Non-Retail Medical Cannabis Business Proposal

Type 8 Laboratory Testing

Prepared in support of an application for a non-retail medical cannabis business in Nevada City, CA

Date: February 6, 2018
Prepared for: NCALC, LLC
For the Property Located at: 440 Lower Grass Valley Rd.
Nevada City, CA 95959

begreenlegal

Cannabis Business and Operations Plan

For the Property Located at

440 Lower Grass Valley Road, Suite “A”

In

Nevada City, California 95959

Prepared for:

NCALC, LLC

A California Limited Liability Corporation

Doing Business As

The Higher Commitment

Prepared Date: February 6, 2018

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1. Company Overview

1a. Introduction

The Higher Commitment represents a partnership between two of Nevada County's distinguished residents for the purpose of establishing the first fully licensed and accredited cannabis laboratory in northeastern California. We appreciate the time and effort Nevada City has spent on crafting a comprehensive ordinance based on California's new state regulations that now allow licensure of cannabis businesses for the first time in history. We understand that the City's ordinance is intended to protect its residents and local land trust, while providing a path for cannabis operators to conduct their business legally and without fear or repercussion from law or code enforcement. To that end, we expect our business to be fully vetted by the City and will not take lightly our responsibilities of complying with all local and state laws, in addition to being a good neighbor and community member. We have attached the Nevada City application for non-retail cannabis businesses as Attachment A.

We request that the City approve our application for a non-dispensary medical cannabis business functioning as a testing laboratory for the following reasons, as described further in the following pages:

- We are a locally owned business, with each respective partner having been a Nevada County resident for years. Both partners have multiple family members living in the area, as well as many friends with whom we have grown up or become close. We believe that our success will be our community's success and show other cities how cannabis businesses can operate harmoniously.
- We are organized and well-funded, with direct industry expertise and a sound business plan based on fact, sourced-findings, accepted scientific laboratory standards, U.S. Food and Drug Administration protocols, and local and state regulations.
- We have chosen to pursue one of the most in-demand businesses in the cannabis industry, which will provide the City with a strong authority on implementing California's stringent cannabis testing requirements, as well as a very successful business with whom local officials will be proud.
- We are responsible and committed business owners who strongly believe that a successful business means supporting the community through local and competitive hiring practices that include insurance and other benefits. We believe that employees have the right to collectively bargain for their rights and plan to provide training and continuing education opportunities. In fact, continuing education will be a requirement for all our employees and owners.

1b. Business Model

Our vision is to establish a cannabis testing laboratory in Nevada City. With the passage of recent state laws that now offer licensure to all manner of cannabis activities, one of the most important components from a public safety perspective is ensuring cannabis products are safe for human consumption, whether that method involves inhalation, ingestion, or absorption. Once cannabis products are cultivated or manufactured, state now requires those products to be handled by a licensed distributor who is responsible for conducting a quality assurance and control assessment before they are transported to any licensed cannabis retailer (dispensary or delivery service). One of the primary components of this assessment is for the distributor to engage a licensed and accredited testing laboratory who is responsible for independently testing samples of those products for a variety of

compounds deemed harmful to consumers by state regulators. If the product sample passes testing, the laboratory issues a certificate of analysis back to the distributor, allowing that product batch to be released for retail sale.

As cannabis lab testing is a new requirement, the industry lacks an adequate number of labs capable of providing testing services, particularly in the more rural parts of California. As noted by the map below, most of the accredited laboratories are also located in the more densely populated areas of the state, particularly the San Francisco Bay area, Los Angeles, and San Diego. With the implementation of regulatory ordinances in Nevada County, as well as other cities and counties in northeastern California over the coming years allowing cannabis businesses, demand for local lab testing facilities in close proximity to distributors receiving products from cultivators and manufacturers is expected to increase dramatically.

Our business is therefore intended to achieve the following goals:

- **Goal #1:** Establish a licensed and accredited lab that is capable of providing cannabis testing services in compliance with California state law to licensed cannabis distributors, as well as pretesting services to cultivators and manufacturers;
- **Goal #2:** Conduct our operations in a way that appeases our neighbor's concerns about cannabis and that benefits the community;
- **Goal #3:** Promote public awareness of how cannabis can be cultivated, manufactured, distributed, sold, and consumed safely to avoid negative connotations of past experiences with illegal or gray market cannabis businesses;
- **Goal #4:** Contribute to the local community through public outreach workshops that educate residents about the benefits of lab testing and by providing voluntary water quality testing to help minimize the impacts of previously unregulated cannabis cultivation on our streams and rivers.

1c. Core Principles

Our laboratory model is built around four primary standards of excellence, including

- **Ethics and Integrity** – Our principals, managers, and employees will operate in a professional manner, advances scientific fundamentals, and public understanding of cannabis.
- **Proficiency and Credibility** – Our quality assurance and quality control procedures (as noted in Attachment A – Standard Operating Procedures Manual) will ensure that the testing results we produce are of only the highest quality and can be relied upon by regulators, other cannabis licensees, and the public.
- **Accountability and Transparency** – We intend to be completely transparent and accountable for all our business operations. Our standard operating procedures identify certain reporting and monitoring tasks we will conduct on a daily basis to ensure we stay in compliance with all local and state laws, as well as our ISO laboratory accreditation.
- **Consistency and Reliability** – We intend to perform our testing responsibilities in an expedient manner, while also producing consistent and reproducible results.

2. Company Structure and Legal Ownership

2a. Entity Structure

The Higher Commitment is a DBA (Doing Business As) of NCALC, a California limited liability corporation (LLC), with its primary business address at 440 Lower Grass Valley Road Suite A, Nevada City, CA (Attachment B – Lease Agreement, Attachment C – Property Owner Approval, Attachment D – Entity Documents). As of January 1, 2018, the state of California allows both for-profit and nonprofit entities to obtain cannabis licenses. While the partners of NCALC, LLC previously operated as a nonprofit cannabis company in Nevada County, we have made the decision to begin our testing laboratory venture as an entirely new entity, allowing direct control and responsibility for the management of our operations to remain with only those individuals requesting approval from Nevada City and the state. Unlike a nonprofit that is governed by a board of directors voted into office by its members, controlling interest of The Higher Commitment will remain with the LLC partners unless we explicitly request a transfer of ownership with the City.

2b. Principal Background

NCALC, LLC is comprised of two partners, both of whom are Nevada County residents, as follows:

[redacted] **– President / Marketing Director**

[redacted] has been a Nevada County resident for over 20 years. He graduated from Nevada Union High School and, shortly after, joined the United States Coast Guard where he specialized in Search and Rescue in one of the most dangerous regions of the Pacific North West. After completing over 100 rescues and receiving the Coast Guard Commandant achievement medal, he attended the Maritime Law Enforcement Academy and received training as a boarding officer for Homeland Security, completing numerous South PAC patrols enforcing immigration and drug trafficking. He honorably earned his disabled veteran status after completing his tour of duty in 2006.

After his military separation, [redacted] focused on employment in the building and development industry, specializing in commercial construction. With a strong interested in creating visions, [redacted] quickly advanced in leadership and management at all levels of construction phases. He used his G.I. funding to attend the Northern California College of Construction where he gained full certification in heavy equipment and state certification on hydraulic cranes. [redacted] is currently employed as an experienced superintendent in the commercial construction field, with broad knowledge of structural, architectural, and civil ground up build outs. He has successfully completed six figure projects with major companies such as Aerospace, Bureau of Land Management, SchoolsFirst Credit Union, and Sierra Nevada Memorial Hospital.

Aside from his professional achievements, [redacted] has also become a dedicated husband and father to his beautiful daughter [redacted] and amazing wife [redacted]. Since his time in military service, [redacted] has wanted to help others and hopes to build a successful company through establishment of the Higher Commitment that incorporates his core values while also providing a contributing service to his community. [redacted] holds [redacted] of NCALC, LLC.

[redacted] **– Chief Executive Officer / Lab Technician**

[redacted] graduated from California State University Fresno in 2012 with his Bachelor of Science degree in biology and an emphasis in ecology, evolution, and organismal biology. His core classes and subsequent research projects provided extensive experience in lab techniques and procedures. [redacted] was born and raised in Upland, CA, but since has been a Nevada County resident and property owner for over three years. His father is a world-renowned periodontist and is the president of multiple dental societies. His mother has her Ph.D. in organizational management, master's in nursing, and has worked as a teacher, principal, and nurse in the Fresno, CA School district.

[redacted] has been involved in the cannabis industry for 14 years and has extensive industry knowledge and connections. His past experience as a Nevada County cultivator has highlighted the need for safer patient access to quality medical cannabis products and also the challenges other cannabis businesses in the County face in accessing testing laboratories, some of which are hundreds of miles away. [redacted] vision for the future of his proposed business is to provide those testing services now required by state law to the Nevada County community. [redacted] of NCALC, LLC.

3. Regulatory Approvals and Compliance

3a. Local Government Cannabis Permitting and Licensing

The Higher Commitment is proposing to locate its operations in Nevada City, California and anticipates complying with all local laws, rules, and regulations deemed necessary to conduct its business. As a medical cannabis business, we intend to comply with Nevada City Municipal Code Chapter 9.22, as well as the local zoning ordinance chapter 17.142, medical cannabis uses and activities. Specifically, we intend to comply as follows:

NC Municipal Code Chapter 9.22.030

- No person affiliated with our organization will engage in any way with any cannabis activity without a valid medical cannabis business permit from the city. Additionally, we will not operate without receiving a temporary or annual Type 8 cannabis laboratory testing license from the Bureau of Cannabis Control.
- As Health and Safety Code Section 11362.775(a) has been repealed as part of the states new cannabis regulatory program, taking effect on January 1, 2018, we intend to operate as a for-profit entity, specifically a Limited Liability Corporation, rather than as a collective or cooperative, also known as a Mutual Benefit Nonprofit Corporation.
- As an approved operator of a local cannabis business, we intend to ensure that all employees of The Higher Commitment comply with all requirements of this chapter, as well as applicable state laws and regulations. Additionally, we anticipate providing employee training on all required standard operating procedures required by the state pertaining to the operations of a cannabis lab testing facility.

NC Municipal Code Chapter 9.22.050

- We intend to comply with all procedures identified by City Council regarding the issuance of our medical cannabis business permit. We have taken extensive measures to provide the City with a complete application package, based on those requirements identified in Exhibit 2 of Resolution

2017-51. However, should the City find that additional information is needed, we are happy to provide this information in an expedient manner.

- We anticipate filing a renewal of our annual medical cannabis business permit at least 60 days prior to the expiration date of our current permit, including the required fee, as set forth by City Council. We will also comply with any additional conditions to the permit renewal process, as described by the city manager
- In the unlikely event that The Higher Commitment state cannabis laboratory license is suspended, revoked, or terminated, we will immediately suspend or terminate all operations until the state, or its respective department or division, reinstates or reissues the state license.

NC Municipal Code Chapter 9.22.070

- When necessary, we will apply to the City's planning department to obtain the requisite land use approvals or entitlements for our location. We anticipate that our project will be categorically exempt from review under the California Environmental Quality Act (CEQA).
- In compliance with local code, we will not attempt to transfer ownership or control of our medical cannabis business. We are anticipating the addition of one or more investors (financial interest holders) up to, but not exceeding 19 percent equity position, which defines these individuals or entities as a financial interest holder under Section 26013 of the California Business and Professions Code. If greater than 19 percent equity is anticipated, we will first discuss the matter with the City to determine the best approach before any transfer is made.

NC Municipal Code Chapter 9.22.080

- We will make sure to obtain a City business license prior to commencing operations.
- We are happy to allow the City the opportunity to inspect our facilities before we begin operations and also plan to obtain any required building permits, fire department approvals, health department approvals, and any additional zoning and land use approvals that may be needed.
- We anticipate receiving certification from the City planning director prior to commencing with operations, indicating the business is located on a site that meets all requirements of the City's zoning and municipal code.
- We have provided a lease agreement with the landlord of our property indicating our right to occupy and use the property for a medical cannabis business. As the lease is executed with the primary tenant of the property, we have also provided a signed and notarized statement from the property owner acknowledging their consent to the operation of a medical cannabis business.
- We anticipate executing an agreement with the City, in a form approved by the City attorney, that indemnifies, defends at our expense, and holds all City officers, officials, employees, representatives, and agents harmless from any claims, losses, damages, injuries, liabilities, or losses that are in any way related to the City's issuance of our medical cannabis permit, decision to approve the operation of our medical cannabis business, the process the City uses in making its decision, or any alleged violation of any federal, state, or local laws by any officer or employee of The Higher Commitment, or its agents.
- We anticipate maintaining all necessary insurance coverages, as noted below in our "Insurances" section. Our anticipated coverage has been directed by The Stratton Agency, a

national provider of insurances and bonds. Should the City attorney require additional coverages, we will comply with those requirements.

NC Municipal Code Chapter 9.22.090

- Our goal is to operate always with all applicable local and state laws, including any regulations promulgated thereunder. As noted below, we believe that our compliance requirements do not end with issuance of any permit or license, but rather are an integral part of our operations. To that end, we anticipate implementing a robust training and compliance program with all active employees to ensure any and all code compliance is met and recorded on a daily basis.
- We anticipate paying all fees, charges, and taxes as applicable to our medical cannabis business. Applicable taxes include sales tax, excise tax, cultivation tax, state income tax, and federal income tax.
- Our operations will include an intensive and thorough recordkeeping program with the intention of our ability to provide any and all reports required by audits, reporting, and renewals as needed on demand. In addition, we intend to implement a compliance program with all employees and operational procedures to track and record daily tasks required by local and state laws.
- We intend to operate only during the hours specified in our medical cannabis business permit. We propose to operate actively (shipping, receiving, customer, supplier activities) between the hours of 8:00am and 6:00pm. Additionally, we propose to operate passively during quiet hours between 6:00am-8:00am and 6:00pm-10:00pm. Passive hours only pertain to extended employee time inside our facility to “catch up” on work, with no noise or visits visible to any outside party. We intend any passive time to meet or exceed the City’s regulations pertaining to noise, light, and other associated nuisances.
- No onsite consumption of any cannabis product will be tolerated by our operation. Employees in violation of this regulation will be terminated immediately.
- Lab testing is paid in the form of fees. We anticipated setting up a point of sale tracking system for samples received by the lab, to be paid by our clients through electronic means. If cash, or check is necessary, those transactions will be similarly recorded electronically. The City is welcome to inspect any and all records on demand.
- No unlicensed cannabis products will ever be tested by our laboratory. Only licensed or medicinal cultivators, manufacturers, and distributors will be allowed as customers. Additionally, we anticipate testing other variables such as water quality for local nonprofits, or soil and water samples for cultivators.
- Emergency contacts for both partners are as follows:
    - [redacted]
    - [redacted]
- We do not anticipate any significant signage for our laboratory other than constructing one visible sign per City ordinance identifying our name on the building as “The Higher Commitment”. No other signage is anticipated.
- As no onsite consumption is allowed and our business does not involve the retail or wholesale distribution of any cannabis product, no client, customer, prospect, or visitor will ever be given any cannabis product. In addition, any visitor who consumes cannabis on our property or within

our facility will be asked to leave immediately. If such person does not leave the premises immediately, we will notify local law enforcement.

- No persons under the age of 18 will be allowed within our premises, unless they possess a medical cannabis recommendation from a licensed medical doctor, or a medical cannabis card from the department of public health. In addition, as a testing laboratory we do not anticipate having visitors other than cannabis licensees.
- Odor from all storage refrigerators and other compartments housing cannabis samples within our facilities will be ventilated through a charcoal filtration system within our negative pressure lab rooms. No odor is anticipated outside our immediate laboratory area within our facility. Specifications of this system will be submitted to the City building department as needed with any required improvement plans.
- The original of our permits and business license will be displayed in a readily-visible location inside the laboratory.
- We have included criminal background checks for both laboratory partners, pursuant to California Penal Code sections 11105(b) and 13300(b)(11). Neither partner has committed any crime listed in California Business and Professions Code section 19323.
- No loitering by persons outside our facility, both on the premises and within 50 feet will be allowed. Per our company protocol, such individuals will be asked to leave. If such individuals do not leave, local law enforcement will be notified.

