

Confidently Test the Potency, Quality, and Safety of Cannabis Products

From extracts to final derived cannabis products, Agilent columns and supplies can help you effectively perform key cannabis testing applications.

Potency testing: cannabis flower, hemp and edibles (Pages 4-7)

Regions that have legalized medicinal or recreational marijuana use typically require cannabinoid quantitation for total tetrahydrocannabinol (THC) and cannabidiol (CBD). The most common analytical procedure to identify and quantify cannabinoids is high performance liquid chromatography (HPLC) with ultraviolet (UV) detectors. Agilent's HPLC based Potency Consumables Kit contains HPLC columns and enough sample preparation supplies needed to analyze 400 cannabis flower and hemp samples.

There is an increased demand to measure Δ^9 -tetrahydrocannabinol (Δ^9 -THC) and cannabidiol (CBD) accurately in edibles in matrices containing

- High fat content like chocolate, brownies, and cookies
- Emulsifying agents such as infused beverages
- High sugar content such as gummies and hard candies.

Agilent provides a range of products and optimized sample preparation methods for these challenging matrices.

Another common analytical methodology for the determination of cannabinoids is gas chromatography-mass spectrometry (GC/MS). Offline derivatization of hemp sample extracts allows for direct analysis and quantitation of total THC and thermally labile cannabinoid acids, naturally occurring in hemp, using a GC/MS.

Pesticide and mycotoxin testing (Pages 8-9)

Potentially harmful pesticides and mycotoxins may be present in cannabis crops and extracts, so monitoring is crucial. Agilent offers four instrument-based kits that contain columns and enough sample preparation supplies needed to detect these substances in 400 samples.

Residual solvent testing (Pages 10)

Residual solvents are extraction byproducts found in processed cannabis. Producers need to incorporate stringent protocols to ensure acceptable levels for their cannabis concentrates, distillates, and extracts.

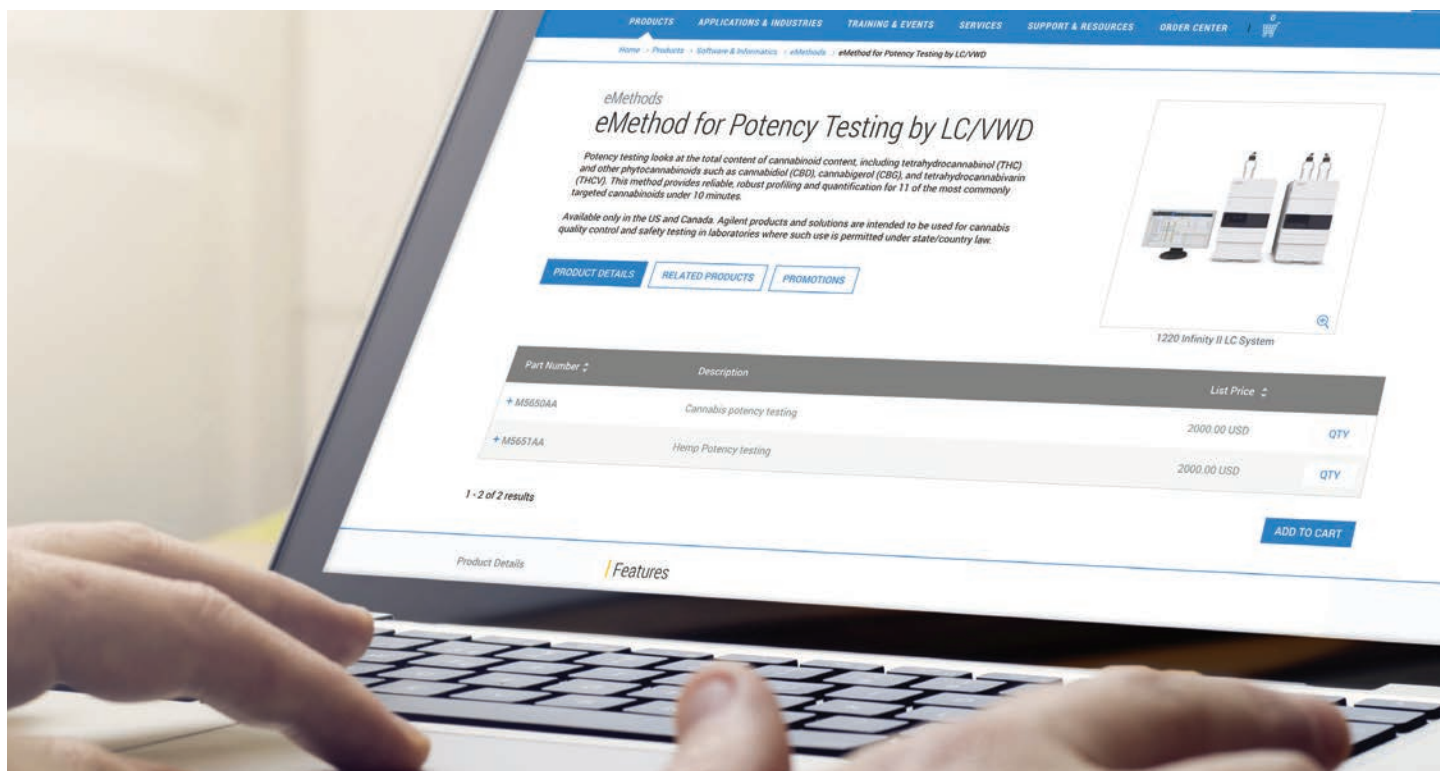
Terpene analysis (Page 11)

Terpenes contribute to the flavor and fragrance of cannabis and have been used to identify and characterize cannabis cultivars. Regularly reproducing the same terpene profile is key to product consistency.

Heavy metal screening (Page 12)

ASTM Committee D37 on Cannabis was formed in 2017 to develop standards to ensure the quality and safety of cannabis and cannabis-based products. Agilent ICP-MS applications specialist Jenny Nelson has been a member of ASTM for many years. As the lead technical contact on ASTM sub-committee D37.03, Jenny led the development of a formal method for the analysis of multiple elements in cannabis and hemp using ICP-MS. The method includes a robust microwave sample digestion approach that was developed in collaboration with workers from CEM Corporation.

