	+	36. Diazinon	4.45	500	305.1	169.2	153.2	+
8. Dimethoate	2.49	100	230.0	199.1	125.1	+	37. Spinosad	4.52	67	732.4	142.2	98.1	+
9. Acetamiprid	2.53	100	223.0	126.1	56.1	+	38. Propiconazole	4.55	100	342.0	159.0	69.2	+
10. Thiacloprid	2.64	100	253.0	126.0	90.1	+	39. Clofentezine	4.59	100	303.0	138.1	102.1	+
11. Aldicarb	2.74	200	116.0	89.2	70.2	+	40. Spinosad (Spinosyn D)	4.96	100	746.5	142.3	98.4	+
12. Dichlorvos (DDVP)	2.87	500	220.9	109.1	79.2	+	41. Trifloxystrobin	5.05	100	409.2	186.1	145.1	+
13. Propoxur	2.87	200	210.1	111.1	93.1	+	42. Prallethrin	5.05	1000	301.2	105.2	123.2	+
14. Carbofuran	2.88	100	222.1	123.1	165.2	+	43. Pyrethrin II	5.27	500	373.1	161.1	133.2	+
15. Imazalil	2.93	200	297.0	159.0	201.0	+	44. Piperonyl butoxide	5.83	100	356.3	177.2	119.2	+
16. Carbaryl	2.96	100	202.1	145.1	127.1	+	45. Chlorpyrifos	5.89	50	349.9	198.0	97.1	+
17. Naled	3.20	200	380.8	127.1	109.0	+	46. Pendimethalin	5.96	200	282.0	212.2	194.2	+
18. Metalaxyl	3.20	200	280.2	220.2	192.2	+	47. Hexythiazox	6.00	500	353.1	228.1	168.1	+
19. Chlorantraniliprole	3.23	100	483.9	452.9	285.9	+	48. Etoxazole	6.46	100	360.2	141.1	304.2	+
20. Phosmet	3.27	100	318.0	160.1	77.2	+	49. Spiromesifen	6.52	100	273.2	255.2	187.2	+
21. Spiroxamine	3.28	200	298.3	144.2	100.2	+	50. Pyrethrin I	6.68	100	329.2	161.2	105.2	+
22. Azoxystrobin	3.37	100	404.0	372.1	344.1	+	51. (E)-Fenpyroximate	6.93	100	422.2	366.1	138.1	+
23. Fludioxonil	3.42	200	247.0	180.0	126.0	-	52. Cypermethrin	7.05	100	433.1	191.0	127.1	+
24. Methiocarb	3.43	100	226.1	169.1	121.1	+	53. trans-Permethrin	7.49	50	408.3	183.2	355.1	+
25. Boscalid	3.48	200	342.9	307.1	140.1	+	54. cis-Permethrin	7.80	50	408.3	183.2	355.1	+
26. Paclobutrazol	3.54	500	294.3	70.1	125.1	+	55. Abamectin	7.83	250	890.5	305.4	567.4	+
27. Malathion	3.55	200	331.0	99.1	127.2	+	56. Etofenprox	7.93	100	394.3	177.2	359.3	+
28. Myclobutanil	3.63	100	289.1	70.1	125.1	+	57. Bifenthrin	8.15	100	440.0	181.1	166.2	+
29. Bifenazate	3.69	100	301.0	198.1	170.2	+	58. Acequinocyl	9.42	1000	386.0	344.2	189.1	+

Column Raptor ARC-18 (cat.# 9314A12)
Dimensions: 100 mm x 2.1 mm ID
Particle Size: 2.7 µm
Pore Size: 90 Å
Temp.: 40 °C
Standard/Sample Arizona pesticide standard #1 (cat.# 32601)
Arizona pesticide standard #2 (cat.# 32602)
Arizona pesticide standard #3 (cat.# 32603)
Arizona pesticide standard #4 (cat.# 32604)
Diluent: Water
Inj. Vol.: 1 µL
Mobile Phase
A: Water, 2 mM ammonium formate, 0.1% formic acid
B: Methanol, 2 mM ammonium formate, 0.1% formic acid

Detector Shimadzu 8045 MS/MS
Ion Source: Electrospray
Ion Mode: ESI+/ESI-
Mode: Scheduled MRM
Instrument Shimadzu Nexera X2
Sample Preparation To prepare the test standard, 1.25 µL of each standard was combined with 995 µL water in a 2.0 mL amber, short-cap vial (cat.# 21142) and then capped with a 9 mm short cap (cat.# 24497).
Notes Arizona pesticide standards are also available as a kit: Arizona pesticide kit (cat.# 32600).