NC Municipal Code Chapter 9.22.100

- All records and reporting will be maintained so as to provide local and state regulators readily available information in the case of an audit or inspection. On an annual basis, or any time upon reasonable request of the City, we will file a sworn statement detailing the number of sales conducted by our laboratory during the previous twelve-month period, or shorter period depending on the request. Our statement will include gross sales for each month, as well as all applicable taxes paid or due to be paid.
- We anticipate maintaining a current register of the names and contact information of anyone owning or holding an interest in our laboratory. This information will be available upon request by the City manager.
- Our records will include a record of all distributors, cultivators, and manufacturers, as well as any other businesses for which we perform testing services.
- Per state law, all transactions involving inventory of samples acquired for testing will be recorded meticulously through Chain of Custody (COC) records, as well as Point-Of-Sale records for the financial transaction. Additionally, we are happy to provide the Certificate of Analysis (COA) for any and all samples tested.
- As noted in our security measures below, we will implement sufficient security measures so as to deter and prevent the theft of medical cannabis or medical cannabis products at the medical cannabis dispensary. As our primary function will be to test products anticipated for the retail market, our customers will consist of licensed distributors, manufacturers, and cultivators. We anticipate receiving visits from one or more licensees on any given day, as well as the occasional Nevada City resident. However, only our front office will be open to anyone unless there is a specific need to escort one or more individuals to our restricted access areas. If the latter is

necessary, per state law these individuals will be issued a temporary ID badge only after producing a valid state ID and signing a registry form.
- Security will be provided per the security section below. In general, all security measures will be compliant with local and state law pertaining to Type 8 cannabis laboratory testing facilities.
- We have explained our storage and transportation plan below, which describes the procedures we plan to implement for safely and securely storing and transporting cannabis, cannabis products, and any currency involved with our testing operations.
- If any discrepancy in inventory occurs, we will notify the City, as well as the Bureau of Cannabis Control immediately.
- No person will be allowed to consume, sell, or dispense alcoholic beverages on or about the premises of our laboratory. Any individual found to be participating in any of these activities will be asked to leave the premises. Any incident involving a person refusing to leave the premises will be immediately reported to local law enforcement.
- All restroom facilities will remain locked and under the control of our management.

NC Zoning Code Chapter 17.142.030

- The property at 440 Lower Grass Valley Avenue is split-zoned. While the southern half of the parcel is zoned as open space (OS) and does not allow businesses, the northern half is zoned as light industrial (LI), which does allow for cannabis businesses. The northern half of the lot is where the existing building and parking area are located.

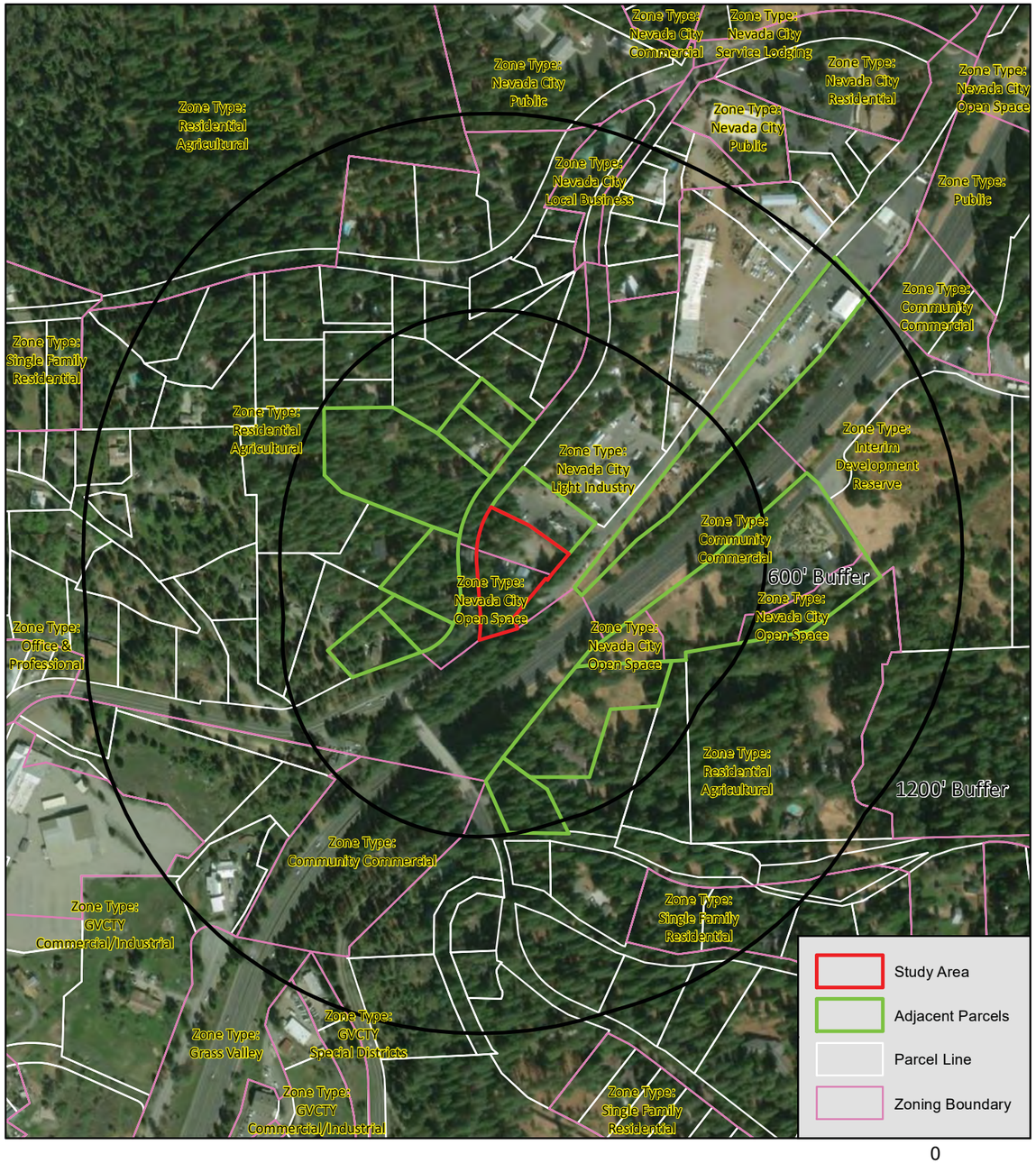
3b. State of California Cannabis Licensing

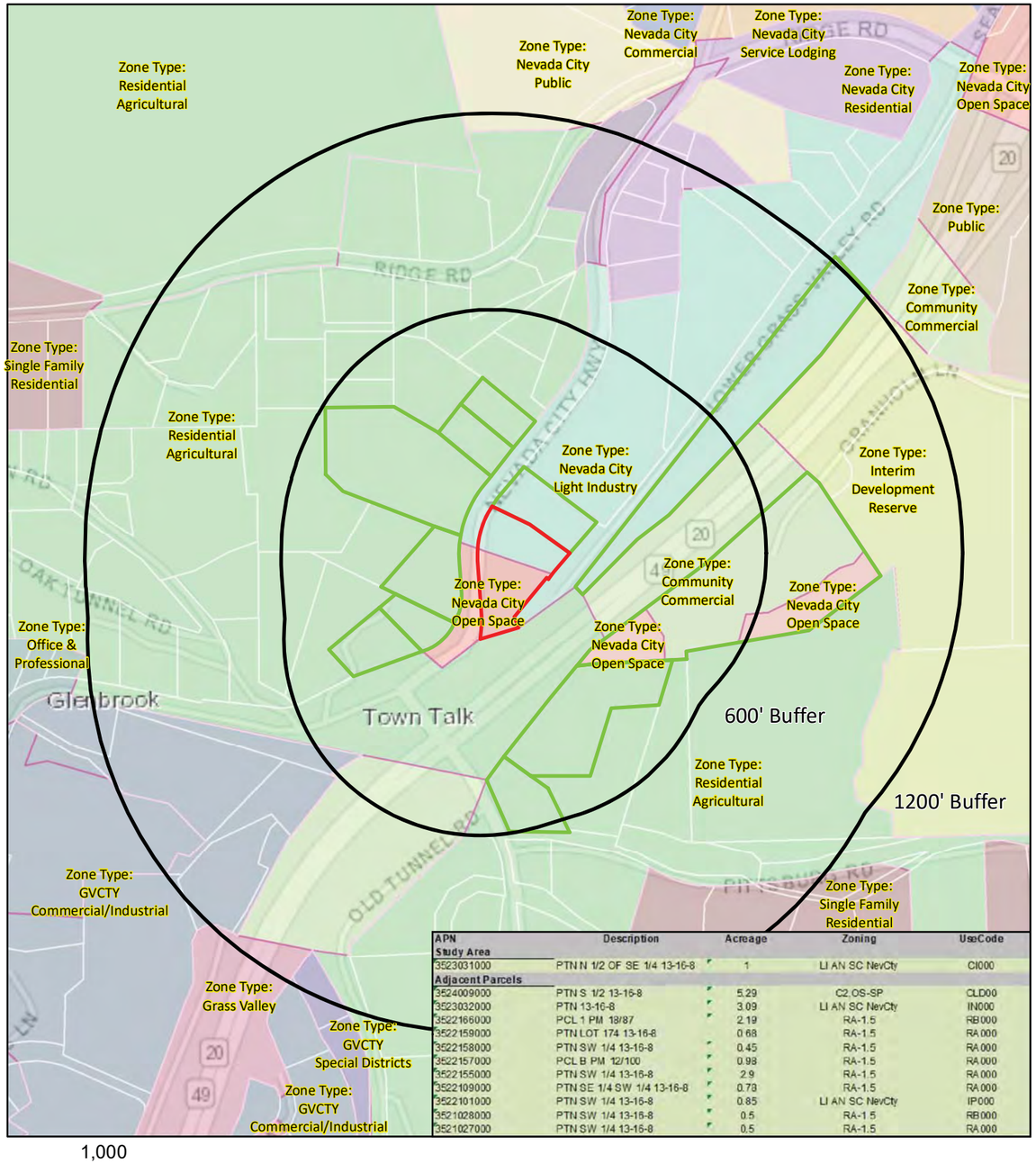
The State of California started issuing licenses to cannabis businesses in January 2018. Cannabis testing laboratories are required to obtain a Type 8 cannabis license from the Bureau of Cannabis Control (BCC).

State regulations require that cannabis for medical or adult-use must be licensed under separated under Type M or Type A license types. Every person or entity operating a cannabis business must obtain a separate license for each location. Licenses are issued for 12 months, requiring annual renewal, and are not transferrable. The exception to these rules is that Type 8 testing laboratories are not required to designate a Type M or Type A license, but rather may conduct operations with either license designation (BPC Section 26013).

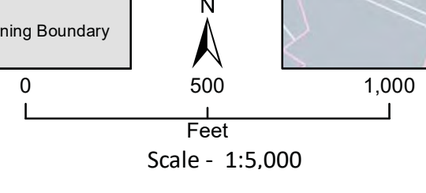
According to state cannabis laboratory license requirements, a licensee must:

- Maintain ISO/IEC 17025 accreditation for the testing of the following:
    - Cannabinoids;
    - Heavy metals;
    - Microbial impurities;
    - Mycotoxins;
    - Residual pesticides;
    - Residual solvents and processing chemicals; and
    - If tested, terpenoids.
- Retain, and make available to the BCC upon request, all records associated with the licensee's ISO/IEC 17025 accreditation.





APN	Description	Acreage	Zoning	UseCode
Study Area				
3523031000	PTN N 1/2 OF SE 1/4 13-16-8	1	LI AN SC NevCty	CI000
Adjacent Parcels				
3524009000	PTN S 1/2 13-16-8	5.29	C2 OS-SP	CLD00
3523032000	PTN 13-16-8	3.09	LI AN SC NevCty	IN000
3522166000	PCL 1 PM 18/87	2.19	RA-1.5	RB000
3522159000	PTN LOT 174 13-16-8	0.68	RA-1.5	RA000
3522158000	PTN SW 1/4 13-16-8	0.45	RA-1.5	RA000
3522157000	PCL B PM 12/100	0.98	RA-1.5	RA000
3522155000	PTN SW 1/4 13-16-8	2.9	RA-1.5	RA000
3522109000	PTN SE 1/4 SW 1/4 13-16-8	0.73	RA-1.5	RA000
3522101000	PTN SW 1/4 13-16-8	0.85	LI AN SC NevCty	IP000
3521028000	PTN SW 1/4 13-16-8	0.5	RA-1.5	RB000
3521027000	PTN SW 1/4 13-16-8	0.5	RA-1.5	RA000



Scale - 1:5,000

FIGURE 1 - VICINITY AND ZONING

THE HIGHER COMMITMENT CANNABIS TESTING LABORATORY • NEVADA CITY, CA

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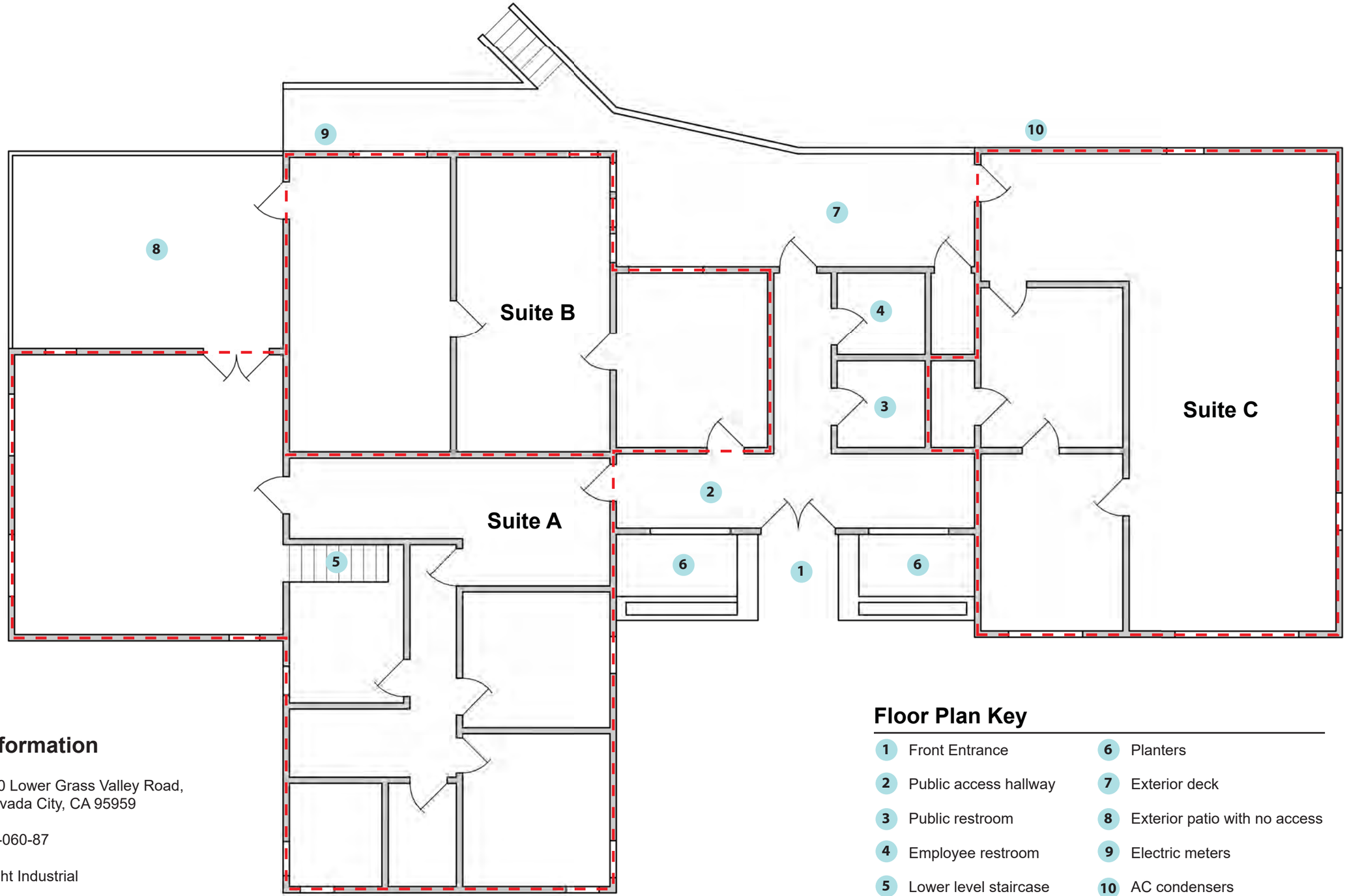

Property Information

Addresss:	440 Lower Grass Valley Road, Nevada City, CA 95959
Parcel #:	37-060-87
Zoning:	Light Industrial

Floor Plan Key

1	Front Entrance	6	Planters
2	Public access hallway	7	Exterior deck
3	Public restroom	8	Exterior patio with no access
4	Employee restroom	9	Electric meters
5	Lower level staircase	10	AC condensers

FIGURE 2 - EXISTING FLOOR PLAN

THE HIGHER COMMITMENT CANNABIS TESTING LABORATORY • NEVADA CITY, CA

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3c. Licensure Priority

An applicant who has served as an active duty member of the Armed Forces of the United States and was honorably discharged and who can provide evidence of such honorable discharge shall have his or her application expedited pursuant to BPC Section 115.4.

We anticipate receiving expedited processing of our state annual license application, given one of the company's partners is an honorably discharged veteran.

3d. Licensing Maintenance

A state cannabis licensee must submit an annual renewal to remain active. Licensees are also subject to unscheduled inspections and compliance with state requirements for standard operating procedures (SOP). We have included a draft copy of our SOP's as a demonstration of our commitment to operating a well-organized, efficient, and accountable cannabis laboratory.

3e. Substantially Related Offenses Review

Our management team and associated partners do not have any felony convictions that may hinder approval of our applications. We will supply the City with our driver's license information for its preliminary check and also conduct a live scan when we apply to the state.