The ASTM method for Analysis of Multiple Elements in Cannabis Matrices by ICP-MS specifies the priority toxic trace elements arsenic, cadmium, mercury, and lead. The method can be extended to other elements if required by local regulators, manufacturers, or customers. The new method has been approved and is available from the [ASTM website](#). The Agilent 7850 ICP-MS analyzer includes a consumables starter kit for cannabis analysis — including standards, peristaltic pump tubing, and autosampler tubes — so you can start producing results quickly.



How This Guide Makes Ordering Simple

This guide includes links for the various kits as well as the recommended columns and supplies within each kit for the different analysis.

Utilize the 'MyList' links to add items under each category to your 'Favorite Products' page in the [Agilent online store](#).

Then, enter the quantities for the products you need. Your list will remain under your 'Favorite Products' for future orders.

If this is your first time using the 'Favorite products' page, you will be asked to enter your email address for account verification. If you have an existing Agilent account, you will be able to log in. However, if you don't have a registered Agilent account, you will need to register for one. This feature is valid only in regions that are e-commerce enabled. All items can also be ordered through your regular sales and distributor channels.

Set Up Your Lab Faster With Ready-To-Run eMethods

With Agilent eMethods, Agilent has done the hard work for you. eMethods are designed to accelerate your startup time by condensing the vast amounts of technical information and optimized analytical methods into a ready-to-run, downloadable, digital information package.

Each eMethod supplies you with information on the instrument configuration, consumables, Sample Preparation Protocols, Analytical methods for sample introduction, chromatographic separation, detection, and data analysis.

This guide provides links to the eMethods that can be used to run the methods in the Application notes. The M####AAA methods can be purchased online, while the corresponding G#### can be purchased through your local sales and distribution channel.

Selection and Ordering Information

Agilent Cannabis and Hemp Potency Testing

These products can be used to run the methods described in the following application notes and eMethod.

Application notes:

5991-9285EN Dedicated Cannabinoid Potency Testing Using the Agilent 1220 Infinity II LC System
(available as eMethod G5277#010 or **M5650AA**)

5994-0912EN Quantification of Cannabinoids in Industrial Hemp Using the Agilent 1220 Infinity II LC System
(available as eMethod G5277#020 or **M5651AA**)

5994-1706EN Quantitation of Phytocannabinoid Oils Using the Agilent Infinity II 1260 Prime/InfinityLab LC/MSD iQ LC/MS System

Sample Preparation and Sample Containment

View [MyList](#) for the items in the table below.

Description	Part Number
Captiva premium syringe filter, regenerated cellulose (RC) membrane, 4 mm diameter, 0.45 µm pore size, 100/pk	5190-5107
Captiva disposable syringe, 5 mL, 100/pk	9301-6476
Ceramic homogenizers for 50 mL tubes, 100/pk	5982-9313
Centrifuge tubes, 50 mL, 25/pk	5610-2049
Cap, screw, green, PTFE/red silicone septa, 100/pk	5182-0718
Vial, screw top, amber, write-on spot, deactivated (silanized), certified, 2 mL, 100/pk	5183-2072
Vial insert, 250 µL, deactivated glass with polymer feet, 100/pk	5181-8872

Potency Standards

View [MyList](#) for the items in the table below.

Description	Part Number
Cannabinoid Mix A - CBD, CBN, delta9-THC	5190-9430
Cannabinoid Mix B - THCA, CBDA, CBG	5190-9429
Cannabinoid Mix C - CBDV, CBGA, CBC	5190-9428
Cannabinoid Mix D - THCV, delta8-THC	5190-9427
Cannabidiol (CBDV) 1 mg/mL	5191-3920
Tetrahydrocannabivarin (THCV), 1 mg/mL	5191-3921
delta8-Tetrahydrocannabinol (delta8-THC)	5191-3922
Cannabigerol (CBG) 1 mg/mL	5191-3923
Cannabidiol (CBD) 1 mg/mL	5191-3924
delta9-Tetrahydrocannabinolic acid (THCA) 1 mg/mL	5191-3925
Cannabinol (CBN) 1 mg/mL	5191-3926
Cannabigerol acid (CBGA) 1 mg/mL	5191-3927
Cannabichromene (CBC) 1 mg/mL	5191-3928
delta9-Tetrahydrocannabinol (delta9-THC) 1 mg/mL	5191-3929
Cannabidiolic acid (CBDA) 1 mg/mL	5191-3930

For custom cannabinoid standards, please go to www.agilent.com/chem/standards

Potency Consumables Kits

Order your kit now, using the following link:

[Cannabis and Hemp Potency Consumables Kit p/n 5610-2036](#)

LC Columns and Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
InfinityLab Poroshell 120 EC-C18, 3.0 × 50 mm, 2.7 µm, LC column	699975-302
InfinityLab Poroshell 120 EC-C18, 3.0 mm, 2.7 µm, UHPLC guard, 3/pk	823750-911
Formic acid, 5 mL	G2453-85060
InfinityLab Ultrapure LC/MS acetonitrile, 1L	5191-4496
InfinityLab Ultrapure LC/MS methanol, 1L	5191-4497
InfinityLab Ultrapure LC/MS water, 1L	5191-4498
InfinityLab Quick Connect assembly, 0.12 x 105 mm, for connection at column inlet on UHPLC systems	5067-5957
InfinityLab Quick Connect assembly, 0.17 x 105 mm, for connection at column inlet on HPLC systems	5067-6166
InfinityLab Quick Turn fitting, for connection between column outlet and detector	5067-5966
InfinityLab Quick Turn capillary, 0.12 x 280 mm, for column outlet	5500-1191
InfinityLab Stay Safe starter kit, including 3 caps GL45 1 port and 1 cap GL45 2 ports, 4 venting valves with time strips and 4 fittings 3.2 mm	5043-1222
InfinityLab solvent filtration assembly includes glass funnel, 250 mL, membrane holder glass base, glass flask, 1 L, and aluminum clamp	5191-6776*
Regenerated cellulose membrane 47 mm, 0.20 µm 100/pk	5191-4340*

*Solvent filtration assembly and associated filter membranes are not recommended for use with InfinityLab Ultrapure LC/MS solvents.

Agilent provides guidance in helping you meet your analytical challenges. Both customized and prepackaged (p/n R4502A) application services for cannabis potency testing are available. [Learn more](#)

Selection and Ordering Information

Quantitation of Cannabinoids in Hemp Flower by GC/MS

Total potency and total THC are two important calculations in the distinction of cannabis and hemp. Following U.S. Federal laws, hemp must be less than 0.3% total THC (by dry weight). Derivatization allows for direct analysis and measurement of the thermally labile acids that are naturally occurring in hemp, which simplifies the determination of total THC.