Time (min)	Flow (mL/min)	%A	%B
0.00	0.5	95	5
1.50	0.5	35	65
8.50	0.5	5	95
9.50	0.5	0	100
10.50	0.5	0	100
10.60	0.5	95	5
12.00	0.5	95	5

Reference Standards

Canadian Pesticide Kit

Cat. # 32593: Canadian Pesticide Standard #1 (15 components)

Aldicarb (116-06-3)
Bifenazate (149877-41-8)
Carbaryl (Sevin) (63-25-2)
Carbofuran (1563-66-2)
Fenoxycarb (72490-01-8)
Iprodione (36734-19-7)
Methiocarb (2032-65-7)
Methomyl (16752-77-5)
Novaluron (116714-46-6)
Oxamyl (23135-22-0)
Pirimicarb (23103-98-2)
Propoxur (Baygon) (114-26-1)
Pyraclostrobin (175013-18-0)
Teflubenzuron (83121-18-0)
Thiophanate-methyl (23564-05-8)

Cat. # 32594: Canadian Pesticide Standard #2 (14 components)

Acephate (30560-19-1)
Chlorpyrifos (2921-88-2)
Coumaphos (56-72-4)
Diazinon (333-41-5)
Dimethoate (60-51-5)

Ethoprophos (13194-48-4)
Fensulfothion (115-90-2)
Fenthion (55-38-9)
Malathion (121-75-5)
Methyl parathion (298-00-0)
Mevinphos (7786-34-7)
Naled (300-76-5)
Phosmet (732-11-6)
Tetrachlorvinphos (22248-79-9)

Cat. # 32595: Canadian Pesticide Standard #3 (18 components)

Abamectin (71751-41-2)
Allethrin (584-79-2)
Bifenthrin (82657-04-3)
Cyfluthrin (68359-37-5)
Cypermethrin (52315-07-8)
Deltamethrin (52918-63-5)
Etofenprox (80844-07-1)
Fenvalerate (51630-58-1)
Permethrin (cis & trans) (52645-53-1)
Phenothrin (cis & trans) (26002-80-2)
Prallethrin (23031-36-9)
Pyrethrins (8003-34-7)
Resmethrin (10453-86-8)

Spinetoram (J&L) (935545-74-7)*
Spinosad (A&D) (168316-95-8)[†]
Spirodiclofen (148477-71-8)
Spiromesifen (283594-90-1)
Tetramethrin (7696-12-0)

Cat. # 32596: Canadian Pesticide Standard #4 (16 components)

Azoxystrobin (131860-33-8)
Chlorfenapyr (122453-73-0)
Clofentezine (74115-24-5)
Cyprodinil (121552-61-2)
Daminozide (1596-84-5)
Etoxazole (153233-91-1)
Etridiazole (2593-15-9)
(E)-Fenpyroximate (134098-61-6)
Fipronil (120068-37-3)
Fludioxonil (131341-86-1)
Imazalil (35554-44-0)
Myclobutanil (88671-89-0)
Paclobutrazol (76738-62-0)
Propiconazole (Tilt) (60207-90-1)
Pyridaben (96489-71-3)
Tebuconazole (107534-96-3)

Cat. # 32597: Canadian Pesticide Standard #5 (17 components)

Benzovindiflupyr (1072957-71-1)
Boscalid (188425-85-6)
Buprofezin (69327-76-0)
Chlorantraniliprole (500008-45-7)
Clothianidin (210880-92-5)
Cyantraniliprole (736994-63-1)
Dimethomorph (110488-70-5)
Dinotefuran (165252-70-0)
Flonicamid (158062-67-0)
Fluopyram (658066-35-4)
Hexythiazox (78587-05-0)
Imidacloprid (138261-41-3)
Metalaxyl (57837-19-1)
Pentachloronitrobenzene (82-68-8)
Spirotetramat (203313-25-1)
Tebufenozide (112410-23-8)
Thiamethoxam (153719-23-4)

Cat. # 32598: Canadian Pesticide Standard #6 (14 components)

Acequinocyl (57960-19-7)
Acetamiprid (135410-20-7)
Dodemorph (1593-77-7)
Endosulfan I (959-98-8)
Endosulfan II (33213-65-9)
Endosulfan sulfate (1031-07-8)
Kinoprene (42588-37-4)
Kresoxim methyl (143390-89-0)
Methoprene (40596-69-8)
MGK-264 (113-48-4)
Piperonyl butoxide (51-03-6)
Spiroxamine (118134-30-8)
Thiacloprid (111988-49-9)
Trifloxystrobin (141517-21-7)

Cat. # 32599: Azadirachtin Standard

Azadirachtin (11141-17-6)

Cat. # 32585: Dichlorvos Standard

Dichlorvos (DDVP) (62-73-7)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
Canadian Pesticide Kit							
1 mL/ampul, 8 ampuls/kit	Yes	6 months	14 months	Ambient	-20 °C or colder	kit	32592
<i>Note: The kit contains one ampul of each of the following. Each ampul may also be purchased individually.</i>							
Canadian Pesticide Standard #1							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32593
Canadian Pesticide Standard #2							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	0 °C or colder	ea.	32594
Canadian Pesticide Standard #3							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	32595
Canadian Pesticide Standard #4							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	-20 °C or colder	ea.	32596
Canadian Pesticide Standard #5							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	0 °C or colder	ea.	32597
Canadian Pesticide Standard #6							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	-20 °C or colder	ea.	32598
Azadirachtin Standard (CAS # 11141-17-6)							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	0 °C or colder	ea.	32599
Dichlorvos Standard (CAS # 62-73-7)							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	14 months	Ambient	0 °C or colder	ea.	32585

* This reference material contains both the Spinetoram J and L isomers (187166-40-1 and 187166-15-0); however, CAS# 935545-74-7 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 935545-74-7 is a blend of Spinetoram J and L, and the ratio of each material isomer are displayed on your certificate of analysis.