3f. Labor Peace Agreement

The State of California requires all cannabis licensees to execute a Labor Peace Agreement with a local union if the licensee employs 20 or more employees. While we plan to employee up to 15 people, should The Higher Commitment employ 20 or more employees in the future, we will execute this agreement with a local labor union. Our employees will receive fair wages and will be allowed to join a union of their choosing.

3h. California Environmental Quality Act

All public agencies in California are required by the California Environmental Quality Act (CEQA) to conduct an environmental assessment of any action they make that has the potential for resulting in a physical change to the environment. We anticipate our project being categorically exempt under CEQA for minor land use modifications and other categories deemed appropriate by the City.

4. Business Premises

4a. General Information

The Higher Commitment has secured a suitable location for its Type 8 medical cannabis laboratory business at 440 Lower Grass Valley Road, Nevada City, California. The property is currently leased by Growing Communities, a local nonprofit, from the Grass Valley Hydrogarden, Inc. The nonprofit in turn is subleasing Unit A in the building located at this address to us for our proposed laboratory. As the building on the property contains three suites that will also be leased to medical cannabis businesses, we hope to create a synergy between us that supports our safety, security, parking, and maintenance responsibilities to make an excellent campus the City will be proud to have in the community.

4b. Neighborhood Context

Our proposed location is an attractive property and surrounded on two sides by wooded open space (Figure 1). The property, also identified by its Nevada County parcel number (APN) as 35-221-07, sits at

the end of Lower Grass Valley Road and is zoned light industrial (LI) on the north side and open space (OS) on the southern portion of the parcel.

This parcel is at the far southwestern corner of the City's jurisdiction. The land in this area is roughly triangularly shaped with two immediately adjacent parcels that are understood to be City or State road easements (Nevada City Highway on one side and State Highway 20/49 (Golden Center Freeway) on the other side of the property). The third parcel boundary is zoned LI and is currently leased by Weiss Brothers Nursery, Inc.

The property sits at the edge of the incorporated area of the City of Nevada City at the end of a long block of industrial-related businesses, which consists primarily of trucking, heavy equipment rental, and landscaping yards.

Beyond the one adjacent neighbor (Weiss Brothers), there are nine other parcels along Lower Grass Valley Road zoned light industrial (LI). Robinson Enterprises is the predominant business along this road, along with an operation by Ferrell Gas, VTae Perfume, and other similar businesses.

Sensitive uses in proximity to our proposed facility include:

- The Sierra Presbyterian Church (and also site of Sierra Christian School, and a children's day-care program) is approximately 1300 feet away
- Nevada County Superintendent of Schools owns a parcel at the corner of Ridge Road and Nevada City Highway. The linear distance between this parcel and our proposed lab is approximately 900 feet and significantly longer by circuitous roadway. While this building has served primarily administrative functions in years past, the District has just converted the use to school/student purposes.
- The next nearest complex of schools is Deer Creek, Seven Hills, and Forest Charter School, the nearest of which is approximately ~3000 linear feet away.
- The proposed site is likely the furthest parcel from any public park within the entire City's jurisdiction.
- In our best survey of existing preschools in the vicinity, the Little Friends Day Care at (10114 Granholm Lane) is approximately 1300 linear feet from the parcel yet is only accessible by crossing the Gold Flat Road overpass, a road distance of approximately 5400 feet. The next preschool seems to be within the residential areas of Deer Creek/Seven Hills school (~3200 feet).

As the last address on Grass Valley Road and the furthest property in the City from the urban center, no through-traffic occurs in front of the property and there is no potential for vehicles to liner or even pass by surreptitiously.

Access is directly off the Golden Center Freeway, which greatly minimizes any potential for vehicle or transit impacts to any residential parcel in the city. Coming from either direction on the Golden Center Freeway, vehicles need only to negotiate one or two immediate intersections between the freeway and our proposed location.

4b. Premises Description

The property includes a commercial building, approximately 3950 square feet, that consists of three suites that are currently vacant, but soon to be entirely leased to non-retail cannabis businesses (Attachment F – Existing and Proposed Site Plans). The Higher Commitment will locate its laboratory in Suite A, there will be a cannabis manufacturer in Suite "C", and Suite "B" will be occupied by the Growing Community (Figure 2 – Existing Floor Plan).

Access

The property is accessed off Lower Grass Valley Road by two entry points. Employees and visitors would park in the designated parking area and enter the building through the double entry door. Suite A is located to the left of the public hallway and can only be accessed through one interior pedestrian door. Two bathrooms are located off this public hallway, one designated for visitors and one for employees. The building exits to the rear with access to the back of the property. Suite A also has access to a private, shared patio with Suite B. This patio has no external access point.

Parking

With an existing paved entrance and large, partially graded parking zone, the topography and layout of the property is well suited to provide ample off-street parking for visitors and employees. The proposed site plan for our Suite includes a total of 8 (eight) parking spaces, and two (2) separate ADA compliant spaces. The landlord intends to re-grade and modify two existing pathways to be ADA compliant, which will lead from the parking areas to the main entrance and also side service entrances.

Specifically, our site plan illustrates:

- A visitor parking zone with eight (8) spaces;
- An employee overflow parking zone with twelve (12) parking spaces in the gravel lot reserved for employees and suppliers;
- Two (2) ADA spaces nearer the building entrance.

As discussed in our safety and security section, our landlord anticipates our parking inventory will be adequate for our premises, as well as that of the other two tenants in the adjacent suites. At the same time, we will consistently and collectively discourage any guests from parking on the street.

Fencing

The property currently has an eight-foot fence around a portion of the perimeter. As noted in the safety and security plan (Attachment G – Safety and Security Plan), the landlord proposes to expand this fence, so the entire perimeter of the property is fenced, ensuring it is not used as a transient route from Grass Valley to Nevada City.

Signage

The landlord intends to place code compliant, prominent, and tasteful signage throughout our premises and property. Primary signage placement is illustrated on the attached site plan (Attachment A). Our signage will comply with the following requirements:

- The business identification signage will be compliant with the requirements of the Nevada City Municipal Code (Section 17.80.190), including applying for a permit from the City.
- As noted on the site plan, our signage will replace existing signage and will include tenants' logos and other identifying information (logo shown on the site plan).
- Signage will be located both at the entrance to the building and the street entrance to the property. No sign will ever obstruct the entrance or exit to the building or any window.
- The signage at the entrance to the building will post a clear and legible notice indicating that smoking, ingesting, or otherwise consuming cannabis on the premises or in the areas adjacent to the dispensary is prohibited. Similar notices will be placed around the premises as appropriate.

4c. Facilities Description

The interior of Suite A is comprised of Seven rooms totaling Approximately 1500 square feet. The suite is accessed off the public hallway (to the left) into a front area that will be used as a lobby, then into a sample intake room before entering the Lab. The remaining five rooms will be reconfigured per the proposed lab plan. This buildout will be conducted in compliance with ISO lab accreditation standards and include a station for testing preparation, as well as several stations for various lab testing equipment. We propose to reconfigure the walls to build a storage room in the back for refrigeration, vacuum pumps, and gases used for testing.

5. Business & Operations Plan

5a. Operations Framework

Laboratory testing in the cannabis industry plays an integral part of the supply chain in that no products can be released for retail sale and consumption without first being tested for a variety of impurities. The basic functions of a laboratory are to:

- Provide standard and calibrated testing services for distributors of cannabis products, as well as pretesting services for manufacturers and cultivators;
- Test all cannabis goods before they are shipped to retailers;
- Test samples from harvest cannabis flower with a maximum batch size of 50 pounds. Larger crops are broken into separate batches.
- Test samples from manufactured cannabis products with a maximum batch size of 150,000 units. Larger production sizes are broken into separate batches.
- Test edible products for homogeneity to ensure consistency throughout.
- Issue a Certificate of Analysis (COA) after tests are completed. If a product passes a test, the COA allows the distributor to release the batch to the retail market after it has been labeled with the test results.
- If a product fails a test, the COA stays with the product batch. Failed product batches can be remediated up to two times before they must be destroyed.

5b. Performed Lab Tests

The state requires testing laboratories to perform many tests on cannabis products to ensure no impurities are present and that consumers know what they are buying from the labeled information on the product. Performed lab tests are as follows:

- Cannabis products produced after January 1, 2018 must be tested for the following:
    - Cannabinoids
    - Moisture content
    - Category II residual solvents and processing chemicals
    - Category I residual pesticides
    - Microbial impurities
    - Homogeneity
- Cannabis products produced after July 1, 2018 must be additionally be tested for the following:
    - Category 1 residual solvents and processing chemicals;
    - Category II residual pesticides
    - Foreign material
- Cannabis products produced after January 1, 2019 must additionally be tested for the following:
    - Terpenoids (if the product requires it)
    - Mycotoxins
    - Heavy metals
    - Water activity

In addition, we intend to perform other tests as needed for our clients, including Greenleaf testing for cultivators to ensure the clones being used for cultivation would pass a pesticide test once flowering is finished, and pretest screening for manufacturers who are using raw cannabis material.

5c. ISO/IEC 17025 Accreditation

In order to be approved for a California state Type 8 cannabis testing license, our laboratory must be ISO 17025 accredited (Attachment H – ISO/IEC 17025 Specifications). This process has two primary components:

- Laboratory buildout – Our laboratory must be built out according to ISO specifications, including facility upgrades such as negative pressure ventilation to prevent cross-contamination or pollutants from outside the lab, detailed work stations for each type of lab test, proper installation of machinery, appropriate utility installations including filtration and air conditioning, water, lighting, electrical ports and switches, network equipment, and surveillance cameras. Once the lab is built out to these standards, we will schedule an inspection from an ISO accreditation program.
- Upon passing the laboratory inspection, the next phase is to conduct three separate calibration tests in which we perform a designated test in our lab and send a duplicate sample to the accreditation program to also run the same test. If our results match their results, we pass the test. Once we have passed three calibration tests, we will receive our ISO certification indicating we are now an accredited lab.

Lab testing will be validated by the ISO accreditation program using the following criteria to ensure that the results are consistent with industry standards:

- Accuracy
- Calibration Standards
- Reproducibility
- Linearity and Range

- Robustness
- Precision
- Sensitivity and Selection
- Limit of Detection
- Recovery

The Bureau of Cannabis Control allows cannabis laboratories to apply for a provisional license if an application for ISO accreditation has also been submitted to an appropriate program. We plan to submit our state license application in this manner, once we have built out our lab to the requisite standards. If our lab fails ISO accreditation, we will immediately notify state regulators as well as the City of Nevada and cease operations until the accreditation is activated.

5c. Daily Cannabis Testing Operations

Our laboratory will perform a variety of functions to conduct the requisite testing needed to send products to the retail market. We have broken down our work flow as illustrated in the following flow chart.

Our primary source of business will be from licensed cannabis distributors as they are the entity in the supply chain responsible for ensuring that cannabis products entering the retail market are properly packaged, tested, labeled, and are of appropriate quality for consumer patients. Additionally, we anticipate conducting pre-test screening for cultivators wishing to make sure the clones they are using are free of pesticides before cultivation begins, as well as manufacturers extracting cannabinoids from raw cannabis material. Samples for pretest screening are expected to be dropped off by customers, though our employees may also pick up these samples from time to time. The following work flow is based on formal testing with a distributor:

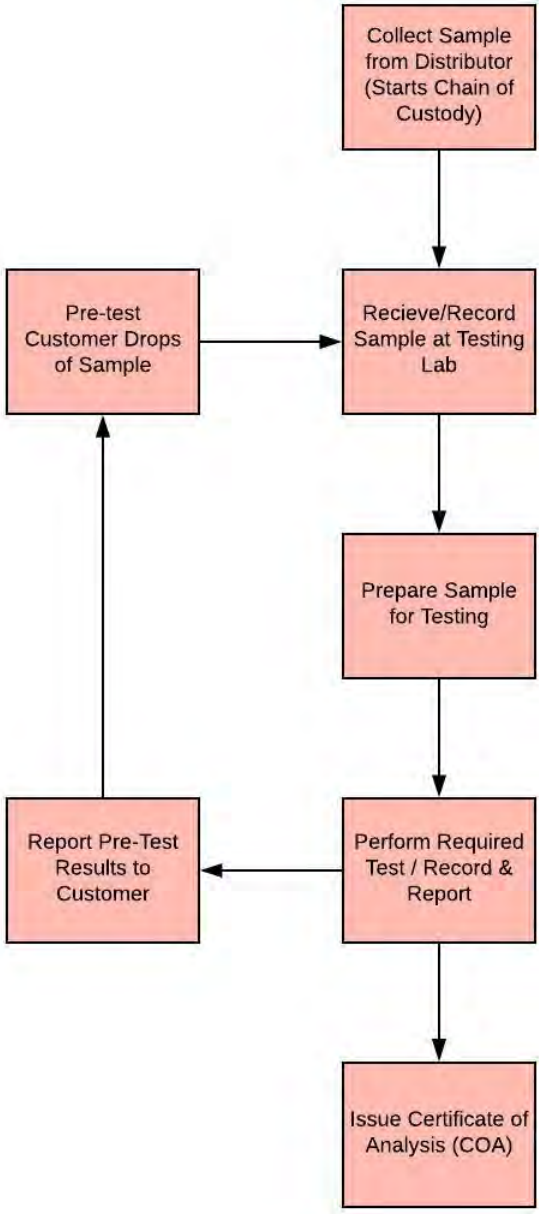
Step 1 – Collect Samples

Our employee will first visit the distributor's facility to pick up cannabis batch samples. State regulations are very specific about how this procedure will happen, which is further laid out in our standard operating procedures (SOP) (Attachment I – Standard Operating Procedures). Our employee and a representative of the distributor must both be in a designated testing area at the distribution center equipped with recording cameras that capture the event with a time stamp. Our testing representative is then responsible for selecting samples in increments laid out by regulations and in our SOPs. Sample increments must be taken from different locations within the batch both vertically and horizontally to make sure they are representative. Our employee then records each sample increment and stores the samples in a designated secured package for transport. Both representatives must also record the Chain of Custody (COC) form.

Step 2 – Receive Samples at Lab

The samples are then transported back to the lab, where they are recorded and stored for later processing. The lab will be equipped with commercial grade refrigerators used to store the samples according to the cultivator's or manufacturer's specifications.

Flow Chart 1 – Daily Lab Testing Work Flow



Step 3 – Prepare Samples

Each sample will be prepared for the required tests. For example, microbial testing requires the growth of cultures, which must be prepared and stored for several days.

Step 4- Testing and Reporting

Samples will then be tested and reported using our state of the art account with Confident Cannabis, an electronic and web-based platform for lab reporting to clients. Testing will be conducted using one of several machines and other equipment, including:

- Agilent 1260
- Agilent 7000 ICPMS
- Agilent 1260/6460 LCMSMS
- Agilent 7890/ 7000 GCMSMS
- Agilent 7890
- Microscope/Camera
- Fritech mill/ Incubaters

Please refer to Attachment F for specific equipment information.

Step 5 – Post-Testing

Once testing and reporting is completed, samples must be stored for 45 days per state regulations before they can be discarded. Our laboratory intends to engage a waste management vendor who will appropriately break down, decompose, and dispose of the samples per state regulations. This step also includes submittal of the COA to the distributor, which either releases the product batch for transport to the retail market or indicates it has failed testing and requires remediation.

5d. Other laboratory Equipment

Our lab will require additional laboratory equipment and utensils to function properly. Such items include the following:

- Computers, scanners, and printers
    - Barcode printer and scanners
    - Two receiving computers
    - Two sending computers
    - Additional staff computers
- Labware
    - Reverse osmosis filter
    - Utensils and glassware
    - Chemicals (i.e. pH up/down)
    - Packaging materials
- Office furniture
    - Tables and chairs
    - Desks

5e. Accounting & Reconciliation

In compliance with state and local regulations, tax requirements, and banking conditions imposed by financial institutions who may service our business, we will painstakingly track each and every cent in and out of our operation and be able to account for all income and expenses through the use of a Point of Sale (POS) system.

The state of California requires that all cannabis businesses retain all their records for a minimum of 7 years. We intend to keep records of the following information, which will be available upon request:

- Financial records, including bank statements, sales invoices, receipts, tax records, etc.;

- Personnel records, including records for each employee (employee's full name, social security, or individual taxpayer identification number, date of beginning employment, and date of termination of employment (if applicable);
- Training records, including training content and records from employees who received the training;
- Inventory records, including chain of custody forms and unique identification numbers for all raw cannabis materials and finished products;
- All contracts and agreements, permits, licenses, and other local authorizations;
- All compliance audits, including private third-party checks;
- Security records, including all visitors, surveillance, incidents, etc.

Additionally, we are reviewing alternative banking solutions that have recently begun to service the cannabis industry, such as Amercanex, which allows the acceptance of electronic funds transfers, making it possible to operate a primarily cashless business.

We will perform internal audits as necessary to remain confident that we are in compliance with state and local regulations so as to pass an audit by an inspector. We are aware that most of the violations and penalties in other states and localities are related to recordkeeping, inventory control, following procedures, and not having adequate safety measures in place. As such, we also plan to employ third party auditors from time to time, to provide an outside perspective.