These products can be used to determine total THC and quantitate an additional nine commonly analyzed cannabinoids using the GC/MS method described in the following application note.

Application note:

[5994-2757EN](#) Quantitation of cannabinoids in Hemp Flower by Derivatization GC/MS

Sample Preparation

View [MyList](#) for the items in the table below.

Description	Part Number
50 mL centrifuge tube, polypropylene, 25/pk	5610-2049
Ceramic homogenizers, 50 mL tubes, 100/pk	5982-9313
Captiva Premium Syringe Filter, regenerated cellulose membrane, 15 mm diameter, 0.45 µm pore size, 100/pk	5190-5109
5 mL Captiva disposable syringe, Polypropylene, 100/pk	9301-6476

Standards

View [MyList](#) for the items in the table below.

Description	Part Number
Cannabinoid Mix A - CBD, CBN, D9-THC	5190-9430
Cannabinoid Mix B - THCA, CBDA, CBG	5190-9429
Cannabinoid Mix C - CBDV, CBGA, CBC	5190-9428
Cannabinoid Mix D - THCV, delta8-THC	5190-9427
Cannabidiol (CBDV), 1 mg/mL	5191-3920
Tetrahydrocannabivarin (THCV), 1 mg/mL	5191-3921
delta8-Tetrahydrocannabinol (delta8-THC), 1 mg/mL	5191-3922
Cannabigerol (CBG), 1 mg/mL	5191-3923
Cannabidiol (CBD), 1 mg/mL	5191-3924
delta9-Tetrahydrocannabinolic acid (THCA), 1 mg/mL	5191-3925
Cannabinol (CBN), 1 mg/mL	5191-3926
Cannabigerol Acid (CBGA), 1 mg/mL	5191-3927
Cannabichromene (CBC), 1 mg/mL	5191-3928
delta9-Tetrahydrocannabinol (delta9-THC), 1 mg/mL	5191-3929
Cannabidiolic Acid (CBDA), 1 mg/mL	5191-3930

For custom cannabinoid standards, please go to www.agilent.com/chem/standards

GC Columns and Supplies for 8890/5977B GCMS

View [MyList](#) for the items in the table below.

Description	Part Number
Agilent J&W DB-35MS UI, 30 m x 250 µm, 0.25 µm capillary column	122-3832UI
Splitless, UI, Fritted Liner, Low, 870 µl, 4 mm, 1/pk	5190-5112
Splitless, UI, Fritted Liner, Low, 870 µl, 4 mm, 5/pk	5190-5112-005
Gold plated inlet seal with washer, Ultra Inert, 10/pk	5190-6145
Column nut, collared, self tightening, inlet/detector	G3440-81011
Inlet septa, 11 mm, Non-stick Advanced Green, 50/pk	8010-0207
Ferrule, 0.4 mm id, 15% graphite/85% Vespel, 0.1-0.25 mm column, 10/pk	5181-3323

MS Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
9 mm extractor lens	G3870-20449
High temperature filament, EI ion source	G7005-60061

Vial and Caps

View [MyList](#) for the items in the table below.

Description	Part Number
250 µL inserts	5181-1270
Vial, screw top, amber, write-on spot, certified, 2 mL, 100/pk. Vial size: 12 x 32 mm (12 mm cap)	5182-0716
Cap, screw, blue, PTFE/red silicone septa, 100/pk. Cap size: 12 mm	5182-0717

Gas Clean Filters

View [MyList](#) for the items in the table below.

Description	Part Number
Gas Clean carrier gas kit for 8890/8860	CP17988
Gas Clean carrier gas purifier replacement cartridge	CP17973

Selection and Ordering Information

Quantification of THC and CBD in Gummies and Hard Candies

Accurate measurement of Δ^9 -tetrahydrocannabinol (Δ^9 -THC) and cannabidiol (CBD) in edibles with a high sugar content such as gummies and hard candies is an important testing requirement to ensure product labeling and safety. Agilent Application note [5994-3790EN](#) demonstrates a simple procedure to grind candies efficiently and extract and quantify cannabinoids by liquid chromatography coupled to UV detection (LC/UV).

Sample Preparation

View [MyList](#) for the items in the table below.

Description	Part Number
QuEChERS extraction salt packets, Original method (10 g samples), no centrifuge tubes, 50/pk	5982-6550
QuEChERS extraction salt packets, EN 15662 method, no centrifuge tubes, 200/pk	5982-7650
QuEChERS extraction kit, Original Method (10 g samples), non-buffered, 50/pk	5982-5550
Captiva Premium Syringe Filter, polypropylene housing, polytetrafluoroethylene (PTFE) membrane, 4 mm diameter, 0.2 μ m pore size, 100/pk	5190-5082
Agilent Captiva EMR—Lipid 3 mL	5190-1003
Captiva Disposable Syringe, 5 mL, Polypropylene, 100/pk	9301-6476
Ceramic Homogenizers, 50 mL tubes, 100/pk	5982-9313
50 mL polypropylene (PP) centrifuge tubes	5610-2049
Agilent 3 mL cartridge rack	5191-4103
Agilent positive pressure manifold (PPM) 48 processor	5191-4101
Waste rack for Agilent PPM-48	5191-4112

HPLC Columns and Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
Agilent InfinityLab Poroshell 120 EC-C18, 3.0 $\times$ 150 mm, 2.7 μ m	693575-302
Agilent InfinityLab Poroshell 120 EC-C18 3.0 $\times$ 5 mm, 2.7 μ m, guard column	823750-911
InfinityLab Quick Connect assembly, 0.12 x 105 mm, for connection	5067-5957
InfinityLab Quick Connect assembly, 0.17 x 105 mm, for connection	5067-6166
InfinityLab Quick Turn fitting, for connection between column	5067-5966
InfinityLab Quick Turn capillary, 0.12 x 280 mm, for column outlet	5500-1191
InfinityLab Stay Safe starter kit, including 3 caps GL45 1 port and 1 cap GL45 2 ports, 4 venting valves with time strips and 4 fittings 3.2 mm	5043-1222
InfinityLab solvent filtration assembly. includes glass funnel, 250 mL, membrane holder glass base, glass flask, 1 L, and aluminum clamp	5191-6776*
Regenerated Cellulose Filter membrane 47 mm, 0.20 μ m 100/pk	5191-4340*
Agilent InfinityLab Ultrapure LC/MS methanol, 1L	5191-4497
Agilent InfinityLab Ultrapure LC/MS acetonitrile, 1L	5191-4496
Agilent InfinityLab Ultrapure LC/MS water, 1L	5191-4498
Formic Acid, 5 mL	G2453-85060
Vial pack, screw top, pre-assembled, certified, clear vials, blue caps, PTFE/red silicone septa, 2 mL, 100/pk	5182-0553

*Solvent filtration assembly and associated filter membranes are not recommended for use with InfinityLab Ultrapure LC/MS solvents.