[†] This reference material contains Spinosad A and D, isomers (131929-60-7 and 131929-63-0); however, CAS# 168316-95-8 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 168316-95-8 is a blend of Spinosad A and D, and the ratio of each material isomer are displayed on your certificate of analysis.



California Pesticide Standards

(6 separate mixes)

- Meet specific cannabis analysis needs of California set forth by the Bureau of Cannabis Control for regulated category I and II residual pesticide reporting—and of states with similar regulations/programs.
- Ideal for creating multipoint (five-point minimum suggested) calibration curves for GC-MS/MS and LC-MS/MS.
- 66 compounds in 6 x 1 mL ampuls at 100 µg/mL.

Each ampul sold separately.

Cat. # 34124: California Pesticide Standard #1 (12 components)

Acephate (30560-19-1)
Chlorpyrifos (2921-88-2)
Coumaphos (56-72-4)
Diazinon (333-41-5)
Dichlorvos (DDVP) (62-73-7)
Dimethoate (60-51-5)
Ethoprophos (13194-48-4)
Malathion (121-75-5)
Methyl parathion (298-00-0)
Mevinphos (7786-34-7)
Naled (300-76-5)
Phosmet (732-11-6)

Cat. # 34125: California Pesticide Standard #2 (11 components)

Abamectin (71751-41-2)
Acequinocyl (57960-19-7)
Bifenthrin (82657-04-3)
Cyfluthrin (68359-37-5)
Cypermethrin (52315-07-8)
Etofenprox (80844-07-1)
Permethrin (cis & trans) (52645-53-1)
Prallethrin (23031-36-9)
Pyrethrins (8003-34-7)
Spinetoram (J&L) (935545-74-7)*
Spinosad (A&D) (168316-95-8)†

Cat. # 34126: California Pesticide Standard #3 (9 components)

Aldicarb (116-06-3)
Bifenazate (149877-41-8)
Carbaryl (Sevin) (63-25-2)
Carbofuran (1563-66-2)
Fenoxycarb (72490-01-8)
Methiocarb (2032-65-7)
Methomyl (16752-77-5)
Oxamyl (23135-22-0)
Propoxur (Baygon) (114-26-1)

Cat. # 34127: California Pesticide Standard #4 (9 components)

Boscalid (188425-85-6)
Captan (133-06-2)
Chlorantraniliprole (500008-45-7)
Daminozide (1596-84-5)
Dimethomorph (110488-70-5)
Fenhexamid (126833-17-8)
Fonicamid (158062-67-0)
Hexythiazox (78587-05-0)
Pyridaben (96489-71-3)

Cat. # 34128: California Pesticide Standard #5 (10 components)

Azoxystrobin (131860-33-8)
Chlorfenapyr (122453-73-0)
(E)-Fenpyroximate (134098-61-6)
Kresoxim methyl (143390-89-0)
Metalaxyl (57837-19-1)

Piperonyl butoxide (51-03-6)
Spiromesifen (283594-90-1)
Spirotetramat (203313-25-1)
Spiroxamine (118134-30-8)
Trifloxystrobin (141517-21-7)

Cat. # 34129: California Pesticide Standard #6 (15 components)

Acetamiprid (135410-20-7)
Chlordane (57-74-9)
Clofentezine (74115-24-5)
Etoxazole (153233-91-1)
Fipronil (120068-37-3)
Fludioxonil (131341-86-1)
Imazalil (35554-44-0)
Imidacloprid (138261-41-3)
Myclobutanil (88671-89-0)
Paclobutrazol (76738-62-0)
Pentachloronitrobenzene (Quintozone) (82-68-8)
Propiconazole (Tilt) (60207-90-1)
Tebuconazole (107534-96-3)
Thiacloprid (111988-49-9)
Thiamethoxam (153719-23-4)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat. #
California Pesticide Standard #1							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	14 months	On Ice	-20 °C or colder	ea.	34124
California Pesticide Standard #2							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	34125
California Pesticide Standard #3							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	34126
California Pesticide Standard #4							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	0 °C or colder	ea.	34127
California Pesticide Standard #5							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	34128
California Pesticide Standard #6							
100 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	24 months	Ambient	-20 °C or colder	ea.	34129

* This reference material contains both the Spinetoram J and L isomers (187166-40-1 and 187166-15-0); however, CAS# 935545-74-7 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 935545-74-7 is a blend of Spinetoram J and L, and the ratio of each material isomer are displayed on your certificate of analysis.

† This reference material contains Spinosad A and D isomers (131929-60-7 and 131929-63-0); however, CAS# 168316-95-8 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 168316-95-8 is a blend of Spinosad A and D, and the ratio of each material isomer are displayed on your certificate of analysis.

Oregon Pesticide Standards

(6 separate mixes)

- Meet specific cannabis pesticide residue analysis needs of Oregon—and states with similar pesticide residue regulations/programs.
- 59 compounds in 6 x 1 mL ampules at 600 µg/mL—resulting in a convenient 100 µg/mL solution when blended immediately before use.