5f. Inventory Tracking and Traceability

Seed to sale tracking tracks the movement of cannabis and cannabis products throughout the supply chain (from cultivation to sale). The seed to sale tracking is an IT-based system. Also known as track and trace, seed to sale tracking is a tool to prevent product grown outside the legal framework from entering the regulated market and regulated product from being diverted to the black market.

The California Department of Food and Agriculture will establish the track-and-trace system for medical cannabis and non-medical cannabis. The state awarded METRC as the seed to sale tracking provider. METRC is the same provider for Oregon, Alaska, and Colorado.

It should be noted that seed to sale tracking is different from accounting, a point of sales (POS), inventory management, or an ERP system. Seed to sale tracking relates to cannabis compliance (tracking inventory).

Inventory management is going to be one of the most important processes in our organization, as approximately 75 percent of the cannabis violations and fines in Colorado have been related to poor inventory management and we expect the same to occur in California. In summary, we want to make it easy for both local and state regulators to review our inventory records. As such, we have designated Michael Kepic as our inventory manager who will be responsible for inventory data entry and reconciliations every 14 days, as required by the state.

We will also track and trace our products through chain of custody records at every step of lab testing, from the time it is collected from the distributor to the point the sample is destroyed. We will also be able to address any potential recalls, should a batch come into conflict with consumer protection.

To ensure 100% awareness and accuracy of our sample inventory, we plan to use the state supplied seed to sale tracking system once it is made available, which would likely closely correspond to our opening after the tenant improvements.

5g. Estimated Construction and Readiness Timeline

As time is of the essence with our lease agreement already being in place, we intend to focus intently on building our lab once we have approval from the City. We expect to work closely with building, fire, and health departments as needed for permitting and anticipate finishing our buildout within 30-60 days, including equipment installation.

Depending on the City's approval needs, we could potentially apply for ISO accreditation and our temporary state license as soon as we receive approval for our business. However, if the City requires a certificate of occupancy before we can apply to the state, we will wait to do so until that time.

Upon completion of our buildout, we will schedule our ISO inspection, which should occur within a few weeks. We anticipate passing this inspection the first time, as we have already taken the time to understand the requirements.

5h. Finances

We have included a Pro Forma, including buildout costs, market research and three years of financial projections, as Attachment J.

6. Neighborhood Compatibility Plan

As mentioned above, we anticipate that our building will house two other non-retail cannabis businesses, depending on approval from the City of Nevada City. We feel that a campus approach to building out and maintain the property will greatly support both the occupants and the community in our mutual efforts to ensure the safety and security of the neighborhood.

The City of Nevada City is understandably concerned about the impact of licensed cannabis businesses within its neighborhoods. We believe several factors of our operations should put these fears to rest.

1) **Discreetness** – We recognize that a cannabis business may make people eager to investigate what's going on inside and interrupt our productivity and security protocol, so we will not be "advertising" the nature of our operation in any way other than adding the name of our business to the landlord's already-designated areas in and outside the building. No marijuana leaves or any other recognizable cannabis symbols will be used.
2) **Noise** – The equipment we will be using as well as the way we have designed the interior of our space will not be distinctly heard outside the building at any time. Our lab equipment makes very little noise and we do not anticipate any decibel level of sound outside above ambient noise levels.
3) **Hours of Operation** – We propose a total of 16 active and passive hours of operation per day, with 10 active hours 8am-6pm and 6 passive hours between 6am-8am, 6pm-10pm. The majority of our operation will work during normal, or active, business hours for a testing facility and we intend to conduct external deliveries only between the hours of 8am-6pm. In addition, technicians and assistants may be operating for up to sixteen hours per day in two shifts, but

their activities will not be heard or produce any odors that will cause any disturbance to the neighborhood. Any external vehicle or pedestrian activity during passive hours will only involve up to 3-4 employees walking to and from their cars. This additional presence after hours would have the added benefit of being a crime deterrent.

4) **Traffic and other external activities** – Thanks to the nature of our non-retail business, our green business practices, and limited employee base, we expect very little in the way of traffic to and from our operation and will train our staff on the importance of courtesy within our Nevada City community. No employees will be allowed to loiter outside our facility except in designated open space areas for the building complex.
5) **Non-Retail Nature** – Neighbors and passersby will not be able to detect our cannabis operation in any way, unless they are familiar with our name on the door. Only licensed cannabis businesses, employees, inspectors, and the occasional checked-in visitor will ever be in our facility.
6) **Enhanced Security** – Unlike a typical tenant of a space like ours, we will have extensive and extremely visible security technology in place that discourages potential break-ins. Every access point to the building will be closely monitored with high definition surveillance cameras capable of recognizing faces and license plates. We have included additional security measures below.
7) **Ultra-Secure Storage** – Our inventory rooms will include the use of locked commercial grade cages that are bolted to the floor. Potential robbers would need to bypass our surveillance, break through multiple key card access doors, and break through our security cages to gain access to products. We have identified further security specifications below and in Attachment G – Security Plan. Additionally, our activities as a testing lab will only involve handling small samples of cannabis material.
8) **Neighbor Complaint Hotline** – We propose to set up a neighbor complaint hotline where residents who may have questions or concerns can call and reach our security point of contact within 24 hours, alleviating any potential that these complaints would be directed to city departments or the County sheriff.
9) **Resident Open House** – From time to time, we anticipate holding an open house in our front lobby area and inviting residents to learn about who we are and what we do.

7. Safety & Security Plan

NC Municipal Code Chapter 9.22.100 (B) & CCR Title 16, Div. 42 BCC, Article 5

Although the Nevada City MCC section regarding Security mentions dispensary operations, we plan to firmly adhere to the spirit of these regulations as well as the State's requirements for Security in all cannabis operations, including additional requirements for Testing Labs, such as the need for "tamper evident" tape or seal for samples. We also intend to higher ADT Security (916-292-0865).
We have included the landlord's Security Plan as well as our security plan, as
Attachment "G" to highlight their purposed security plan for other suites if needed as well.

7a. Perimeter Security

Fencing is the first layer of security for our premises. The parcel already has fencing installed and we will upgrade this protection with locking gates, which will include Fire Safety-approved override access, possibly to include secure "knox" boxes.

As a non-retailer with limited amounts finished goods, most of which are disturbed by the testing process, combined with the minimal signage and lack of traffic, we don't expect our operation to gather much interest from the public, but rest assured our lot will be protected, monitored and offer very limited access.

7b. Exterior Lighting

Per Local and State Code, we will install and upgrade exiting lighting strategically to highlight the entrances and exits to the lot and the building. All areas under video surveillance will be properly lit for proper resolution and focus. This lighting, along with surveillance, will also serve as a deterrent for trespassing. Our neighbors input will be sought as to the level and angles of this lighting so as not to disturb them

7c. Video Surveillance

The State of California Bureau of Cannabis Control's regulations call out very specific requirements for a licensee in regard to video surveillance in Section 5044, and our operation is designed to comply with these much-needed levels of caution.

a) Our digital cameras will have a resolution of at least 1280 × 720 pixels and be permanently mounted in fixed locations. They will record with a time and date stamp continuously 24 hours per day and at a minimum of 15 frames per second (FPS).
b) Our recordings will be kept for at least 90 days and secured in a manner that will protect it from tampering or theft.
c) Each camera shall be placed in a location that allows the camera to clearly record activity occurring within 20-feet of all points of entry and exit on the licensed premises and allows for the clear and certain identification of any person and activities, including both indoor and outdoor vantage points.
d) Our system will be transmission control protocol (TCP) capable of being accessed through the internet providing remote and real-time, live access to the video footage from the cameras by, at a minimum, the city manager or his/her designee(s), and the city's police department, and that it is compatible with the city's software and hardware.
e) We will also have a notification system in place if there is an interruption of coverage or a storage issue.
f) We will at all times be able to effectively and clearly record images of the area under surveillance.
g) The cameras will be recording areas that include, but are not limited to, the following:
    i) [redacted]

7d. Access, Including Limited Access Areas & Alarm System

To ensure the safety of our operation, its employees and the products being tested, the following protocol will be followed:

a) No persons under the age of 21 will be admitted inside our premises, and comprehensive security including mandatory identification will be implemented within our facility.
b) Identification badges will be worn at all times by employees, which will include their photos.
c) All non-employees will be issued clearly marked Visitor badges.
d) We will have policies and procedures in place to ensure that any person on the licensed premises, except for employees and contractors of the licensee, are escorted at all times by the licensee or at least one employee of the licensee when in the limited-access areas of the premises.
e) To ensure we are aware of visitors, both expected and unexpected, we will be installing sensors shall be installed to detect entry and exit from all secure areas as part of our professionally installed, maintained, and monitored alarm system.
f) We will use only commercial-grade, nonresidential door locks on all points of entry and exit to the licensed premises, as well as highly secure areas within the facility.

7e. Staffing, Communication with City & Training

We will be designating a trained designated security representative/liaison to the city, who shall be reasonably available to meet with the city or his/her designee regarding any security related measures or and operational issues. This representative will make themselves reasonably available to meet with the city or his/her designee regarding any security related measures or and operational issues and to host inspections or audits of the effectiveness of our security plan.

Our security representative will notify the city manager or his/her designee(s) within twenty-four (24) hours after discovering any significant discrepancies identified during our taking of inventory, and any diversion, theft, loss, or any criminal activity by any agent or employee of our operation.

All staff members will be thoroughly trained, as evidenced by signed (digitally or physically) logs, in the importance of Security for their own as well as the operation and of course our community's well-being.

7d. Cash Flow & Handling

The difficulty of cannabis operations to obtain traditional bank services has received significant media coverage and solutions will eventually be developed, but we do have to plan for and expect to receive at least some portions of our revenue in cash.

As a testing lab, we will have limited number of transactions, and expect to bill for our services over time, which both reduce our risks related to the handling of cash.

We expect an armored guard service to be made available to us in conjunction with some level of formalized banking by the end of 2018, and plan to install a safe of sufficient protection and capacity to ensure proper storage and handling for the periods between this service.

7f. Tamper Evidence

Although technically not part of what many would consider the Security proton of our Application, we did want to elaborate on an item mentioned at the beginning of this section, the requirement of tamper evident tape or seals on the samples we collect and test for our licensed clients.

For the safety of the patients who will eventually receive their medicine from our clients as well as our reputation alone, tamper evident seals would be a required business practice.

The City's patients should be happy to know in furtherance of their safety, the state has recognized this tamper evident step, as well as placing comprehensive burdens well beyond other state's regulations and business practices such as the acquisition of samples from our clients under mandatory video surveillance at their facilities. All of these steps will be a part of our standard operation procedures and extensive training.

7g. Limited Traffic

As a non-retailer, we do not expect to experience any more than other types of commercial operations. Our traffic will consist of employees coming and leaving work and those trips related to sample collections, plus any deliveries of supplies and materials.

8. Community Relations

While enjoying a far less public profile than a dispensary operation to be sure, our organization recognizes the need to be a great corporate citizen and contribute to the productive discussions and atmosphere surrounding the entire cannabis legalization and economic movement. We take this responsibility seriously and anticipate the following forms of participation with our neighbors and local agencies and authorities.

We plan on being active participants in the City's Chamber of Commerce, specifically representing the vast economic impact that the cannabis industry can have on our great community, as well as the following initiatives:

8a. Awareness

We plan to make our immediate and city-wide neighbors aware of the value and role that a testing lab plays in the overall patient safety within cannabis. Our role is simply put to protect the health of California's patients and we plan to deliver without failure.

To bring our neighbors and local leadership up to speed on our role, we plan to:

a) Attend and participate in City meetings and hearings to make sure that the leadership as well as the community has the greatest opportunity to understand our role and aid in the dialogue related to the cannabis industry as a whole in whatever way we can.
b) Make sure local officials are updated on the cannabis industry on both the local and state levels.
c) Host informational meetings, including presentations on our role, processes and even employment opportunities within our company at the onset and as we expect to grow.
d) Host limited access, adult-only Open Houses to display our work in person once we're operational.
e) Invite the planning and building professionals, law enforcement, fire safety and the like to inspect and audit our compliance without appointment.

8b. Support Science-Based Education

As we practice and love the chemistry related to cannabis, we look forward to sharing our passion for science with the local educational community in whatever ways schools and families see fit. We could see donations of equipment, specific presentations and other methods of support both helping the City's students appreciate and excel in the science fields, and also helping to create qualified candidates to fill our employment needs as we grow in the future.

8c. Jobs for Locals

The State of California has designed a business model for testing labs that is very different and expanded when compared to other cannabis legal states thus far. One very unique aspect to our state's version of our business model is that testing licensees are required to drive to their licensed clients and hand select the samples, under clear video surveillance, that its lab technicians will be testing for potency and contaminants.

Depending on the size that our business grows to and the related geographic territory we cover as well as the density of licensees in our great area, this responsibility could result in the need for many collection agents.

Given the eventual destination for each of these trips is the City of Nevada City, it is only logical to assume that applicants living in proximity to our lab will be very interested in these positions. We would like nothing more than to have our staff live nearby and appreciate the chance to have a great working relationship with and help to financially support the lives of their families.

As our military Veterans are especially tied to the benefits the cannabis plant delivers to help them deal with PTSD as the muscular pain as a result of their service, we would like to give special attention to those applicants who sacrificed so much to protect our freedom.

8d. Tax Benefits

With the City still determining the taxation of the licensed cannabis operators, we cannot be sure of the actual tax benefits our operation will provide the City and its residents, we expect it to be substantial. As well as our payments directly to the City, the increase in local employment and wages we expect to occur will also drive tax collections from the local businesses our team supports in our daily lives.

8e. Environmental Awareness

We anticipate working with the South Yuba River Citizens League, a community nonprofit organization focused on assisting the California Regional Water Board with local watershed monitoring programs. Specifically, the group tests water quality and conducts reporting on water impurities. As cannabis cultivation has been a considerable contributor to poor water quality, we strongly feel that our laboratory could provide voluntary analyses to assist with local awareness about this issue and educate cultivators about the consequences of pollutants such as nutrients, pesticides, and sediments entering surface runoff, drainages, streams, and wetlands.

9. Enhanced Product Safety

9b. Sample Handling Controls

From the time our representative collects cannabis samples from the distributor to the time they are disposed of, all products will be recorded meticulously through COC forms and electronic database reporting.

9c. Testing and Reporting Controls

Our testing methods and equipment will be closely monitored and inspected by both state regulators and ISO accreditation specifications, as noted above and in our SOPs.

10. Environmental Benefits

Our laboratory will not impact the environment other than minimal waste generated from disposal of laboratory samples, as well as normal office refuse. We plan to engage an appropriate vendor to handle cannabis sample waste, which could be decomposed and recycled as a nutrient for cultivators. We also intend to purchase a hybrid vehicle to be used for sample collection and other errands, which will reduce our impact of greenhouse gas emissions.

11. Labor & Employment

11a. Staff Organization

We will open our operation with approximately nine (9) employees per our organization chart below. These positions will be focusing on laboratory management, lab technicians and assistants, administrative assistance, sample transport, and marketing.

Thanks to the legalization movement, many of the jobs we will be creating are starting to be in high demand and commanding impressive wage levels within the industry.

11b. Training

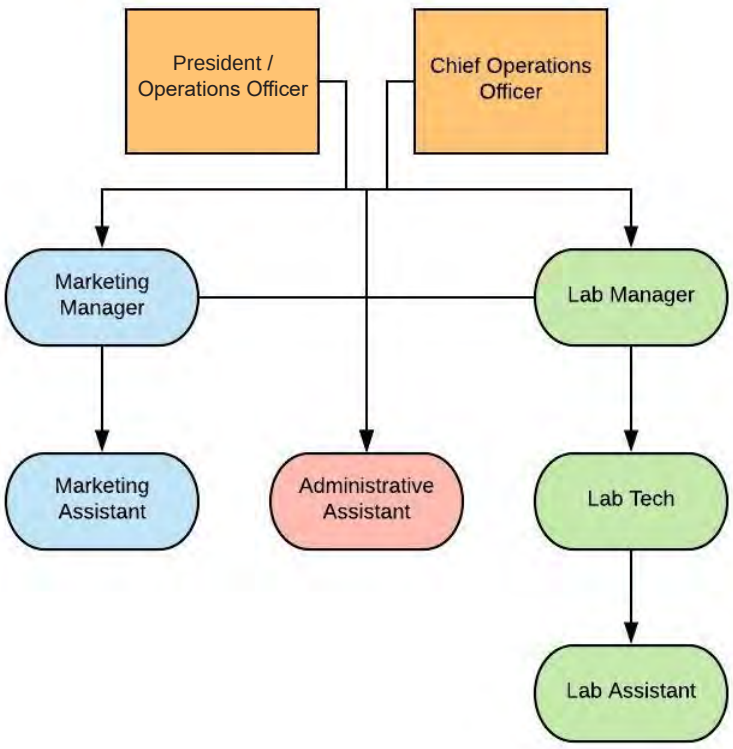
Staff members will be fully trained and certified on all lab testing equipment before they are allowed to operate. Our lab manager holds a college degree per state requirements in chemistry and lab sciences and also has extensive experience working in the cannabis testing lab space. Lab techs will be required to have formal training, college degree, or certification in lab work. Lab techs and our manager will continuously receive training on equipment, as well as testing methodologies, best practices, and industry innovations. As our institutions of higher learning include topics that are relevant to the cannabis industry, will reimburse tuition and fully support select staff members to participate in this education.