Potency Standards

View [MyList](#) for the items in the table below.

Description	Part Number
Cannabichromene (CBC), 1 mg/mL	5191-3928
Cannabidiolic Acid (CBDA), 1 mg/mL	5191-3930
Cannabidivarin (CBDV), 1 mg/mL	5191-3920
Cannabigerol (CBG), 1 mg/mL	5191-3923
Cannabigerol Acid (CBGA), 1 mg/mL	5191-3927
Cannabinoid Mix A - CBO, CBN, delta9-THC, multiple	5190-9430
Cannabinoid Mix 8 - CBG, THCA, CBOA, multiple	5190-9429
Cannabinoid MIX C - CBC, CBGA, CBDV, multiple	5190-9428
Cannabinoid Mix D - THCV, delta8-THC, multiple	5190-9427
Cannabinol (CBN), 1 mg/mL	5191-3926
delta8-Tetrahydrocannabinol (delta8-THC), 1 mg/mL	5191-3922
delta9-Tetrahydrocannabinolic acid (THCA), 1 mg/mL	5191-3925
Tetrahydrocannabinol (THCV), 1 mg/mL	5191-3921
Agilent cannabidiol (CBD) certified reference material, 1.0 mg/mL	5191-3924
Agilent Δ^9 -THC certified reference material, 1.0 mg/mL	5191-3929

For custom cannabinoid standards, please go to www.agilent.com/chem/standards

Selection and Ordering Information

Quantification of THC and CBD in Cannabis-Infused Chocolate Edibles

Accurate measurement of Δ^9 -tetrahydrocannabinol (Δ^9 -THC) and cannabidiol (CBD) in samples with high fat content like chocolate, brownies, and cookies is an important testing requirement to meet the evolving regulatory landscape for cannabis. Chocolate is a complex matrix, rich in protein, fat, and cocoa, making it particularly challenging to analyze. Agilent Application note [5994-2873EN](#) demonstrates a simple optimized procedure to grind chocolate, extract cannabinoids, and to quantify them by LC/UV.

Sample Preparation

View [MyList](#) for the items in the table below.

Description	Part Number
Agilent Captiva EMR—Lipid 3 mL	5190-1003
Ceramic Homogenizers, 50 mL tubes, 100/pk	5982-9313
50 mL polypropylene (PP) centrifuge tubes	5610-2049
15 mL polypropylene (PP) centrifuge tubes	5610-2039
Agilent 3 mL cartridge rack	5191-4103
Agilent positive pressure manifold (PPM) 48 processor	5191-4101
Waste rack for Agilent PPM-48	5191-4112

HPLC Columns and Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
Agilent InfinityLab Poroshell 120 EC-C18, 3.0 × 150 mm, 2.7 µm	693575-302
Agilent InfinityLab Poroshell 120 EC-C18, 3.0 × 5 mm, 2.7 µm, guard column, 3/pk	823750-911
InfinityLab Quick Connect assembly, 0.12 x 105 mm, for connection	5067-5957
InfinityLab Quick Connect assembly, 0.17 x 105 mm, for connection	5067-6166
InfinityLab Quick Turn fitting, for connection between column	5067-5966
InfinityLab Quick Turn capillary, 0.12 x 280 mm, for column outlet	5500-1191
InfinityLab Stay Safe starter kit, including 3 caps GL45 1 port and 1 cap GL45 2 ports, 4 venting valves with time strips and 4 fittings 3.2 mm	5043-1222
InfinityLab solvent filtration assembly. includes glass funnel, 250 mL, membrane holder glass base, glass flask, 1 L, and aluminum clamp	5191-6776*
Regenerated Cellulose Filter membrane 47 mm, 0.20 µm 100/pk	5191-4340*
Agilent InfinityLab Ultrapure LC/MS methanol, 1L	5191-4497
Agilent InfinityLab Ultrapure LC/MS acetonitrile, 1L	5191-4496
Agilent InfinityLab Ultrapure LC/MS water, 1L	5191-4498
Formic Acid, 5 mL	G2453-85060
Vial pack, screw top, pre-assembled, certified, clear vials, blue caps, PTFE/red silicone septa, 2 mL, 100/pk	5182-0553

*Solvent filtration assembly and associated filter membranes are not recommended for use with InfinityLab Ultrapure LC/MS solvents.

Potency Standards

View [MyList](#) for the items in the table below.

Description	Part Number
Cannabichromene (CBC), 1 mg/mL	5191-3928
Cannabidiolic Acid (CBDA), 1 mg/mL	5191-3930
Cannabidivarin (CBDV), 1 mg/mL	5191-3920
Cannabigerol (CBG), 1 mg/mL	5191-3923
Cannabigerol Acid (CBGA), 1 mg/mL	5191-3927
Cannabinoid Mix A - CBO, CBN, delta9-THC, multiple	5190-9430
Cannabinoid Mix 8 - CBG, THCA, CBOA, multiple	5190-9429
Cannabinoid MIX C - CBC, CBGA, CBDV, multiple	5190-9428
Cannabinoid Mix D - THCV, delta8-THC, multiple	5190-9427
Cannabinol (CBN), 1 mg/mL	5191-3926
delta8-Tetrahydrocannabinol (delta8-THC), 1 mg/mL	5191-3922
delta9-Tetrahydrocannabinolic acid (THCA), 1 mg/mL	5191-3925
Tetrahydrocannabinol (THCV), 1 mg/mL	5191-3921
Agilent cannabidiol (CBD) certified reference material, 1.0 mg/mL	5191-3924
Agilent Δ^9 -THC certified reference material, 1.0 mg/mL	5191-3929

For custom cannabinoid standards, please go to www.agilent.com/chem/standards

Selection and Ordering Information

Quantification of THC and CBD in Beverages Containing Microemulsions and Nanoemulsions

Accurate measurement of $\Delta 9$ -tetrahydrocannabinol ($\Delta 9$ -THC) and cannabidiol (CBD) in cannabis-infused beverages is a pivotal testing requirement to ensure regulatory compliance including product labeling and product safety. Agilent application note [5994-3791EN](#) demonstrates a simple and robust procedure to extract cannabinoids in the presence of emulsifying agents, and to quantify those cannabinoids by liquid chromatography coupled to UV detection (LC/UV).