Oregon Cannabis Pesticide Standards meet the specific cannabis pesticide residue analysis needs of Oregon and other states with similar pesticide residue regulations/programs. Dissolved in acetonitrile and formulated for stability, the 59 compounds are separated into 6 x 1 mL solutions with individual analyte concentrations of 600 µg/mL—resulting in a convenient 100 µg/mL solution when blended immediately before use. Designed with quality and convenience in mind, this set of standards eliminates the need for in-house standards preparation. Restek's Oregon Pesticide Standards are certified reference materials (CRM) manufactured and QC tested in ISO-accredited labs.

Each ampul sold separately.

Cat.# 32586: Oregon Pesticide Standard #1 (6 components)

Abamectin (71751-41-2)
Acequinocyl (57960-19-7)
(E)-Fenpyroximate (134098-61-6)
Imidacloprid (138261-41-3)
Spinosad (A&D) (168316-95-8)*
Spirotetramat (203313-25-1)

Cat.# 32587: Oregon Pesticide Standard #2 (14 components)

Acetamiprid (135410-20-7)
Azoxyrobin (131860-33-8)
Bifenazate (149877-41-8)
Boscalid (188425-85-6)
Chlorfenapyr (122453-73-0)
Etoxazole (153233-91-1)
Fludioxonil (131341-86-1)
Kresoxim methyl (143390-89-0)
Metalaxyl (57837-19-1)
MGK-264 (113-48-4)
Piperonyl butoxide (51-03-6)
Spiromesifen (283594-90-1)
Spiroxamine (118134-30-8)
Trifloxystrobin (141517-21-7)

Cat.# 32588: Oregon Pesticide Standard #3 (10 components)

Aldicarb (116-06-3)
Fipronil (120068-37-3)
Flonicamid (158062-67-0)
Hexythiazox (78587-05-0)
Methiocarb (2032-65-7)
Methomyl (16752-77-5)
Oxamyl (23135-22-0)
Pyridaben (96489-71-3)
Thiacloprid (111988-49-9)
Thiamethoxam (153719-23-4)

Cat.# 32589: Oregon Pesticide Standard #4 (12 components)

Carbaryl (Sevin) (63-25-2)
Carbofuran (1563-66-2)
Chlorantraniliprole (500008-45-7)
Clofentezine (74115-24-5)
Daminozide (1596-84-5)
Fenoxycarb (72490-01-8)
Imazalil (35554-44-0)
Myclobutanil (88671-89-0)
Paclobutrazol (76738-62-0)
Propiconazole (Tilt) (60207-90-1)
Propoxur (Baygon) (114-26-1)
Tebuconazole (107534-96-3)

Cat.# 32590: Oregon Pesticide Standard #5 (7 components)

Bifenthrin (82657-04-3)
Cyfluthrin (68359-37-5)
Cypermethrin (52315-07-8)
Etofenprox (80844-07-1)
Permethrin (cis & trans) (52645-53-1)
Prallethrin (23031-36-9)
Pyrethrins (8003-34-7)

Cat.# 32591: Oregon Pesticide Standard #6 (10 components)

Acephate (30560-19-1)
Chlorpyrifos (2921-88-2)
Diazinon (333-41-5)
Dichlorvos (DDVP) (62-73-7)
Dimethoate (60-51-5)
Ethoprophos (13194-48-4)
Malathion (121-75-5)
Methyl parathion (298-00-0)
Naled (300-76-5)
Phosmet (732-11-6)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
Oregon Pesticide Standard #1							
600 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	18 months	Ambient	-20 °C or colder	ea.	32586
Oregon Pesticide Standard #2							
600 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	18 months	On Ice	-20 °C or colder	ea.	32587
Oregon Pesticide Standard #3							
600 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	18 months	Ambient	10 °C or colder	ea.	32588
Oregon Pesticide Standard #4							
600 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	18 months	Ambient	10 °C or colder	ea.	32589
Oregon Pesticide Standard #5							
600 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	18 months	Ambient	10 °C or colder	ea.	32590
Oregon Pesticide Standard #6							
600 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	14 months	Ambient	10 °C or colder	ea.	32591

* This reference material contains Spinosad A and D isomers (131929-60-7 and 131929-63-0); however, CAS# 168316-95-8 is displayed on the certificate as this is the neat material dissolved in the solution. CAS# 168316-95-8 is a blend of Spinosad A and D, and the ratio of each material isomer are displayed your certificate of analysis.

LC Multiresidue Pesticide Kit

- Accurately detect and quantify pesticides of global food safety concern in a wide range of fruits, vegetables, and other commodities by LC-MS/MS.
- Full kit contains 204 compounds of interest, covering many LC-determined pesticides listed by government agencies; individual ampuls also sold separately.