11c. Wage Scale by Position

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

* We will be giving some of our employees a chance to earn a significant performance bonus based on gross laboratory revenues versus costs.

Flow Chart 1 – Daily Lab Testing Work Flow



12. Local Enterprise

Both partners of The Higher Commitment Laboratory are residents of Nevada County. [redacted] lives in the unincorporated area of Nevada County just outside Grass Valley, as does John Alexander and his Family. Both partners are anticipating working full time at the lab facility.

13. Insurance Requirements

We anticipate carrying several insurance policies required by state and local agencies. At this time, we have secured general liability insurance to cover our leased building. We anticipate adding the following insurance policies as needed:

- **Commercial general liability insurance**
  - No less than $2,000,000 and no less than $1,000,000 for each loss
- **Property insurance**
  - Buildout
  - Equipment and furniture
  - Electronic data equipment (EDP)
  - Inventory
  - Crop coverage (cultivation from seed through finished processing (greenhouse/indoor))
  - Loss of income
- **Product liability related chain of custody**
  - No less than $2,000,000 and no less than $1,000,000 for each loss
  - Mostly covers attorney fees for defending against a lawsuit
- **Cargo**
  - Covers transit
- **Stock through put**
  - Covers product care, custody, control during transport
- **Worker's compensation insurance**
  - Class code – Lab workers
- **Surety Bond**
  - $5,000 for each license obtained (double check Nevada City);
- **Theft**
- **Employee Practice Insurance (EPI)**
- **Errors and Omissions Insurance**
- **Small group disability for officers of the company**
- **Commercial automobile insurance**
- **Non-owner auto coverage**

Attachment A – Application

City of Nevada City

Staff Use

Planning Department
317 Broad Street,
Nevada City CA 95959

Fee: $_____

Date Paid:_____

Phone: 530-265-2496
Email: Amy.Wolfson@NevadaCityCA.gov

MEDICAL CANNABIS BUSINESS PERMIT APPLICATION FORM

(for non-dispensary businesses)

Please submit a minimum of **five (5) bound hard copies** and **one (1) digital copy** (usb drive or CD) of all application material.

Check business type being proposed. If multiple types are proposed, each type will need to be distinctly addressed in the supplemental documentation and on this form. A separate form may be submitted if it will help provide clarity.

____Manufacturing

____Cultivation

_____Distribution

__x__Testing Laboratory

Business Name: The Higher Commitment (NCALC, LLC)

Business Primary Contact: [redacted]

Contact Title: Chief Executive Officer

Contact's Mailing Address: [redacted]

Phone#: [redacted] **E-mail:** [redacted] **24-**

Hour Contact Information: _____

For details about the information required as part of the application process, please see the Implementation Procedures to Operate a Medical Cannabis Business in Nevada City Municipal Code Chapter 9.22 and additional requirements in

order to complete the application process. All these documents can be found on the Nevada City webpage: www.NevadaCityCA.gov

Section A: Principal Background Information (Must be signed by all Principals)

(Add more pages as necessary to accommodate signatures of all Medical Cannabis Business Principals.)

Under penalty of perjury, I acknowledge that I have personal knowledge of the information stated in this application and that the information contained herein is true. I also understand that the information provided in this application, except the Safety and Security Plan in Section C and certain confidential information such as driver's license and social security number, which can be redacted, may be public information and subject to disclosure under the California Public Records Act.

Principal Name [redacted] **Principal Title:** [redacted] **Principal Home or Cell Phone:** [redacted]

Principal Home Address: [redacted]

Principal Signature: [redacted]

Attachments:

____If business will operate as a collective/cooperative provide proof of status as a qualified patient or primary caregiver (State card or doctor recommendation)

____Receipt/Proof of completion of preliminary background check

____Picture of applicant (two passport quality photographs 2X2) Copy of

____Social Security Card

____Copy of Driver's License, DMV issued ID Card or Passport

____Proof of address (DMV-issued ID/driver's license, and/or recent utility bill under Principal's name)

Staff use only: Pass background check_____

****

Principal Name:_____Principal Title:_____Principa

l Home or Cell Phone: _____

Principal Home Address: _____

Principal Signature: _____Date: _

Attachments:

- ☐ If a business will operate as a collective/cooperative, provide proof of Status as a qualified patient or primary caregiver (State card or doctor recommendations)
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- ☒ Picture of applicant (two passport quality photographs 2x2)
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- ☐ Copy of Driver's License, DMV issued ID Card or Passport
- ☐ Proof of Address (DMV-Issued ID/Driver's License, and/or recent utility bill Under Principal's name)

Staff use only: Pass background check_____

Principal/Partner History:

1. List whether, the applicant(s) has other licenses and/or permits issued to and/or revoked from the applicant, in the three years prior to the year of the permit application, such other licenses and or permits relating to similar business activities as in the permit application. If yes, please list the type, current status, issuing/denying for each license/permit. (Please attach a separate document explanation if necessary)

N/A

2. List any and all partners who have been found guilty of a violent felony, a felony or misdemeanor involving fraud, deceit, embezzlement, or moral turpitude, or the illegal use, possession, transportation, distribution or similar activities related to controlled substances, as defined in the Federal Controlled Substance Act, with the exception of medical cannabis related offenses for which the conviction occurred after the passage of the Compassionate Use Act of 1996. (Please attach a separate document explanation if necessary)

None of the above.

Section B: Business Organization Status

1. Describe the Medical Cannabis Business organizational status:

LLC

[X] Attach proof of status, such as articles of incorporation, by-laws, partnership agreements, and other documentation as may be appropriate or required by the City.

Section C: Medical Cannabis Business Description and Location

1. Statement of Purpose of Medical Cannabis Business (a separate sheet may be attached, labeled Section C.1):

See attached.

order to complete the application process. All these documents can be found on the Nevada City webpage: www.NevadaCityCA.gov

Section A: Principal Background Information (Must be signed by all Principals)

(Add more pages as necessary to accommodate signatures of all Medical Cannabis Business Principals.)

Under penalty of perjury, I acknowledge that I have personal knowledge of the information stated in this application and that the information contained herein is true. I also understand that the information provided in this application, except the Safety and Security Plan in Section C and certain confidential information such as driver's license and social security number, which can be redacted, may be public information and subject to disclosure under the California Public Records Act.

Principal Name: [redacted] **Principal Title:** [redacted] **Principal Home or Cell Phone:** [redacted]

Principal Home Address: [redacted]

Principal Signature: [redacted]

Attachments:

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____Social Security Card

____Copy of Driver's License, DMV issued ID Card or Passport

____Proof of address (DMV-issued ID/driver's license, and/or recent utility bill under Principal's name)

Staff use only: Pass background check_____

****

Principal Name:_____ **Principal Title:**_____ **Principa**

l Home or Cell Phone: _____

Principal Home Address: _____

Principal Signature: _____ Date: _

Attachments:

- ☐ If a business will operate as a collective/cooperative, provide proof of Status as a qualified patient or primary caregiver (State card or doctor recommendations)
- ☐ Receipt/Proof of completion of preliminary background check
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Staff use only: Pass background check_____

Principal/Partner History:

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N/A

2. List any and all partners who have been found guilty of a violent felony, a felony or misdemeanor involving fraud, deceit, embezzlement, or moral turpitude, or the illegal use, possession, transportation, distribution or similar activities related to controlled substances, as defined in the Federal Controlled Substance Act, with the exception of medical cannabis related offenses for which the conviction occurred after the passage of the Compassionate Use Act of 1996. (Please attach a separate document explanation if necessary)

None of the above See, background check.

Section B: Business Organization Status

1. Describe the Medical Cannabis Business organizational status:

☐ Attach proof of status, such as articles of incorporation, by-laws, partnership agreements, and other documentation as may be appropriate or required by the City.

Section C: Medical Cannabis Business Description and Location

1. Statement of Purpose of Medical Cannabis Business (a separate sheet may be attached, labeled Section C.1):

Attachment B – Lease Agreement

EXHIBIT A
THE PREMISES

THE MASTER LEASE

Attachment C – Property Owner Approval

CONSENT TO SUBLEASE

January 8, 2017

Growing Community
440 Lower Grass Valley Road
Nevada City, CA 95959

NCALC
P.O. Box 501
Colfax, CA 95713

Re: Consent to Sublease

1. Pursuant to Section 12.1 of the Lease ("the Lease") dated August 11, 2017, between Grass Valley Hydrogarden, Inc. ("Landlord"), a California corporation, and Growing Community ("Tenant"), a California mutual benefit corporation, relating to the premises ("the Premises") located at 440 Lower Grass Valley Road, Nevada City, California 95959, Landlord hereby consents to Tenant's sublease of Suite B to NCALC ("Sub-Tenant"), a California limited liability company, upon the terms and conditions set forth in the Sublease Agreement ("the Sublease") attached hereto as Exhibit A,.

2. Landlord consents to Sub-Tenant using the Premises for analytical laboratory analysis and research of cannabis products.

GRASS VALLEY HYDROGARDEN, INC.

Attachment D – Entity Documents

Attachment E – Exiting and Proposed Site Plans

Attachment F – Equipment Specifications

1260

Agilent 1260 Infinity II LC

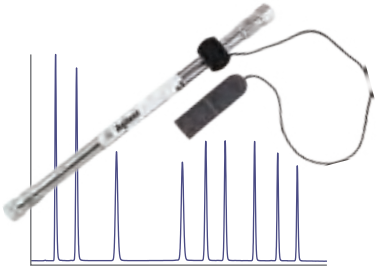
ASPIRE TO NEW LEVELS OF EFFICIENCY – EVERY DAY IN EVERY WAY

Agilent Technologies

AGILENT 1260 INFINITY II LC

EVERYDAY EFFICIENCY WITH CONFIDENCE

Put your trust in the LC platform that runs, and runs, and runs. The Agilent 1260 Infinity II LC offers the broadest choice of instrumentation while giving you the best operational efficiency to take you to the next level of confidence – every day in every way.



EVERYDAY ANALYTICAL EFFICIENCY

Reliable instrumentation combines with latest column technologies and advanced supplies to guarantee robust separation and detection performance for highest confidence in your daily results.

EVERYDAY INSTRUMENT EFFICIENCY

Easy column handling and superior sample logistics – from sample submission to data analysis – ensure fast turnaround times and highest instrument utilization.

EVERYDAY LABORATORY EFFICIENCY

Seamless method transfer and stepwise upgrade paths facilitate risk-free integration in current infrastructure – for nondisruptive transition to highest performance within the confines of your budget.

AGILENT INFINITYLAB –

A PERFECT **MATCH**

The Agilent InfinityLab family of instruments, columns and supplies are matched to work seamlessly together, alongside Agilent OpenLAB software and Agilent CrossLab services, to provide highest efficiency in laboratory workflows. Agilent InfinityLab columns and supplies provide the links to the Agilent InfinityLab LC Series to optimize performance for highest efficiency and laboratory safety.

EVERYDAY ANALYTICAL EFFICIENCY

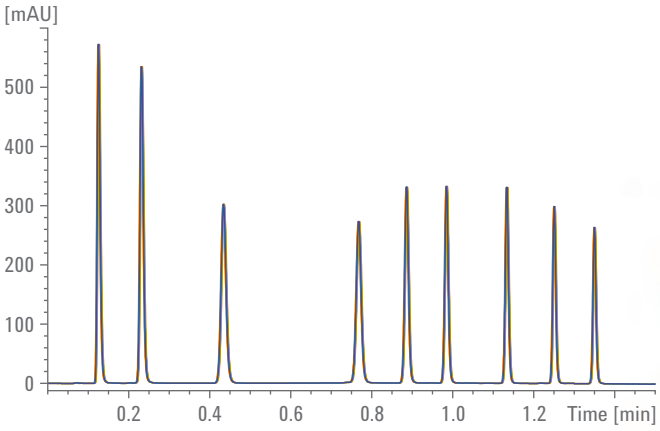
EXPERIENCE ROBUST PERFORMANCE FOR HIGHEST CONFIDENCE IN DAILY RESULTS

A broad range of reliable instrumentation combines with latest column technologies and advanced supplies to guarantee robust separation and detection performance – for highest confidence in your daily results and business decisions.

Robust and reliable solvent delivery

Delivering pressures up to 600 bar, the 1260 Infinity II Quaternary Pump is a perfect match for our InfinityLab Poroshell 120 columns. Pulse-free, stable and well-mixed gradients ensure higher sensitivity and more reliable results while the smaller particles achieve faster separations and higher resolution. With access to up to four solvents, you have utmost flexibility in automated solvent blending for a wide range of research and routine applications. Robust materials withstand the most demanding applications and keep the pump running for years, reducing downtime to a minimum and lowering operating costs.

For analysis of biological samples or applications demanding extreme pH conditions, a highly corrosion-resistant, titanium-based version of the quaternary pump is available. Combined with other 1260 Infinity II Bio-inert modules, you can configure a system with a completely metal-free sample flow path up to a power range of 600 bar – unique to Agilent.



The 1260 Infinity II Quaternary Pump delivers highly accurate and reproducible gradients for reliable retention time precision – even under the most demanding fast, ultrahigh performance LC conditions. In this example, 20 replicate analyses achieve an RT RSD of 0.187 % at 0.232 min and 0.086 % at 0.887 min.

Rugged, high-resolution separations

InfinityLab Poroshell 120 columns provide fast, rugged, high-resolution separations at pressures up to 600 bar and perform best with the 1260 Infinity II LC. Within our InfinityLab column family, currently 12 bonded phases are available for flexible development and straightforward transfer of methods. Each column is supplied with a permanently fitted column ID tag that is preprogrammed with details of phase and dimensions. When in use, you can confirm the type of column installed as well as track the column usage history, providing you with added confidence and security in your routine analysis. InfinityLab Quick Connect fittings provide robust, leak-tight connections for every user through innovative spring-loaded design with zero dead volumes – even after hundreds of reconnections.

InfinityLab columns and supplies match perfectly with our InfinityLab LC Series systems and solutions, taking advantage of the latest innovations to combine ease of use with robust performance, for highest confidence in your daily results.

Flexibility for any application

With our broad range of detection options, you can benefit from increased data rates to capture even the narrowest ultrahigh performance LC peaks. High-sensitivity flow cells for our diode array detector allow you to detect the weakest sample concentrations. Also available for the diode array and fluorescence detectors are special bio-inert flow cells, to guarantee safe data capture from your biological samples.

BIO INERT

Choose a detection technique that meets your application requirements. Options include UV-visible, fluorescence, refractive index, evaporative light scattering or mass-selective detection for acquisition of orthogonal data from your samples.

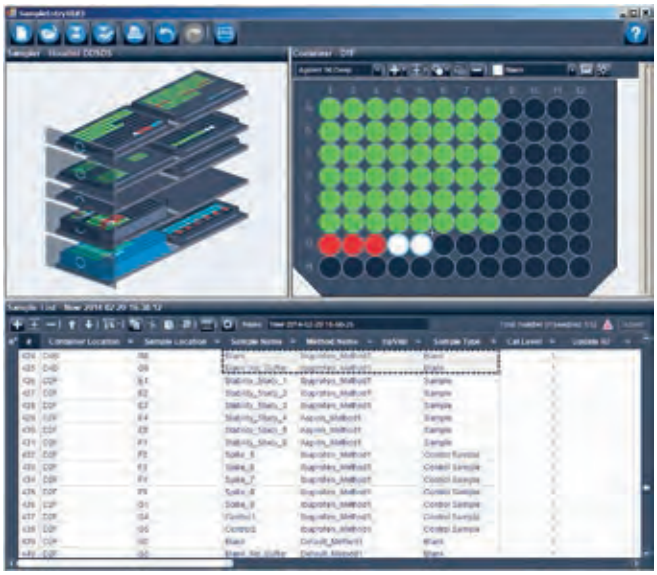
EVERYDAY INSTRUMENT EFFICIENCY

ACHIEVE FAST TURNAROUND FOR HIGHEST INSTRUMENT UTILIZATION

Easy column handling with direct, valve-based access combines with superior sample logistics – from sample submission to data analysis – to ensure fast turnaround times and highest instrument utilization.

Efficient sample handling and logistics

The 1260 Infinity II LC gives you unmatched flexibility to handle multiple sample containers. Simply exchange a sample tray or an entire drawer in the easy-to-access Multisampler, and submit your samples for analysis through the intuitive graphical software interface. Hundreds or even thousands of samples can be processed – with no manual interaction. The Multisampler's unique dual-needle option allows you to perform sample-handling steps in parallel to analyses of other samples, reducing overall analysis cycle times significantly.