Sample Preparation

View [MyList](#) for the items in the table below.

Description	Part Number
QuEChERS extraction kit, Original Method (10 g samples), non-buffered, 50/pk	5982-5550
QuEChERS extraction salt packets, Original method (10 g samples), no centrifuge tubes, 50/pk	5982-6550
QuEChERS extraction salt packets, Original method (10 g samples), no centrifuge tubes, 200/pk	5982-7550
Ceramic Homogenizers, 50 mL tubes, 100/pk	5982-9313
Agilent Captiva EMR—Lipid 3 mL	5190-1003
50 mL polypropylene (PP) centrifuge tubes	5610-2049
15 mL polypropylene (PP) centrifuge tubes	5610-2039
Agilent 3 mL cartridge rack	5191-4103
Agilent positive pressure manifold (PPM) 48 processor	5191-4101
Waste rack for Agilent PPM-48	5191-4112

HPLC Columns and Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
Agilent InfinityLab Poroshell 120 EC-C18, 3.0 × 150 mm, 2.7 μ m	693575-302
Agilent InfinityLab Poroshell 120 EC-C18 3.0 × 5 mm, 2.7 μ m, guard column	823750-911
InfinityLab Quick Connect assembly, 0.12 x 105 mm, for connection	5067-5957
InfinityLab Quick Connect assembly, 0.17 x 105 mm, for connection	5067-6166
InfinityLab Quick Turn fitting, for connection between column	5067-5966
InfinityLab Quick Turn capillary, 0.12 x 280 mm, for column outlet	5500-1191
InfinityLab Stay Safe starter kit, including 3 caps GL45 1 port and 1 cap GL45 2 ports, 4 venting valves with time strips and 4 fittings 3.2 mm	5043-1222
InfinityLab solvent filtration assembly. includes glass funnel, 250 mL, membrane holder glass base, glass flask, 1 L, and aluminum clamp	5191-6776*
Regenerated Cellulose Filter membrane 47 mm, 0.20 μ m 100/pk	5191-4340*
Agilent InfinityLab Ultrapure LC/MS methanol, 1L	5191-4497
Agilent InfinityLab Ultrapure LC/MS acetonitrile, 1L	5191-4496
Agilent InfinityLab Ultrapure LC/MS water, 1L	5191-4498
Formic Acid, 5 mL	G2453-85060
Vial pack, screw top, pre-assembled, certified, clear vials, blue caps, PTFE/red silicone septa, 2 mL, 100/pk	5182-0553

*Solvent filtration assembly and associated filter membranes are not recommended for use with InfinityLab Ultrapure LC/MS solvents.

Potency Standards

View [MyList](#) for the items in the table below.

Description	Part Number
Cannabichromene (CBC), 1 mg/mL	5191-3928
Cannabidiolic Acid (CBDA), 1 mg/mL	5191-3930
Cannabidivarin (CBDV), 1 mg/mL	5191-3920
Cannabigerol (CBG), 1 mg/mL	5191-3923
Cannabigerol Acid (CBGA), 1 mg/mL	5191-3927
Cannabinoid Mix A - CBO, CBN, delta9-THC, multiple	5190-9430
Cannabinoid Mix 8 - CBG, THCA, CBOA, multiple	5190-9429
Cannabinoid MIX C - CBC, CBGA, CBDV, multiple	5190-9428
Cannabinoid Mix D - THCV, delta8-THC, multiple	5190-9427
Cannabinol (CBN), 1 mg/mL	5191-3926
delta8-Tetrahydrocannabinol (delta8-THC), 1 mg/mL	5191-3922
delta9-Tetrahydrocannabinolic acid (THCA), 1 mg/mL	5191-3925
Tetrahydrocannabinol (THCV), 1 mg/mL	5191-3921
Agilent cannabidiol (CBD) certified reference material, 1.0 mg/mL	5191-3924
Agilent $\Delta 9$ -THC certified reference material, 1.0 mg/mL	5191-3929

For custom cannabinoid standards, please go to www.agilent.com/chem/standards

Selection and Ordering Information

Pesticides and Mycotoxins Testing of Cannabis Flower

Residual pesticide analysis in cannabis matrices is challenging due to the complexity of the matrix and the very low action limits, requiring LC/MS/MS and GC/MS/MS methods. These products can be used to run the methods described in the following application notes and eMethods.

Application notes:

5994-0429EN A Sensitive and Robust Workflow to Measure Residual Pesticides and Mycotoxins from the Canadian Target List in Dry Cannabis Flower (available as eMethod G5279#030 or **M5657AA** with 1290/6470 LC/TQ and G5278#030 or **M5654AA** with 7890/7010B GC/TQ)

5994-1604EN Analysis of Challenging Pesticides Regulated in the Cannabis and Hemp Industry with the Agilent Intuvo 9000-7010 GC/MS/MS System: The Fast-5. (available as eMethod G5278#020 or **M5653AA**)

5994-1127EN Why LC/MS/MS and GC/MS/MS Are Required for the Analysis of Certain Pesticides

5994-1786EN Analysis of 27 GC-Amenable Pesticides in Cannabis in North America with the Agilent 8890/7010B Triple Quadrupole GC/MS System (available as eMethod G5278AA#010 or **M5652AA**)

5994-1734EN Determination of Pesticides and Mycotoxins in Cannabis Flower as Defined by Legalized U.S. State Recreational Cannabis Regulations (available as eMethod G5279#10 or **M5656AA** with the 1260/Ultivo LC/TQ and G5279#020 or **M5655AA** with the 1260/6470 LC/TQ System)

Sample Preparation and Sample Containment

View [MyList](#) for the items in the table below.