Cat. # 31972: LC Multiresidue Pesticide Standard #1 (13 components)
Organophosphorus Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31974: LC Multiresidue Pesticide Standard #3 (38 components)
Carbamate/Uron Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31976: LC Multiresidue Pesticide Standard #5 (30 components)
Organonitrogen Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31978: LC Multiresidue Pesticide Standard #7 (7 components)
Organonitrogen Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31980: LC Multiresidue Pesticide Standard #9 (7 components)
Carbamate/Uron Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31973: LC Multiresidue Pesticide Standard #2 (16 components)
Carbamate/Uron Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31975: LC Multiresidue Pesticide Standard #4 (63 components)
Organonitrogen Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31977: LC Multiresidue Pesticide Standard #6 (28 components)
Organonitrogen Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31979: LC Multiresidue Pesticide Standard #8
Organonitrogen Compounds
100 µg/mL each in acetonitrile,
1 mL/ampul

Cat. # 31981: LC Multiresidue Pesticide Standard #10
Carbamate/Uron Compounds
100 µg/mL each in methanol,
1 mL/ampul

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
Contains 1 mL each of these mixtures.	Yes	6 months	On Ice	-20 °C or colder	kit	31971

Note: When combining a large number of compounds with different chemical functionalities, mix stability can be an issue. In formulating these standards, we extensively studied the 204 compounds involved, then grouped them into as few mixes as possible while still ensuring maximum long-term stability and reliability. For quantitative analysis, we recommend analyzing each mix separately to ensure accurate results for every compound.

Note: In this standard, fluazinam should only be used for qualitative analysis. A single-component standard (cat.# 31982) is available for quantitative analysis.

GC Multiresidue Pesticide Kit

- Accurately identify and quantify pesticide residues by GC-MS/MS in fruits, vegetables, botanicals, and herbals, such as tea, ginseng, ginger, echinacea, and dietary supplements.
- Comprehensive 203-compound kit covers food safety lists by the FDA, USDA, and other global governmental agencies; individual ampuls also sold separately.



Cat. # 32563: GC Multiresidue Pesticide Standard #1 (16 components)
Organophosphorus Compounds
100 µg/mL each in toluene,
1 mL/ampul

Cat. # 32565: GC Multiresidue Pesticide Standard #3 (25 components)
Organonitrogen Compounds
100 µg/mL each in toluene,
1 mL/ampul

Cat. # 32567: GC Multiresidue Pesticide Standard #5 (34 components)
Organonitrogen Compounds
100 µg/mL each in toluene,
1 mL/ampul

Cat. # 32569: GC Multiresidue Pesticide Standard #7 (10 components)
Herbicide Methyl Esters
100 µg/mL each in toluene,
1 mL/ampul

Cat. # 32571: GC Multiresidue Pesticide Standard #9 (8 components)
Organophosphorus Compounds
100 µg/mL each in toluene, |
1 mL/ampul

Cat. # 32564: GC Multiresidue Pesticide Standard #2 (40 components)
Organochlorine Compounds
100 µg/mL each in toluene,
1 mL/ampul

Cat. # 32566: GC Multiresidue Pesticide Standard #4 (28 components)
Organonitrogen Compounds
100 µg/mL each in toluene,
1 mL/ampul

Cat. # 32568: GC Multiresidue Pesticide Standard #6 (18 components)
Synthetic Pyrethroid Compounds
100 µg/mL each in toluene,
1 mL/ampul

Cat. # 32570: GC Multiresidue Pesticide Standard #8 (24 components)
Organophosphorus Compounds
100 µg/mL each in toluene,
1 mL/ampul

Description	Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
GC Multiresidue Pesticide Kit	Contains 1 mL each of these mixtures.	Yes	6 months	Ambient	10 °C or colder	kit	32562

For the complete compound list, visit www.restek.com.



QuEChERS Performance Standards Kit

- Designed for use in all QuEChERS methods for pesticides in fruits and vegetables, including the original unbuffered method, AOAC 2007.01, and EN 15662.
- Kit contains organochlorine, organonitrogen, organophosphorus, and carbamate pesticides commonly used on fruits and vegetables.
- Volatile, polar, active, base-sensitive, and nonvolatile compounds are included to allow comprehensive evaluation of QuEChERS extraction and cleanup efficiencies, and optimization of GC and LC instrumental conditions.
- Ideal for initial method evaluations and ongoing method performance validations.
- Analytes are divided into three ampuls based on compatibility for maximum stability and shelf life.*
- Precise formulations improve data quality and operational efficiency; spend more time running samples and less time sourcing and preparing standards.
- Quantitatively analyzed to confirm the composition and stability of each mixture.

**When combining compounds with different functionalities, chemical stability can be an issue. The analytes in this kit are separated into three mixes to ensure maximum long-term storage stability. For analysis, a fresh working standard should be prepared by combining the three kit mixes in a 1:1:1 ratio to prepare a 100 µg/mL working standard solution. Once blended, Restek does not recommend storing working standards or subsequent dilutions for future use.*

Contains 1 mL each of these mixtures; 31153: QuEChERS Performance Standard A; 31154: QuEChERS Performance Standard B; 31155: QuEChERS Performance Standard C.