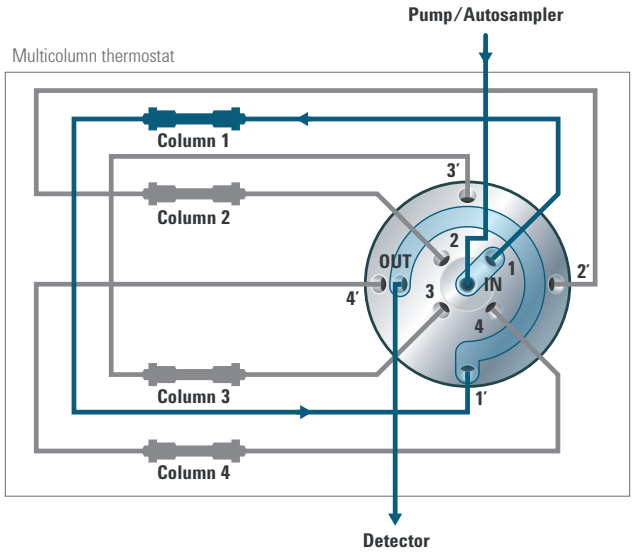


The design concept of the 1260 Infinity II Multisampler provides for constant access for sample submission. Sample trays or entire drawers can be exchanged easily to match your application needs.

Efficient column handling and switching

The 1260 Infinity II Multicolumn Thermostat holds up to four 30 cm columns and gives you direct access to each column through an InfinityLab Quick Change switching valve. Run different methods automated without the need to disconnect and reconnect your columns. Nonremovable, single-use tags for all four columns record identity and full usage history, ensuring compliance with regulatory guidelines. Column tracking also helps you to prevent failures during important sequences or avoid mismatch of stationary phases, solvents and temperatures.

An easy-to-access compartment facilitates fast and straightforward column exchange with InfinityLab Quick Connect column fittings. Next-generation InfinityLab Quick Connect heat exchangers are also easily connected or replaced.



Efficient control, acquisition and reporting

Agilent OpenLAB CDS software gives you the most comprehensive and fully traceable management of your 1260 Infinity II LC, including instrument control, result generation, data management and advanced reporting. With OpenLAB CDS, you can visualize data trends quickly, capturing at-a-glance artifacts or outliers such as missing or additional peaks, retention time shifts, or integration problems. Extensive built-in calculations provide results directly in data analysis, without the need to generate a full report and eliminating errors caused by data export or manual transcription. Confirmation and documentation of audit-trail reviews are part of the electronic record within the data system, making it an easy task to comply with the latest FDA regulatory requirements.

Peak Explorer helps you uncover and resolve problems faster. Find anomalies at a glance – even among hundreds of chromatograms and peaks.

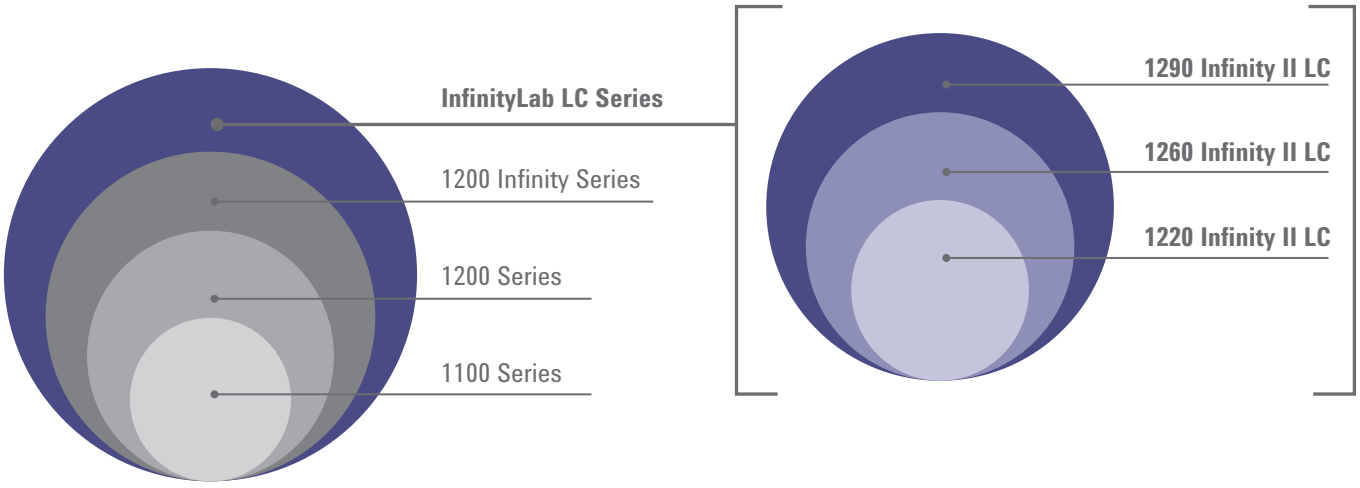
EVERYDAY LABORATORY EFFICIENCY

REALIZE SEAMLESS INTEGRATION FOR HIGHEST INVESTMENT PROTECTION

Seamless method transfer and stepwise upgrade paths facilitate risk-free integration in your laboratory's current infrastructure – for nondisruptive transition to highest performance within the confines of your budget.

Advance with ease, at ease

When you invest in a new 1260 Infinity II LC, you can rest assured that you can use all your established methods and run all your current applications. You can even upgrade your current Agilent LC module-by-module over time, for stepwise increase in efficiency and highest protection of your current investments. Add a new 1260 Infinity II Multicolumn Thermostat with direct, valve-based access to four columns and run multiple methods automatically. Or, upgrade with a 1260 Infinity II Multisampler and boost your sample capacity.



While totally committed to advancing LC technology, Agilent takes compatibility with current equipment extremely seriously. When you invest in an InfinityLab LC Series instrument, you can rest assured of seamless integration in any laboratory using Agilent LC systems. And, our sophisticated models can run all methods that can be run on the more affordable InfinityLab LC Series instruments.

Get the most from your investment

If you are ready for a true technology refresh of the instrumentation and software in your lab, Agilent CrossLab provides transition services to enable rapid and seamless shift to the latest technology. Leave it to the experts to provide a speedy, stepwise upgrade that matches your needs and budget with minimal disruption to your workflows.

Agilent also offers comprehensive instrument and enterprise services as well as a full curriculum of Agilent University learning solutions to maximize uptime, simplify administration and protect the investments in your laboratory. Through preventive maintenance, our service plans protect your laboratory against the unknown, for dependable efficiency, fewer workflow disruptions, and optimized laboratory productivity. All service plans include Agilent Remote Advisor, a powerful set of proactive, real-time support and reporting features, delivered by knowledgeable Agilent experts.

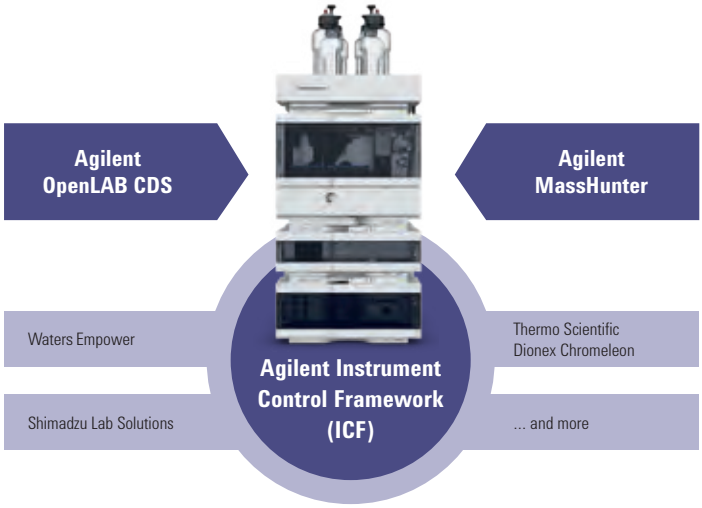
	GOLD	SILVER	BRONZE
Services Included in All Agilent CrossLab Service Agreements			
Contract-level Preferred Response vs. T&M	✓	✓	✓
Hardware Telephone Support	✓	✓	✓
Onsite Repair Services			
Unlimited Onsite Repair Visits (travel & labor)	✓	✓	✓
Parts Required for Repair	✓	✓	✓
Consumables/Supplies Required for Repair, including liners, seals, tubing, assemblies, and multipliers	✓	✓	✓
Advanced Diagnostics and Reporting			
Agilent Remote Advisor-Assist	✓	✓	✓
Agilent Remote Advisor-Report	✓	✓	✓
Agilent Remote Advisor-Alert	✓	✓	
High-Availability Services			
Extended Coverage Hours Discount	✓		

Agilent CrossLab service plans let you choose the service level that best meets your needs, goals and budget. Regional differences to service plans may apply. Additional options areavailable.

Take control of your chromatography

Agilent OpenLAB CDS is the perfect companion for your 1260 Infinity II LC and 6100 Series Single Quadrupole LC/MS. For more demanding LC/MS applications, Agilent MassHunter gives you combined control of your Agilent LC and Triple Quadrupole or Quadrupole Time-of-Flight LC/MS, as well as powerful tools for comprehensive data analysis.

With a strong commitment to open systems, Agilent offers Instrument Control Framework (ICF), a free-of-charge software component that makes it faster and easier for third-party providers to enable and control Agilent LCs through their CDS or workstations. Integrate a new 1260 Infinity II LC in your current CDS, seamlessly and with access to most of the advanced capabilities and features.



The 1260 Infinity II LC runs best when controlled through OpenLAB CDS or MassHunter software. Agilent ICF technology gives third-party CDS providers an easy route to support the 1260 Infinity II LC.

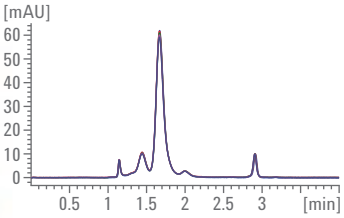
AGILENT LC & LC/MS WORKFLOW SOLUTIONS

OPTIMIZE YOUR WORKFLOW EFFICIENCY WITH TAILORED LC & LC/MS SOLUTIONS

The flexibility of the 1260 Infinity II LC allows us to offer the broadest portfolio of chromatography solutions – giving you unmatched possibilities to solve your separation challenges.

Bio-inert LC solutions

The Agilent 1260 Infinity II Bio-inert LC is a dedicated solution for analysis of large biomolecules. The metal-free sample flow path ensures the integrity of your biomolecules, minimizing unspecific surface interactions and increasing column life-time. New bio-inert heat exchangers and four-column selection valve support multiple-attribute analysis without column exchange between assays. Agilent Buffer Advisor software and application-specific data-analysis tools help you to solve your biopharmaceutical challenges easily.

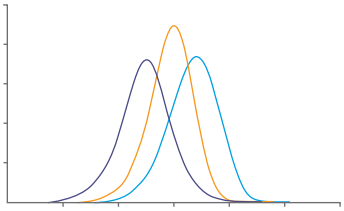


Overlay of IgG chromatograms of injection 1, 100, 200 300 and 400 on a Agilent AdvanceBio SEC 300Å, 7.8 x 150 mm column.

BIO INERT

GPC/SEC solutions

The Agilent 1260 Infinity II GPC/SEC system is a cost-effective solution for routine polymer characterization by conventional GPC/SEC separation with refractive index, UV-visible or evaporative light scattering detection. Ideally suited for refractive index detection, the new 1260 Infinity II Isocratic Pump lets you choose between three different solvents and the built-in degassing unit achieves even better baseline stability.



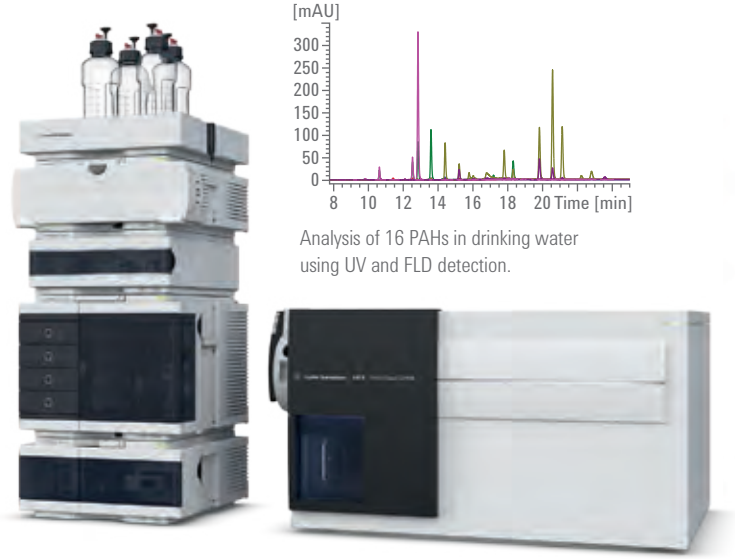
Molecular weight distributions for three polyethylene samples – purple plot shows the unbranched sample.

Online SPE solutions

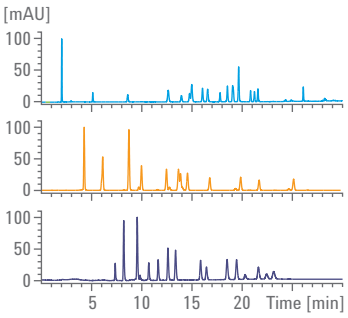
Whether you need to enrich analytes, remove matrix components, or lower detection limits, the highly modular design of Agilent online SPE solutions provides you with the flexibility to tailor your system to match virtually any analytical LC challenge. Combining a 1290 Infinity Flexible Cube – a multifunctional module that houses reusable SPE cartridges and one or two switching valves – with a 6400 Series Triple Quadrupole LC/MS takes you into a new dimension of ultralow, trace-level detection.

Method development solutions

The Agilent 1260 Infinity II Method Development Solution comes ready-to-run and is designed for automated access to more than 600 sets of unique LC separation conditions. Different combinations of stationary phases and solvents are at your fingertips to determine the optimum separation conditions for your application. Agilent Method Scouting Wizard software allows you to generate all required methods and sequences in minutes. Powerful data reports provide you with the most suitable conditions at a glance.



Analysis of 16 PAHs in drinking water using UV and FLD detection.



Analysis of nitroaromatics, aldehydes and polynuclear aromatics – all three applications were run on a single system, switching automatically between columns and solvents for optimum system utilization.

Learn more
www.agilent.com/chem/1260

Find an Agilent customer center
www.agilent.com/chem/contactus

USA and Canada
1-800-227-9770
agilent_inquiries@agilent.com

Europe
info_agilent@agilent.com

Asia Pacific
inquiry_lsca@agilent.com

Published in the USA, May 1, 2016
5991-6781EN

Agilent Technologies

AriaMx

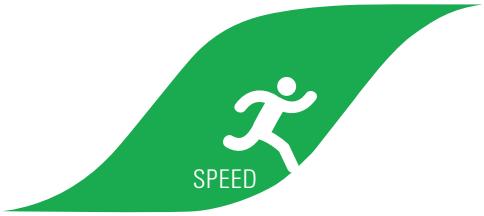
REAL-TIME PCR SYSTEM

Agilent Technologies

TOTAL CONFIDENCE qPCR

Built on Stratagene's legacy of enzyme engineering expertise and precision instruments, Agilent Technologies provides a comprehensive approach to real-time quantitative PCR (qPCR)—from sample preparation to data analysis. Every Agilent qPCR instrument, including the AriaMx Real-Time PCR System, comes with the same quality, intuitive software, and technical support that you have come to expect from the successful Mx3000P and Mx3005P qPCR instruments on the market today. We are proud to carry forward the people and product excellence from the Stratagene family to the Agilent family—ready to support you at every step.

Whether you are new or experienced in qPCR, Agilent's full range of products and industry-leading support is sure to keep you up and running with complete confidence and superior results.



Confidence in Success with Brilliant Ultra-Fast Master Mixes

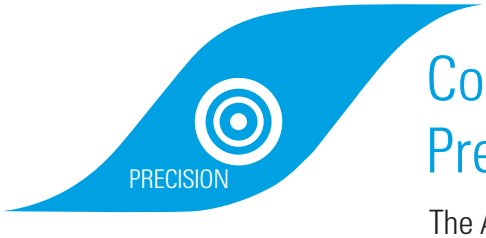
Our unique Brilliant reagents are equally robust and reproducible across a variety of assays—even on fast cycling platforms. Superior specificity is delivered utilizing a novel, faster-activating hot start method to minimize the formation of primer-dimers and other off-target reactions.

- Enhanced rapid hot start capability
- Reliable and reproducible data

Confidence in a System that Meets Your Needs—Today and Tomorrow

The agile design of the AriaMx Real-Time PCR System offers the industry's first configurable and customer-changeable optics. Now you can mix-and-match optics to suit your needs today, and easily change them to suit your needs for tomorrow.

- Modular design
- Ready-to-use
- Future-proof



Confidence in Easy-to-Use, Precise Software

The AriaMx Software combines robust data analysis algorithms and intuitive organization for precision and ultimate ease-of-use.

- Control experimental bias due to differences in amplification efficiencies through a proprietary algorithm
- Multiple, customizable data analysis algorithms
- Thermocycling control and precision you expect from a more expensive instrument
- 21 CFR part 11 compliant software

INTRODUCING

AriaMx

BETTER SYSTEMS. BRILLIANT RESULTS.

Confidence in a system that meets your needs today and tomorrow.