Description	Part Number
SampliQ SPE cartridges: C18 endcapped, 6 mL tubes, 500 mg, 30/pk	5982-1365
Ceramic homogenizers for 50 mL tubes, 100/pk	5982-9313
Centrifuge tubes, 50 mL, 25/pk	5610-2049
SPE cartridge rack, 6 mL, for PPM-48	5191-4104
Waste rack and 3 waste bins, for PPM-48	5191-4112
Cap, screw, green, PTFE/red silicone septa, 100/pk	5182-0718
Vial, screw top, amber, write-on spot, deactivated (silanized), certified, 2 mL, 100/pk	5183-2072
Vial insert, 250 µL, deactivated glass with polymer feet, 100/pk	5181-8872

GC Columns and Supplies for 7890/8890

View [MyList](#) for the items in the table below.

Description	Part Number
For Canada methods	
J&W HP-5ms Ultra Inert GC column, 15 m, 0.25 mm, 0.25 µm	19091S-431UI*
J&W DB-35ms Ultra Inert GC column, 15 m, 0.25 mm, 0.25 µm	122-3812UI*
ALS syringe, blue line, 10 µL, fixed needle, 23/42/cone, PTFE-tip plunger	G4513-80220
Inlet septa, advanced green, non-stick, 11 mm, 50/pk	5183-4759
Inlet liner, Ultra Inert, splitless, dimpled, 2 mm id, 5/pk	5190-4006*
Inlet liner, Ultra Inert, splitless, single taper with wool, 4 mm id, 5/pk	5190-3163*
Ferrule, 0.4 mm id, 15% graphite/85% Vespel, 0.1 mm to 0.25 mm column, 10/pk	5181-3323
Internal nut, CFT capillary fitting	G2855-20530
Ferrule, flexi inert 0.25 mm column, 10/pk	G3188-27501
Column nut, collared, self-tightening, inlet/detector	G3440-81011
Column nut, collared, self-tightening, MSD	G3440-81013
Purged Ultimate Union - Inert	G3186-60581
Ultra Inert Gold Seal, with washer, 10/pk	5190-6145
Gas Clean carrier gas kit for 7890	CP17988
Gas Clean carrier gas kit for 8890/8860	CP179880
Gas Clean carrier gas purifier replacement cartridge	CP17973

**U.S. customers favor a HP-5ms Ultra Inert x HP-5ms Ultra Inert setup (two columns total) with liner p/n 5191-4006, p/n 5190-2297, 1/pk, while customers in Canada favor a HP-5ms Ultra Inert x DB-35ms Ultra Inert setup with liner p/n 5191-3163 (p/n 5190-2293, 1/pk).*

Chemical Standards*

Description	Part Number
View MyList Mycotoxin standards for cannabis	
Cannabis Mycotoxin Mix	TOX-CBS-Mix1
Aflatoxin B1	TOX-UNI-AflaB1
Aflatoxin B2	TOX-UNI-AflaB2
Aflatoxin G1	TOX-UNI-AflaG1
Aflatoxin G2	TOX-UNI-AflaG2
Ochratoxin A	TOX-UNI-OchrA
View MyList of California mixes and standards	
California Cannabis Pesticide Kit (2020)	PST-CBS-CA
Azoxystrobin	PST-1905A100A01
Captan	PST-090K100A01
Chlordane (mixture of isomers)	PP-150-1
Chlorfenapyr	PST-2120M100A01
Coumaphos	PST-130M100A01
Dimethomorph	PST-2210A100A01
Etoxazol	PST-2265K100A01
Fenhexamid	PST-2295A100A01
Fludioxonil	PST-2340A100A01
Pentachloronitrobenzene (Quintozene)	PST-770A100A01
Piperonyl butoxide	PST-820A100A01
Spinetoram J	PST-3730A1000
View MyList of Oregon mixes and standards	
Oregon Cannabis Pesticide Kit (2020)	PST-CBS-OR
Azoxystrobin	PST-1905A100A01
Chlorfenapyr	PST-2120M100A01
Chlormequat chloride	PST-2870M100A01
Etoxazol	PST-2265K100A01
Fludioxonil	PST-2340A100A01
Phenothrin	PST-2700M100A01
Trifloxystrobin	PST-2630A100A01
View MyList of Nevada mixes and standards	
Nevada Cannabis Pesticide Mix (2020)	PST-CBS-NV
Azoxystrobin	PST-1905A100A01
Chlorfenapyr	PST-2120M100A01
View MyList of Colorado mixes and standards	
Colorado Cannabis Pesticide Mix (2020)	PST-CBS-CO
View MyList of Canada mixes and standards	
Canada Cannabis Pesticide Kit (2020)	PST-CBS-CAN

*Our chemical standards recommendations show existing mixes offered by Agilent, and the additional compounds needed, to meet state requirements as of April 1, 2020.

For an expanded selection of individual pesticide standards and mixes, please go to www.agilent.com/chem/standards

LC Columns and Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
InfinityLab Poroshell 120 Phenyl-Hexyl, 3 x 100 mm, 2.7 µm LC column	695975-312
InfinityLab Poroshell 120 Phenyl-Hexyl, 3 x 5 mm, 2.7 µm, UHPLC guard, 3/pk	823750-914
Formic acid, 5 mL	G2453-85060
5M ammonium formate solution	G1946-85021
InfinityLab Ultrapure LC/MS acetonitrile, 1L	5191-4496
InfinityLab Ultrapure LC/MS methanol, 1L	5191-4497
InfinityLab Ultrapure LC/MS water, 1L	5191-4498
Quick Connect assembly, 0.12 x 105 mm, for connection at column inlet on UHPLC systems	5067-5957
Quick Connect assembly, 0.17 x 105 mm, for connection at column inlet on HPLC systems	5067-6166
Quick Turn fitting, for connection between column outlet and detector	5067-5966
Quick Turn capillary, 0.12 x 280 mm, for column outlet	5500-1191

GC Columns and Supplies for Intuvo 9000

View [MyList](#) for the items in the table below.