Cat. # 31153: QuEChERS Performance Standard A (16 components)

Acephate (30560-19-1)
Azinphos methyl (86-50-0)
Chlorpyrifos (2921-88-2)
Coumaphos (56-72-4)
Diazinon (333-41-5)
Dichlofluanid (1085-98-9)
Dichlorvos (DDVP) (62-73-7)
Dimethoate (60-51-5)
Fenthion (55-38-9)
Malathion (121-75-5)
Methamidophos (10265-92-6)
Mevinphos (7786-34-7)
Omethoate (1113-02-6)
Phosalone (2310-17-0)
Pirimiphos methyl (29232-93-7)
Propargite (2312-35-8)

Cat. # 31154: QuEChERS Performance Standard B (7 components)

gamma-BHC (Lindane) (58-89-9)
Chlorothalonil (1897-45-6)
4,4'-DDT (50-29-3)

Dicofol (Kelthane) (115-32-2)
Endosulfan sulfate (1031-07-8)
Endrin (72-20-8)
2-Phenylphenol (90-43-7)

Cat. # 31155: QuEChERS Performance Standard C (17 components)

Bifenthrin (82657-04-3)
Captan (133-06-2)
Carbaryl (Sevin) (63-25-2)
Cyprodinil (121552-61-2)
Deltamethrin (52918-63-5)
Fenhexamid (126833-17-8)
Fenpropathrin (39515-41-8)
Folpet (133-07-3)
Imazalil (35554-44-0)
Iprodione (36734-19-7)
Metalaxyl (57837-19-1)
Methiocarb (2032-65-7)
Myclobutanil (88671-89-0)
cis-Permethrin (61949-76-6)
trans-Permethrin (61949-77-7)
Thiabendazole (148-79-8)
Vinclozolin (50471-44-8)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
300 µg/mL each in acetonitrile/acetic acid (99.9:0.1), 1 mL/ampul. Blend equal volumes of all three ampuls for a 100 µg/mL final solution.	Yes	3 months	Ambient	10 °C or colder	kit	31152

Additional Pesticides of Interest

Glyphosate Standard

Glyphosate (N-(phosphonomethyl)glycine) (1071-83-6)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
1000 µg/mL in DI water, 1 mL/ampul	Yes	6 months	36 months	Ambient	10 °C or colder	ea.	32426
1000 µg/mL in DI water, 5 mL/ampul	Yes	6 months	36 months	Ambient	10 °C or colder	ea.	32427

AMPA (glyphosate metabolite)

Aminomethyl phosphonic acid (AMPA) (1066-51-9)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
100 µg/mL in DI water, 1 mL/ampul	Yes	6 months	18 months	Ambient	10 °C or colder	ea.	32428

Internal Standards for Pesticides

Description	CAS #	Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	qty.	cat.#
Atrazine-d5	163165-75-1	100 µg/mL in acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	10 °C or colder	ea.	31984
Carbaryl-d7	362049-56-7	100 µg/mL in acetonitrile, 1 mL/ampul	Yes	6 months	31 months	Ambient	10 °C or colder	ea.	31985
Diazinon-d10 (diethyl-d10)	100155-47-3	100 µg/mL in acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	10 °C or colder	ea.	31986
Dichlorvos-d6	203645-53-8	100 µg/mL in acetone, 1 mL/ampul	Yes	3 months	12 months	Ambient	10 °C or colder	ea.	31987
Dimethoate-d6	1219794-81-6	100 µg/mL in acetonitrile, 1 mL/ampul	Yes	6 months	36 months	Ambient	10 °C or colder	ea.	31988
Diuron-d6	1007536-67-5	100 µg/mL in acetonitrile, 1 mL/ampul	Yes	6 months	31 months	Ambient	10 °C or colder	ea.	31989
Linuron-d6	1219804-76-8	100 µg/mL in acetonitrile, 1 mL/ampul	Yes	6 months	31 months	Ambient	10 °C or colder	ea.	31990



Sample Preparation



ordering notes

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

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; MgSO₄ – 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.



Description	Material	Method	Type	Volume	qty.	Similar to Part #	cat.#
Foodstuffs with fats and waxes (e.g., cereals, avocado, nuts, seeds, and dairy)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes	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 tubes	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 tubes		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 tubes		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 tubes		26244
General fruits and vegetables (e.g., celery, head lettuce, cucumber, melon)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes	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 tubes		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 tubes	Agilent 5982-5056	26223
General purpose (wide variety of sample types, including fatty and pigmented fruits and vegetables)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes		26245
Highly pigmented fruits and vegetables (e.g., red peppers, spinach, blueberries)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes		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 tubes		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 tubes		26225
Pigmented fruits and vegetables (e.g., strawberries, sweet potatoes, and tomatoes)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes		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 tubes		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 tubes		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.

Multiple sorbents are used to extract different types of interferences.

- MgSO₄—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.



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. Shafir, 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 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.



Description	Material	Packing	Volume	qty.	cat.#
Resprep C18 SPE Cartridges	Polypropylene tubes with polyethylene frits	C18 (trifunctional, high-load)	1 mL, 100 mg	100-pk.	26030



25846

Empty Centrifuge Tubes, Polypropylene

Description	qty.	cat.#
Empty 50 mL Centrifuge Tube, Polypropylene w/Cap	50-pk.	25846
	500-pk.	28290



23997

Empty Centrifuge Tubes, FEP

Sturdy, easy-to-clean FEP (fluorinated ethylene propylene) tubes **last indefinitely** under normal usage conditions—and **cost 50% less!**

Description	Material	qty.	cat.#
Empty 50 mL Centrifuge Tube	FEP (fluorinated ethylene propylene) Tube w/ETFE (ethylene tetrafluoroethylene copolymer) Cap	2-pk.	23997

Q-sep Tube Racks

- Available for 2 mL, 15 mL, and 50 mL tubes.
- Alphanumeric 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



Thomson SINGLE StEP Standard Filter Vials

- Recommended for samples containing less than 10% solid particulates.
- Easy-to-use vials offer fast sample filtration and require only a squeeze of your fingers.
- 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.