The AriaMx Real-Time PCR System is a fully integrated qPCR amplification, detection, and data analysis system. The system's modular design combines a state-of-the-art thermal cycler, an advanced optical system with spectra-optimized LED cartridges, and data analysis software.

The instrument leverages a comprehensive software suite of on-board instrument diagnostics, giving you confidence that instrument failpoints are identified prior to running your assay. Experience total confidence with AriaMx's blend of speed, agility, and precision.

PRE-RUN TEST:
60+ ATTRIBUTES
IN ~1MIN

PRECISE
THERMAL
UNIFORMITY

SPEED
Ready, Go!

Factory Calibrated
AriaMx is ready to go—no need to set quantification curves or calibrate the instrument.

Ultra-Fast Chemistry
AriaMx is optimized for Agilent's Brilliant III reagents, but also runs all fast chemistries.

Blazing Scan Times
Scan all channels in less than three seconds—the fastest in the industry.

AGILITY
Today and Tomorrow

Modular Design
Modular cartridges make in-lab upgrades possible with the click of a button.

Intuitive Interface
AriaMx's touchscreen makes system integration easy for all users.

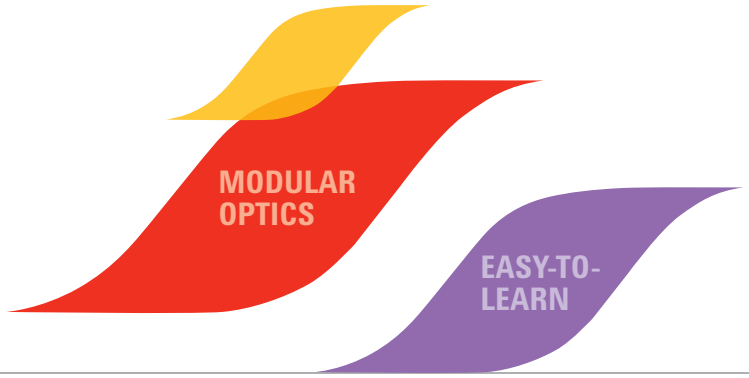
Broad Applications
AriaMx supports more than one assay and chemistry. Applications include: Gene Expression, Comparative Quantification (Single-Plex and Multiplex), Quantitative PCR (Single-Plex and Multiplex), Genotyping, Allele Discrimination, NGS Library Quantification, and more.

PRECISION
Superior Data

Thermal Control
Easily maintains within ± 0.2°C or less of target temperature.

Impressive Sensitivity
Two-fold discrimination in a single cycle with 95% confidence over a wide range of copies.

Robust Validation
Tested on 100,000 samples.



SPEED

BRILLIANT REAGENTS Built upon Stratagene's legacy, Agilent Technologies provides a total solution approach to real-time quantitative PCR.

- Robust validation and tight manufacturing quality controls
- SYBR assay results in 42 minutes using Brilliant III reagents
- Open reagent platform: use your assays and reagents
- AffinityScript for the toughest samples and alleles

Ultra-Fast SYBR Master Mixes

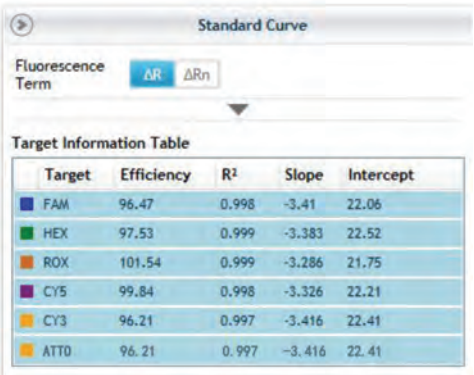
A proprietary, quick acting hot start *Taq* mutant enables ultra-fast reactions which maintain amplification efficiency, R2, dynamic range and detection sensitivity.

SPEED. AGILITY. PRECISION.

AriaMx instrumentation makes routine and complicated applications faster and easier without sacrificing data integrity. Applications where AriaMx excels:

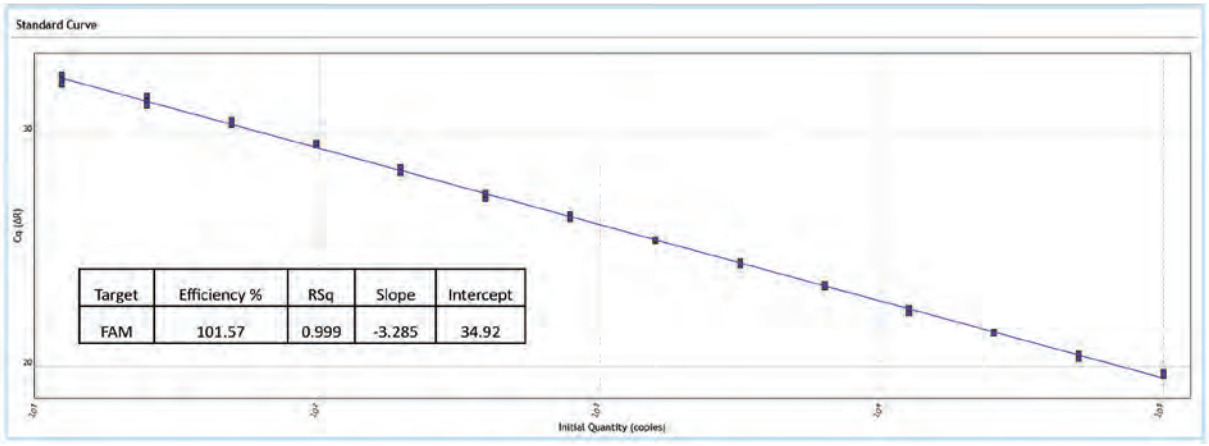
- **HRM**
  Confidently genotype the toughest alleles in less time
- **Multiplex**
  More agility and speed in your assays with reagents optimized for your reactions
- **NGS Library Quantification**
  Optimal cluster density improving efficiency and data quality
- **miRNA Quantification**
  Master mixes which enable your assays to discriminate miRNA differences—even by one SNP
- **Open Platform**
  Instrumentation validated for all major manufacturer kits as well as Agilent reagents

FIG. 1 Six Color Standard Curve Data by Fluor



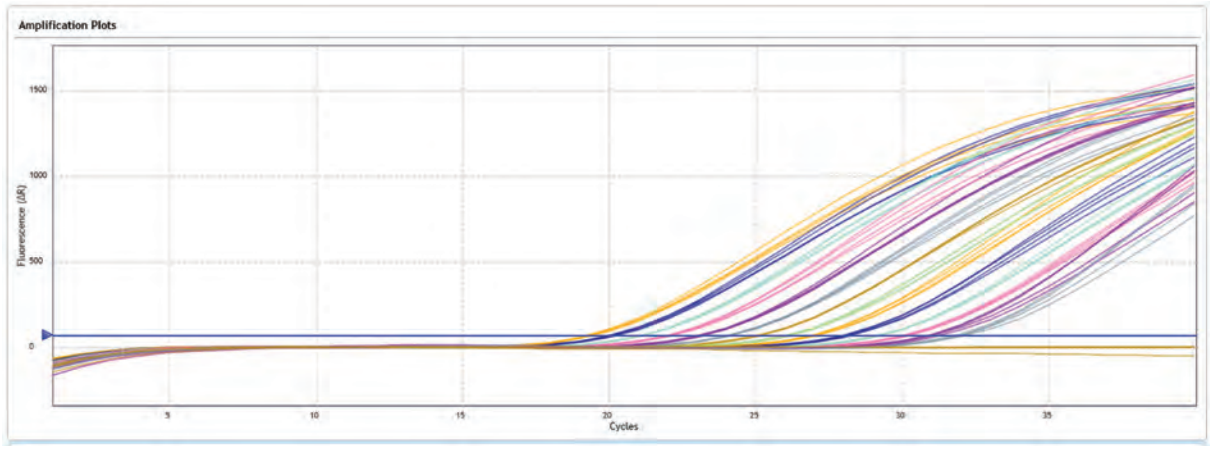
Target	Efficiency	R^2	Slope	Intercept
FAM	96.47	0.998	-3.41	22.06
HEX	97.53	0.999	-3.383	22.52
ROX	101.54	0.999	-3.286	21.75
CY5	99.84	0.998	-3.326	22.21
CY3	96.21	0.997	-3.416	22.41
ATTO	96.21	0.997	-3.416	22.41

FIG. 2 SYBR Green Assay—Amplification and Standard Curve Plots Showing Sensitivity Measuring a Two-Fold Change



Target	Efficiency %	RSq	Slope	Intercept
FAM	101.57	0.999	-3.285	34.92

The standard curve consisted of nine, ten-fold dilutions starting with $1x10^9$ copies and ending at two copies. Amplification plots are below.



SPEED

BRILLIANT HRM ULTRA-FAST LOCI MASTER MIX

Fast chemistry to confidently identify hard-to-detect genotypes.

High Resolution Melt Application

High resolution melt analysis (HRM) is a quick method to monitor and record the melt profile of amplicons in a sample, post-PCR. HRM's high sensitivity can detect even the smallest of melting temperature changes like those caused by single-base changes, nucleotide repeats and small deletions in DNA.

Some of the more common applications of HRM include: genotype confirmation, mutation identification and screening, clone confirmation and methylation analysis.

HRM is often used at hypervariable loci to find hard-to-detect base changes. In contrast to *Taq*Man assays, which can easily miss new or unknown mutations, HRM can detect any mutation between two primers in the assay. HRM also cost-effectively resolves small changes while maintaining melting temperature control.

Brilliant HRM Ultra-Fast Loci Master Mix Advantages

- **Mix and Go**
  $MgCl_2$ and dNTPs are included.
- **Better stability**
  Stable after multiple freeze thaws, reducing wastage and increasing batch-to-batch reliability.
- **Fast-Start *Taq***
  Three-minute activation time for the proprietary mutant Fast-Start *Taq* polymerase.
- **EvaGreen Release-on-Demand based dye**
  Non-toxic and can be added at saturating concentrations—insuring minimal inhibition while preserving high sensitivity.
- **Platform independent**
  Use with any HRM-capable thermocycler.

High-Performance Agilent HRM Options:

Brilliant HRM Ultra-Fast Loci Master Mix
Faster HRM on any platform with total confidence

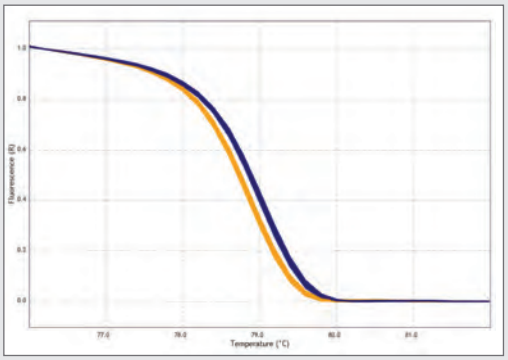
Complete AriaMx HRM Solution
The fastest way to confidently identify hard-to-detect genotypes

Agilent HRM Ultra-Fast Loci Master Mix

For the scientist looking to quickly "mix-and-go" with greater confidence, Agilent now offers the Brilliant Ultra-Fast Loci Master Mix as a stand alone reagent—validated to work on your existing instrumentation. Although optimized for Agilent's AriaMx, the master mix also works on most major manufacturer instrumentation.

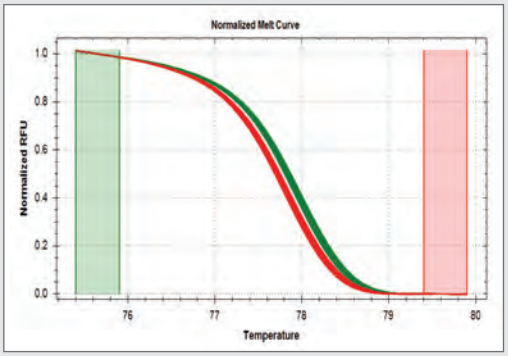
The HRM Ultra-Fast Loci Master Mix combines a fast-start mutant *Taq* polymerase, $MgCl_2$ buffer optimized for most HRM reactions, dNTPs and an EvaGreen low toxicity dye, considered the most reliable for HRM.

FIG. 3 HRM of SNP Rs9939609 (FTO) Using Brilliant HRM Master Mix on Three Different Instruments



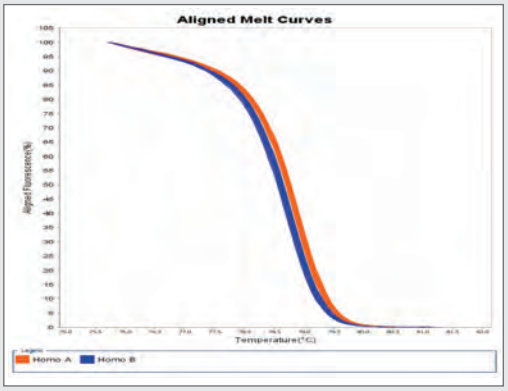
Panel A (Agilent AriaMx qPCR System)

SNP identified using Brilliant HRM Master Mix on Agilent's AriaMx qPCR Instrument.



Panel B (Competitor B)

The same SNP identified using Brilliant HRM Master Mix on Competitor B qPCR Instrument.



Panel AB (Competitor AB)

The same SNP identified using Brilliant HRM Master Mix on the Competitor AB qPCR Instrument.

SPEED

BRILLIANT HRM ULTRA-FAST LOCI MASTER MIX

Complete HRM Solution for total confidence in your data.

Intuitive HRM Software

Agilent includes fully featured software for HRM analysis which contains several benefits over other software packages with respect to plate set up, analysis and reporting (Table 1). Unlike competitive HRM software, Agilent HRM software comes standard with the AriaMx Real-Time PCR System—included with the instrument at no charge.

The Agilent platform's speed advantage over the competition is due to fast scan times and an algorithm used to interpolate the maximum T_m peak value. Other platforms report the highest melt peak value observed during the run, requiring additional scans to obtain an equivalent answer.

Part Number	Description
5190-7827	Brilliant III HRM Ultra-Fast Loci Master Mix
5190-7702	AriaMx HRM Calibration Kit

Table 1. Comparison of Instrument Software for HRM Analysis

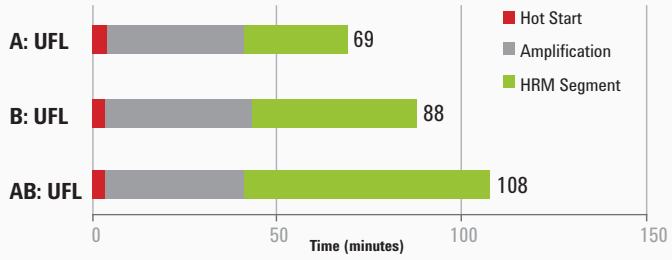
Feature	Instrument		
	A (AriaMx)	B	AB
Set up replicates quickly using "smart-rules-based" software	Yes	Partial	No
Use files from a previously-run experiment as a template	Yes	No	No
Use a highlighting feature to link plots to the results table for easier analysis	Yes	Yes	No
Hover over each plot to reveal key data (e.g. X, Y coordinates, replicate number, dye channel)	Yes	No	No

Yes No Partial

Agilent Complete HRM Solution

For researchers ready for a change in genotyping speed and confidence, Agilent offers a complete solution: **HRM Master Mix**, an **instrument** and **analysis software.**

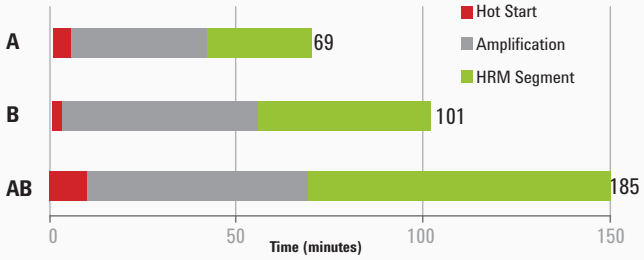
FIG. 4 Agilent AriaMx qPCR Instrument is > 20% Faster than Competitor Instruments



This graph shows the time required to identify the Class IV SNP Rs9939609 FTO with the Brilliant HRM Ultra-Fast Loci Master Mix (UFL) on three different qPCR instruments. The assay consisted of a hot start, 40 cycles of qPCR amplification and a high resolution melt segment. The time differences observed are due to: 1) differences in instrument scanning speeds, 2) the number of measurements over the temperature profile, and 3) *Taq* polymerase's activation time.