Description	Part Number
J&W HP-5ms Ultra Inert Intuvo GC column module, 15 m, 0.25 mm, 0.25 µm**	19091S-431UI-INT
ALS syringe, blue line, 10 µL, fixed needle, 23/42/cone, PTFE-tip plunger	G4513-80220
Inlet septa, advanced green, non-stick, 11 mm, 50/pk	5183-4759
Inlet liner, Ultra Inert, splitless, dimpled, 2 mm id, 5/pk	5190-4006
Compression bolt, Intuvo	G4581-60260
Intuvo polyimide gasket, 5/pk	5190-9072
Guard chip, Intuvo, multimode inlet, 2/pk	G4587-60665
Gas clean kit for Intuvo	CP17995

**Qty=2 required for setup

Pesticides and Mycotoxins Consumables Kits

Order the kit most suited for your laboratory using the following links:

LC/MS Kit (designed for U.S. state pesticide lists that only include LC/MS amenable compounds)

[p/n 5610-2050](#)

LC/MS and GC/MS 7890/8890 General Kit (designed for U.S. labs doing both LC/MS and GC/MS analyses)

[p/n 5610-2051](#)

LC/MS and GC/MS 7890/8890 Canada Kit (designed for Canadian labs doing both LC/MS and GC/MS analyses)

[p/n 5610-2052](#)

LC/MS and GC/MS Intuvo 9000 Kit (designed for labs doing both LC/MS and GC/MS analyses with an Agilent Intuvo 9000)

[p/n 5610-2053](#)

Selection and Ordering Information

Residual Solvents Analysis of Cannabinoid Products

Residual solvent analysis of cannabinoid products is not akin to USP <467> and requires a unique analytical approach specific to cannabinoid products. These products can be used to run the methods described in the following application note and eMethod.

Application note:

[5994-1926EN](#) Novel Residual Solvents Analysis of Cannabinoid Products with the Agilent Headspace-GC/MS System (available as eMethod G5280#010 or [M5658AA](#))

Intuvo Columns and Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
DB-Select 624 Ultra Inert column (30 m x 0.25 mm x 1.4 µm)**	122-0334UI-INT
Polyimide gasket, gasket, 5/pk	5190-9072
Intuvo MMI Guard Chip, 2/pk	G4587-60665
Mid-column backflush chip	G4588-60721
Flow Chip, detector tail, HES MS	G4590-60109
Compression bolt, Intuvo	G4581-60260

**Qty=2 required for setup

GC Columns and Supplies for 7890/8890/8860*

View [MyList](#) for the items in the table below.

Description	Part Number
DB-Select 624 Ultra Inert Column (30 m x 0.25 mm x 1.4 µm)**	123-0334UI
Gold plated inlet seal with washer, Ultra Inert, 10/pk	5190-6145
Column nut, collared, self tightening, inlet/detector	G3440-81011
Column nut, collared, self tightening, MSD	G3440-81013
Ferrule, 0.4 mm id, 15% graphite/85% Vespel, 0.1-0.25 mm column, 10/pk	5181-3323

*The method has not been tested on these instruments

**Qty=2 required for setup

GC/MS and Autosampler Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
Inlet liner, Ultra Inert, split, low pressure drop, 4 mm id, 1/pk	5190-2295
Inlet liner, Ultra Inert, split, low pressure drop, 4 mm id, 5/pk	5190-3165
Inlet septa, bleed and temperature optimized (BTO), Non-Stick, 11 mm, 50-pack	5183-4757
Inlet septa, bleed and temperature optimized (BTO), Non-Stick, 11 mm, 100-pack	5183-4757-100
Sample Loop, headspace, 0.5 mL, inert	G4556-80105
Sample probe, deactivated, for Agilent 7697A headspace sampler	G4556-63825
High temperature filament, EI ion source	G7005-60061
9 mm GC/MS extractor lens	G3870-20449
Gas tight syringe, 10 µL (for 7697A headspace sampler)	5181-3354
Gas tight syringe, 25 µL (for 7697A headspace sampler)	5183-0316
Gas tight syringe, 100 µL (for 7697A headspace sampler) Syringe, 100 µL, fixed needle, 23/42/cone	5183-2058
Gas tight syringe, 100 µL (for 7697A headspace sampler) ALS Syringe, 100 µL, fixed needle, 23-26s/42/cone	5183-2042
Gas tight syringe, 250 µL (for 7697A headspace sampler)	G4513-60560

Vials and Caps

View [MyList](#) for the items in the table below.

Description	Part Number
20 mm flat bottom glass crimp top headspace vials, clear, graduation marks and write-on spot	5190-2288
20 mm crimp caps steel/high temperature septa, headspace, 100/pk	5190-3987
20 mm flat bottom glass crimp top headspace vials, amber, graduation marks and write-on spot	5190-2286
20 mm crimp cap, headspace, aluminum, PTFE/silicone septa (100/pk)	5183-4477
20 mm vial crimper	5191-5615
20 mm vial decapper	5191-5613

Standards

View [MyList](#) for the items in the table below.

Description	Part Number
California Cannabis residual solvent kit (2020)	RSC-CBS-CA
California Cannabis residual solvent mix 1	RSC-CBS-CA1
California Cannabis residual solvent mix 2A	RSC-CBS-CA2
Ethylene Oxide	RSC-CBS-CA3
Universal Cannabis residual solvent mix	RSC-CBS-UNI
Canada Cannabis residual solvent mix (2020)	RSC-CBS-CAN
Oregon Cannabis residual solvent mix (2020)	RSC-CBS-OR
Colorado Cannabis residual solvent kit (2020)	RSC-CBS-CO
Colorado Cannabis residual solvent mix 1	RSC-CBS-CO1
Colorado Cannabis residual solvent mix 2	RSC-CBS-CO2

For an expanded selection of individual residual solvent standards and mixes, please go to www.agilent.com/chem/standards

Gas Purification System

View [MyList](#) for the items in the table below.

Description	Part Number
Gas Clean carrier gas kit for 7890	CP17988
Gas Clean carrier gas kit for 8890/8860	CP179880
Gas Clean carrier gas purifier replacement cartridge	CP17973
Gas kit for Intuvo	CP17995

Terpenes Analysis in Cannabis Products by Direct Injection

The most common approach to terpenes analysis is headspace gas chromatography (GC) with flame ionization detection (FID), mass spectrometry (MS) or both (FID/MS). This approach, however, may result in loss of sesquiterpenoids like alpha-bisabolol in high-potency cannabis samples. Terpene analysis using liquid injection overcomes this problem. These products can be used to run the methods described in this application note and eMethod.

Application note:

5994-2032EN Terpenes Analysis in Cannabis Products by Liquid Injection Using the Agilent Intuvo 9000/5977B GC/MS System (available as eMethod G5282AA#010 or **M5659AA**)

Intuvo Columns and Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
DB-Select 624 Ultra Inert column (30 m x 0.25 mm x 1.4 µm)**	122-0334UI-INT
Polyimide gasket, 5/pk	5190-9072
Intuvo MMI Guard Chip, 2/pk	G4587-60665
Mid-column backflush chip	G4588-60721
Flow Chip, detector tail, HES MS	G4590-60109
Compression bolt, Intuvo	G4581-60260

**Qty=2 required for setup

GC Columns and Supplies for 7890/8890/8860*

View [MyList](#) for the items in the table below.