Description	Color	Porosity	qty.	cat.#
Nylon				
Thomson SINGLE StEP Standard Filter Vial	black preslit cap	0.2 µm	100-pk.	25891
	pink preslit cap	0.45 µm	100-pk.	25892
PES (polyethersulfone)				
Thomson SINGLE StEP Standard Filter Vial	grey preslit cap	0.2 µm	100-pk.	25897
PTFE (polytetrafluoroethylene)				
Thomson SINGLE StEP Standard Filter Vial	green preslit cap	0.2 µm	100-pk.	25893
	blue preslit cap	0.45 µm	100-pk.	25894
PVDF (polyvinylidene fluoride)				
Thomson SINGLE StEP Standard Filter Vial	red preslit cap	0.2 µm	100-pk.	25895
	yellow preslit cap	0.45 µm	100-pk.	25896

Patent No. 7,790,117

For more information

Access technical articles, chromatograms, and products for pesticides residue analysis: discover.restek.com/industries-application/cannabis

Mycotoxins Analysis

Mycotoxins are toxic compounds produced by mold or fungi that can grow on cannabis throughout the cultivation process. Due to their toxicity, there is a growing need to detect their presence in both raw materials and finished cannabis and hemp products. Our high-throughput Raptor ARC-18 LC column is ideal for these analyses. When combined with our innovative sample preparation products and mycotoxin certified reference materials (CRMs), Restek offers a complete solution for your mycotoxins analysis.

Columns



Raptor ARC-18 LC Columns (USP L1)

- Ideal for high-throughput LC-MS/MS applications with minimal sample preparation.
- Well-balanced retention profile for better detection and integration of large, multiclass analyte lists.
- Sterically protected to endure low-pH mobile phases without sacrificing retention or peak quality.
- Part of Restek's Raptor LC column line featuring 1.8, 2.7, and 5 μm SPP core-shell silica.

ID	Length	qty.	cat.#
2.7 μm Particles			
2.1 mm	100 mm	ea.	9314A12



Raptor Biphenyl LC Columns (USP L11)

- Ideal for bioanalytical testing applications like drug and metabolite analyses.
- Heightened selectivity and retention for compounds that are hard to resolve or elute early on C18 and other phenyl chemistries.
- Limits ionization suppression and allows simple, MS-friendly mobile phases.
- Part of Restek's Raptor LC column line featuring 1.8, 2.7, and 5 μm SPP core-shell silica.

ID	Length	qty.	cat.#
2.7 μm Particles			
2.1 mm	50 mm	ea.	9309A52

Do you need a specific column dimension?

View our complete selection of GC and LC columns at
discover.restek.com/industries-application/cannabis

Raptor EXP Guard Column Cartridges

To help protect your investment and further extend the life of our already-rugged LC columns, Restek offers the patent-pending guard column hardware developed by Optimize Technologies. A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other minimal sample preparation techniques.

Description	Particle Size	Size	qty.	cat.#
Raptor Biphenyl EXP Guard Column Cartridge	5 µm	5 x 4.6 mm	3-pk.	930950250
	5 µm	5 x 2.1 mm	3-pk.	930950252
	5 µm	5 x 3.0 mm	3-pk.	930950253
	2.7 µm	5 x 4.6 mm	3-pk.	9309A0250
	2.7 µm	5 x 2.1 mm	3-pk.	9309A0252
	2.7 µm	5 x 3.0 mm	3-pk.	9309A0253
	UHPLC	5 x 2.1 mm	3-pk.	9309U0252
	UHPLC	5 x 3.0 mm	3-pk.	9309U0253
Raptor ARC-18 EXP Guard Column Cartridge	5 µm	5 x 4.6 mm	3-pk.	931450250
	5 µm	5 x 2.1 mm	3-pk.	931450252
	5 µm	5 x 3.0 mm	3-pk.	931450253
	2.7 µm	5 x 4.6 mm	3-pk.	9314A0250
	2.7 µm	5 x 2.1 mm	3-pk.	9314A0252
	2.7 µm	5 x 3.0 mm	3-pk.	9314A0253
	UHPLC	5 x 2.1 mm	3-pk.	9314U0252
	UHPLC	5 x 3.0 mm	3-pk.	9314U0253

Maximum cartridge pressure: 1034 bar/15,000 psi* (UHPLC); 600 bar/8700 psi (2.7 µm); 400 bar/5800 psi (5 µm).

* For maximum lifetime, recommended maximum pressure for UHPLC particles is 830 bar/12,000 psi.

Intellectual Property: optimizetech.com/patents



EXP Direct Connect Holder

A Restek LC guard cartridge in an EXP direct connect holder is the ultimate in column protection, especially when using dilute-and-shoot or other minimal sample preparation techniques.

Description	qty.	cat.#
EXP Direct Connect Holder for EXP Guard Cartridges (includes hex-head fitting & 2 ferrules)	ea.	25808

Maximum holder pressure: 20,000 psi (1400 bar).