Description	Part Number
DB-Select 624 Ultra Inert Column (30 m x 0.25 mm x 1.4 µm)**	123-0334UI
Gold plated inlet seal with washer, Ultra Inert, 10/pk	5190-6145
Column nut, collared, self tightening, inlet/detector	G3440-81011
Column nut, collared, self tightening, MSD	G3440-81013
Ferrule, 0.4 mm id, 15% graphite/85% Vespel, 0.1-0.25 mm column, 10/pk	5181-3323

*The method has not been tested on these instruments

**Qty=2 required for setup

GC Columns and Supplies for 7890/8890/8860*

View [MyList](#) for the items in the table below.

Description	Part Number
Vials screw cap, 1.8 mL	5188-6535
12 mm screw cap, green, PTFE/silicone/PTFE septa, 100/pk	5182-0724

Standards

View [MyList](#) for the items in the table below.

Description	Part Number
Terpenes Kit	WRK-105
Cannabis Terpenes Mix – 100 mg/L – 21 Components	TPM-105-1
Cannabis Terpenes Mix – 100 mg/L – 21 Components	TPM-100-1
Cannabis Terpenes Mix – 100 mg/L – 21 Components	TPM-110-1
Cannabis Terpenes Mix – 100 mg/L – 21 Components	SNV-105-1

For an expanded selection of individual terpene standards and mixes, please go to www.agilent.com/chem/standards

Inlet and Detector supplies

View [MyList](#) for the items in the table below.

Description	Part Number
Inlet liner, Ultra Inert, split, low pressure drop, 4 mm id, 1/pk	5190-2295
Inlet liner, Ultra Inert, universal, low pressure drop, 4 mm id, 5/pk	5190-3165
Inlet septa, bleed and temperature optimized (BTO), Non-stick, 11mm, 50/pk	5183-4757
ALS syringe, blue line, 10 µL, fixed needle, 23/42/cone, PTFE-tip plunger	G4513-80220
High temperature filament, EI ion source	G7005-60061
9 mm GC/MS extractor lens	G3870-20449
FID jet, universal fit, 0.29 mm (0.011 inch) id capillary	5200-0176

Gas Clean Purification System

View [MyList](#) for the items in the table below.

Description	Part Number
Gas Clean carrier gas kit for 7890	CP17988
Gas Clean carrier gas kit for 8890/8860	CP179880
Gas Clean carrier gas purifier replacement cartridge	CP17973
Gas kit for Intuvo	CP17995

Selection and Ordering Information

Heavy Metals Analysis

These products can be used to run the ASTM method for Analysis of Multiple Elements in Cannabis Matrices by ICP-MS (available from the [ASTM website](#)) and the methods described in the following application note for testing of cannabis and associated products to ensure safety from contaminants, including inorganic impurities such as the toxic elements As, Cd, Pb, and Hg.

The analysis of mineral and additional trace elements provides labeling information that is required when these products are used as nutritional supplements. Since contamination can occur during the manufacturing process, analysis is necessary at all stages of production.

Application notes:

5994-4080EN Determination of Heavy Metals in Cannabis and Hemp Products Following AOAC Method for ICP-MS. The AOAC method is suitable for the analysis of the range of cannabis and hemp-based products. A sample from each category was analyzed in this study, including hemp flower, hemp butter, pain relief cream, and CBD crude extract.

5991-8482EN Multi-Element Analysis of Cannabis and Hemp using ICP-MS. The application note describes the analysis of a range of cannabis and hemp-based products, including cannabis, cannabis tablets, a cannabidiol tincture, chewable sweets, and a hemp-based body cream.

Standards

Not available for online sale.

Description	Part Number
Initial calibration verification*	5183-4682
Environmental spike mix*	5183-4687
Environmental calibration standard*	5183-4688
ICP-MS internal standard mix	5188-6525
ICP-MS stock tuning solution (100 mL)	5188-6564
Mercury, 1000 µg/mL, 100 mL	5190-8485
Mercury calibration standard	8500-6941

*Not available for online purchase. Contact your local Agilent sales representative.

For an expanded selection of individual heavy metal standards and mixes, please go to www.agilent.com/chem/standards

ICP-MS Supplies

View [MyList](#) for the items in the table below.

Description	Part Number
Easy-fit Peristaltic pump tubing, standard for sample uptake, white/white, 12/pk	5005-0020
Easy-fit Peristaltic pump tubing, standard for spray chamber drain, yellow/blue, 12/pk	5005-0022
Easy-fit Peristaltic pump tubing, standard for internal standard (ISTD) uptake, blue/orange, 12/pk	5005-0021
Easy-fit Peristaltic pump tubing, for high matrix sample uptake, black/black, 12/pk	5005-0023
Tube 16.5 mL 130 x 17 mm polypropylene, 1000/case	00000001600L
Centrifuge tube polypropylene, 50 mL, 500/pk	190065200
Sample tubing, PFA, 0.5mm ID, 1.6mm OD, 5m	G1820-65105
Nebulizer, MicroMist, U-series with UniFit sample connector, standard with Agilent 7800/ 7850/7900 Series ICP-MS	G3266-80004
Sample uptake tube and connector, UniFit, 0.5 mm id x 700 mm capillary, for U-Series MicroMist concentric nebulizer, 10/pk	G3266-80012
Quartz Spray chamber for 7850, 7900, and 8900 with UHMI	G8400-67150
Quartz Spray chamber for 7800 with HMI	G3280-80008
Quartz Torch, single-piece, 2.5 mm id injector	G3280-80053
ICP-MS sampler cone, Nickel-tip with Nickel-plated copper base**	G3280-67061
x-lens ICP-MS skimmer cone, Nickel, for 7800 and 7850 ICP-MS	G3280-67041
x-lens ICP-MS skimmer cone, Nickel, for 7900 and 8900 ICP-MS	G8400-67200

**Optional sampling cone with nickel-plated copper base to increase corrosion resistance and extend lifetime with high chloride matrix. [Learn more](#).

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Learn more about CrossLab at www.agilent.com/crosslab.



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