Intellectual Property: optimizetech.com/patents



UltraShield UHPLC PreColumn Filter

- Cost-effective protection for UHPLC systems.
- Reliable way to filter out particulates and extend column lifetime.
- Minimize extra column volume and maximize UHPLC sample throughput vs. guard cartridges.
- Connects easily to any column with Parker-style ports; not compatible with Waters columns.
- Leak tight to 15,000 psi (1034 bar).
- 0.5 µm or 0.2 µm stainless-steel frit in a stainless-steel body with PEEK ferrule.

Description	Porosity	qty.	cat.#
UltraShield UHPLC PreColumn Filter	0.5 µm frit	ea.	24995
	0.5 µm frit	5-pk.	24996
	0.5 µm frit	10-pk.	24997
	0.2 µm frit	ea.	25809
	0.2 µm frit	5-pk.	25810
	0.2 µm frit	10-pk.	25811



Reference Standards



Multicomponent Mixes

Aflatoxins (B1, B2, G1, G2) Standard

(4 components)

Ideal for mycotoxin analyses in cannabis and food testing labs.

Aflatoxin B1 (1162-65-8)
Aflatoxin B2 (7220-81-7)

Aflatoxin G1 (1165-39-5)
Aflatoxin G2 (7241-98-7)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	Data pack available?	qty.	cat.#
10 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	On Ice	0 °C or colder	No	ea.	34121

Singles

Ochratoxin A Standard

Ideal for mycotoxin analyses in cannabis and food testing labs.

Ochratoxin A (303-47-9)

Conc. in Solvent	CRM?	Min Shelf Life on Ship Date	Max Shelf Life on Ship Date	Shipping Conditions	Storage Temp.	Data pack available?	qty.	cat.#
10 µg/mL, Acetonitrile, 1 mL/ampul	Yes	6 months	36 months	On Ice	0 °C or colder	No	ea.	34122



Sample Preparation

Q-sep QuEChERS Extraction Salts

- Free-flowing salts transfer easily and completely.
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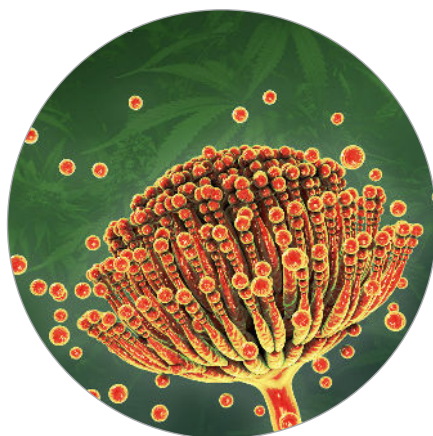
Description	Material	Method	qty.	cat.#
Q-sep QuEChERS Extraction Salt Packets Only	4 g MgSO ₄ , 1 g NaCl	Original unbuffered	50 packets	25847
Q-sep QuEChERS Extraction Kit	4 g MgSO ₄ , 1 g NaCl with 50 mL Centrifuge Tube	Original unbuffered	50 packets & 50 tubes	25848
Q-sep QuEChERS Extraction Salt Packets 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; MgSO₄ – magnesium sulfate; NaCl – sodium chloride; NaOAc – sodium acetate; TSCD – trisodium citrate dihydrate



ordering notes

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





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.
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- Pre-weighed, ultra-pure sorbents.
- Support original unbuffered, AOAC (2007.01), European (EN 15662), and mini-multiresidue QuEChERS methods.

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Description	Material	Method	Type	Volume	qty.	Similar to Part #	cat.#
Foodstuffs with fats and waxes (e.g., cereals, avocado, nuts, seeds, and dairy)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes	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 tubes	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 tubes		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 tubes		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 tubes		26244
General fruits and vegetables (e.g., celery, head lettuce, cucumber, melon)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes	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 tubes		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 tubes	Agilent 5982-5056	26223
General purpose (wide variety of sample types, including fatty and pigmented fruits and vegetables)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes		26245
Highly pigmented fruits and vegetables (e.g., red peppers, spinach, blueberries)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes		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 tubes		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 tubes		26225
Pigmented fruits and vegetables (e.g., strawberries, sweet potatoes, and tomatoes)							
Q-sep QuEChERS dSPE Tubes	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 tubes		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 tubes		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 tubes		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 tubes		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.

Multiple sorbents are used to extract different types of interferences.

- MgSO₄—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.

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.

Description	Material	Packing	Volume	qty.	cat.#
Resprep C18 SPE Cartridges	Polypropylene tubes with polyethylene frits	C18 (trifunctional, high-load)	1 mL, 100 mg	100-pk.	26030



Empty Centrifuge Tubes, Polypropylene

Description	qty.	cat.#
Empty 50 mL Centrifuge Tube, Polypropylene w/Cap	50-pk.	25846
	500-pk.	28290



25846

Empty Centrifuge Tubes, FEP

Sturdy, easy-to-clean FEP (fluorinated ethylene propylene) tubes **last indefinitely** under normal usage conditions—and **cost 50% less!**

Description	Material	qty.	cat.#
Empty 50 mL Centrifuge Tube	FEP (fluorinated ethylene propylene) Tube w/ETFE (ethylene tetrafluoroethylene copolymer) Cap	2-pk.	23997



23997

Q-sep Tube Racks

- Available for 2 mL, 15 mL, and 50 mL tubes.
- Alphanumeric 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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