A: AriaMx instrument with Brilliant HRM Master Mix
B: Competitor B qPCR instrument with Brilliant HRM Master Mix
AB: Competitor AB qPCR instrument with Brilliant HRM Master Mix

FIG. 5 Agilent Complete HRM Solution is > 30% Faster than Competing HRM Solutions



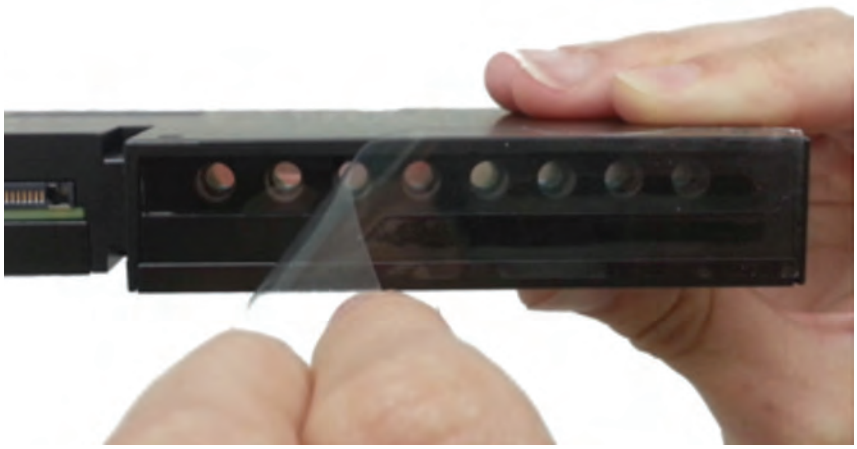
This graph shows the time to identify the Class IV SNP Rs9939609 FTO on three competing qPCR instruments with manufacturer's respective HRM chemistries. Manufacturer's recommended HRM protocols were used.

A: Agilent AriaMx qPCR Instrument with Agilent Brilliant HRM Ultra-Fast Loci Master Mix
B: Competitor B qPCR instrument and competitor B's HRM Master Mix
AB: Competitor AB qPCR instrument with competitor AB's HRM Master Mix

Using Agilent's complete HRM solution, **the time to correctly identify the most difficult-to-detect genotypes can be cut in half** (Figure 5). The longest run time (185 minutes) was on the AB instrument with the AB reagents. In contrast, on the Agilent AriaMx instrument with the Brilliant HRM Ultra-Fast Loci Master Mix, the same result was obtained in only 69 minutes. Now researchers can identify difficult-to-detect genotypes much faster than any other 96-well plate based solution—with ease and confidence.

AGILITY

MODULAR OPTICAL CARTRIDGES The first real-time PCR system with optics contained in modular cartridges, the AriaMx allows for less cross talk between channels—resulting in improved data resolution.



MULTIPLEX FROM 2 TO 6 CHANNELS

Ready, Go!

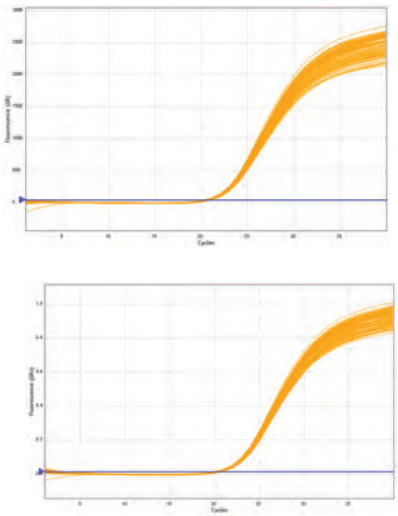
AriaMx comes calibrated straight from the factory. Calibration is only necessary if future modules are added. Now you can be confident you are measuring biological variation over the instrument's life.

Key Features

- Expandable and upgradeable in the lab
- No reference channel needed
- "Set it and forget it" calibration
- Future-proof
- Accommodate as many or as few optic channels as you require

With optical cartridges that have no need for a reference channel, the tight calibration of the cartridges and steady emission wavelengths from the instrumentation provide consistent data with every run.

FIG. 6 Validation Run With No ROX Reference (Above) and With ROX Reference (Below)*



When detecting biologically relevant changes, which occur at low thresholds, instrument sensitivity is critical. The SYBR uniformity curves at left were generated as part of the AriaMx validation on the same day. Both begin at cycle seven and end at cycle 17.

**Sigma multiplier was set to 19 for both runs. Adaptive smoothing was also on for the baseline graph. dR, SD = 0.13 Cq for both runs.*

Better multiplexing: Don't sacrifice time, samples or reagents

We know you're always looking to maximize information obtained from rare samples. Multiplexing is one solution to getting answers in the least amount of time. However, multiplexing often requires extensive optimization of reagents, which can be expensive in both time and reagent costs and is quickly becoming an impractical method. Agilent's Brilliant Master Mixes allow you to normalize your results with internal controls, providing the most accurate quantification possible.

Agilent Brilliant Multiplex qPCR Master Mixes

Providing sensitive, real-time amplification, Agilent Brilliant Multiplex qPCR Master Mix allows the use of internal controls to provide normalization within each reaction while reducing time and reagent costs. The Brilliant Multiplex qPCR Master Mix provides amplification of up to four targets per reaction, and each requires far less template than if performed in four separate reactions. Moreover, the sensitivity remains equivalent to that seen in single-plex.

Agilent Complete Multiplex Solution

AriaMx delivers answers from multiplexing experiments faster than most thermocycler-based platforms. Get ready for an improvement in time-to-results and accuracy.

Part Number	Description
600880	Brilliant III Ultra-Fast QPCR Master Mix for Multiplex Reactions
600884	Brilliant III Ultra-Fast QRT-PCR Master Mix for Multiplex Reactions

PRECISION

Advanced, yet easy-to-use **SOFTWARE** with proprietary algorithms accompany AriaMx's precision chemistry and thermocycling capability.

FIG. 7 Easy-to-access Plate and Well Maps

Easy Touchscreen Set-Up

Simple-to-use, feature-rich touchscreen allows you to set up runs with the touch of a finger.

21 CFR Part 11 compatible features are available by licensing ET software.

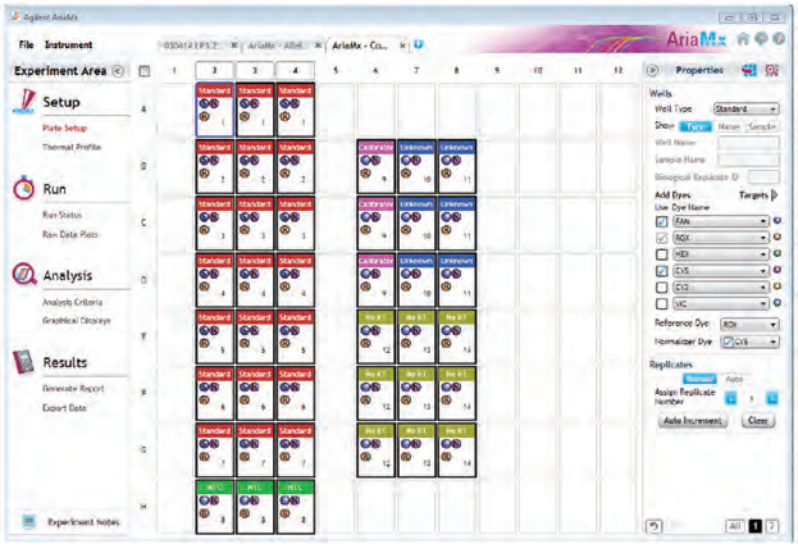
Plate Maps at Your Fingertips

Program at the plate and well level. Simply hover over a well, and its details will open in a new window.

New Software Features

- Touchscreen Set-Up
- Onboard Diagnostics
- Remote Monitoring
- Base software included with instrument purchase

FIG. 8 Set-up Screen for Comparative Quantitation



AriaMx Software helps you control experimental bias due to differences in amplification efficiencies through a proprietary algorithm—resulting in higher accuracy.

Pre-programmed Assays

Pre-programmed assays allow for easy selection of calibrators, normalizers and sample associations.

- Quantitative PCR
- Allele Discrimination
- Comparative Quantification
- High-Resolution Melt

In high throughput gene expression studies, standard curves are not used. Relative quantity calculation is automated using the Comparative Quantitation module in the AriaMx Software. See Figure 8 for details.

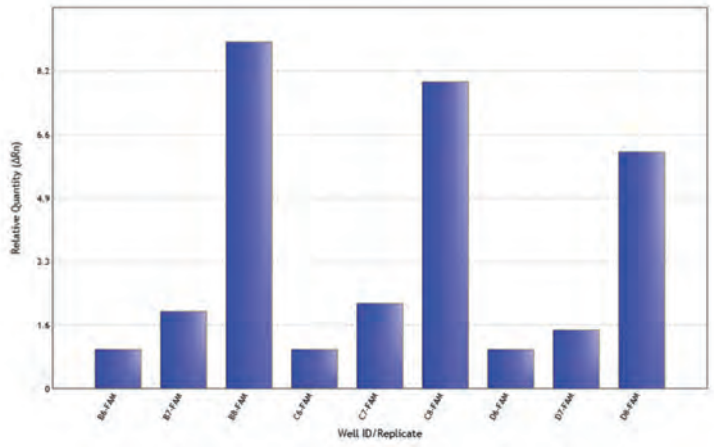
Multiple, Customizable Data Analysis Algorithms

Identify NGS Bias and Fragment Drop

Accurate NGS library quantification is crucial for determining sequencing efficiency and data quality.

Combine the AriaMx System with the Agilent Bioanalyzer for a powerful gene expression and next-gen sequencing solution. See www.agilent.com/genomics/bioanalyzer for more details.

FIG. 9 Relative Gene Expression

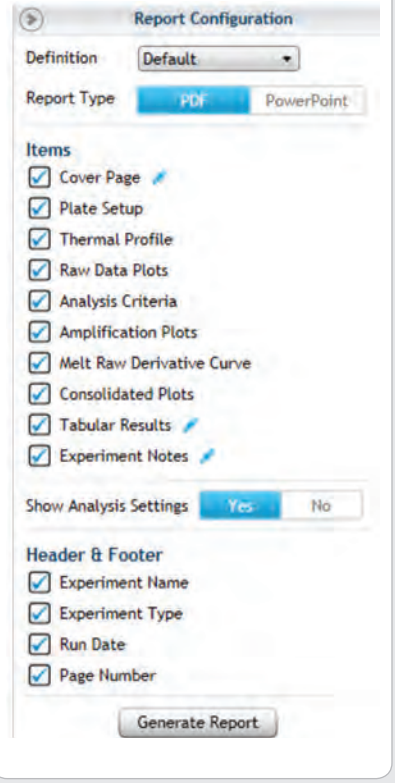


Easy Reporting

Easily export raw data in multiple formats with the touch of a finger. Select only those datasets you want displayed using custom data reports:

- Plate Set-Up
- Experimental Thermal Profile
- Raw Data Plots
- Analysis Criteria
- Amplification Plots
- Allele Determination
- Graphical Displays
- Tabular Results
- Experimental Notes

FIG. 10 Report Configuration



SERVICES

Give your research the attention it deserves. Regain time lost on peripheral tasks and focus on the critical processes that keep your lab competitive and successful.

- Speedy delivery for critical parts
- Dedicated instrument support for fast issue resolution

More Reliable Results and Achievements

Agilent service agreements, preventative maintenance, and compliance services are sold to you at the system level, assuring all modules of your system are covered.

Confidence, Not Compromise

Agilent's service group stands behind every instrument, giving you confidence in equipment functionality and data. Agilent has one global focal point: providing our customers with the best service available worldwide. It's no wonder that over 70% of our service employees stay with Agilent for over five years. Equipped with calibrated and traceable tools, our service technicians verify your equipment is running at maximum performance. Agilent hardware and software qualification protocols ensure rapid conflict resolution. Specialized remote monitoring (free to activate as needed) allows Agilent's service group to troubleshoot your instrument directly from the lab, providing confidence at every turn.

Breadth of Services

Agilent's professional services team has been called upon for our support with customized training, systems and enterprise integration, workflow design, special engineering projects, protocol development, and project management. We have conducted over 100,000 successful system qualifications worldwide, and our genomics professionals operate in 65 countries.

Rapid Assistance

Whatever the challenge, Agilent's broad resources address your needs. Expect reduced repair time with:

- Call Center: Rapid assistance with instrumentation, reagents, applications, and protocols requires a vast knowledge of a variety of chemistries. That's why our technical support professionals are PhD scientists with genomics experience—just like you.
- Detailed Asset Information: Agilent's tracking system provides critical information on instrument usage, resulting in quicker solutions.
- Wireless Technology: Enables our service team to provide instant access to a database of information and resources.
- Remote Monitoring: Instrument health monitored remotely for greater troubleshooting flexibility.

Warranty and Multi-Year Upfront Coverage

Each AriaMx has a global warranty, including the standard warranty for the country of purchase. If moved to another country, the destination country's standard warranty will apply to the instrument.*

Services available for purchase with AriaMx include:

- Return to Agilent (RTA): This may be accomplished with a loaner instrument, exchanging out your instrument, or direct return of your instrument to Agilent.
- Installation and Familiarization (I&F): Have an Agilent Field Service engineer or member of our team install and familiarize you with the AriaMx.
- Standard Preventative Maintenance (PM): Agilent is available to run routine maintenance check-ups on your instrument annually to ensure peak performance for the upcoming year.**
- Extended Preventative Maintenance: Conducted annually on your instrument and includes thermal block tests to evaluate uniformity and precision.**
- Silver Service Package: Bundled service including Standard Preventative Maintenance check-ups and the Return to Agilent (RTA) program, if necessary.

1-year base warranty sold with the instrument. Additional coverage can be purchased at a minimal cost.

1-YEAR	+1 YEAR	+2 YEARS	+3 YEARS	+4 YEARS
Initial Warranty Sold with instrument (covers 1 year)	**Extended Warranty 2** Adds additional year (covers 2 years) 8D2	**Extended Warranty 3** Adds additional year (covers 3 years) 8D3	**Extended Warranty 4** Adds additional year (covers up to 4 years) 8D4	**Extended Warranty 5** Adds additional year (covers up to 5 years) 8D5

*Except for on-site warranty where Agilent does not have an applicable product-specific support presence or authorized representative in that country.

**Unless a service contract is in place, parts replaced outside the scope of preventative maintenance will be charged as a repair event (this includes the engineer's time and materials).

SPECIFICATIONS

Feature	Description
Excitation Source	8 dye specific LEDs per optical module
Detection Sources	8 photodiodes
Optical Cartridges	SYBR/FAM HEX ROX CY3 CY5 ATTO425 6 slots, swappable optical modules
Dye Selection	Excitation and Emission
Reaction Volume	10µL to 30µL
Chemistries Supported	SYBR, Probe, HRM
Thermal System	Six Peltiers made from two ceramic plates with semi-conductor elements, 96-well
Thermal System Temperature Range	25.0 – 99.9°C Heating: 6.0°C/sec Cooling: 3.0°C/sec (Median), 2.5°C/sec (Average) Accuracy: ± 0.2°C or better at typical annealing, amplification, and denaturation temperatures
Dynamic Range	9
Experiment Types	Quantitative PCR with dye, Quantitative PCR with probe, Allele Discrimination with HRM, Allele Discrimination with probe, Comparative Quantitation, User Defined
Uniformity	± 0.4°C
Data Acquisition Time	<3 seconds for all
Cq Uniformity	Cq St Dev <0.20 at fast cycling (5s 95°C/10s 60°C)
Electrical Power (input)	100 – 240VAC, 50/60Hz, 1100VA
Operating Environment	20 – 30°C, 20 – 80% non-condensing humidity, 7500 feet, max altitude
Weight	50 lbs. (23 kg)
Dimensions	19.7" W x 18.1" D x 16.5" H (50cm x 46cm x 42cm)
Sample Containers	96-well plates, strip tubes; 0.2mL tubes
Warranty	• 1-year warranty is standard with the instrument • 5-year warranty and service packages available
Onboard Analytics	• Thermal, physical, interactive (sensors) tests • Extended: 125 performance points tested in 30 minutes • Start-up: 59 performance points tested in ~1 minute • Optional bypass of both features
Services (upon request)	• Installation and familiarization • Standard and Enhanced Preventative Maintenance • Additional year warranty (+1 increments, up to 5 years coverage) • Return-to-Agilent Instrument Exchange Program • Thermal block verification
Operating System	• Windows 7 and 10
MS Office Compatibility	• Microsoft 2010 and 2013 compatible
Run Modes	• Stand alone • PC connected • LAN connected to PC (more than 20 instruments can be connected and monitored remotely) • USB connected, external devices
Software	Free software including LIMS connectivity
Optical Module Calibration and Cleaning	• All channels can be tested and calibrated • All attributes of optical channels are calibrated at the factory – LED light output, light path, mirror, and photodiode • Optical modules can be cleaned in lab without Agilent technician or sending back to factory
Selected Applications	• Quantitative and qualitative gene expression analysis • miRNA analysis • Genetic mapping • Genetic fingerprinting • NGS library quantification • 2-6 channel multiplex ability • HRM analysis (including genotyping, mutational analysis, and class IV SNP detection) • Pathogen quantification

QUICK REFERENCE

Useful Tools and Web Links

qPCR Decision Tree: Determine which qPCR reagents or enzymes best serve your needs.

Software Updates: Ensure your software is the most current version.

qPCR Methods and Applications Guide: Useful for both new and expert users.

Field Notes: Updates and quick tips on AriaMx, from new applications to protocols you can rely on.

TECHNICAL SUPPORT

Americas
qPCR@agilent.com | 800.227.9770

Other regions, consult:
www.agilent.com/genomics/contactus

ORDERING INFORMATION

Category	Part #	Description	Quantity
Base Instrumentation	G8830A	AriaMx Real-Time PCR System	1
Optical Cartridges (*Use part numbers to upgrade post instrument purchase)	Option 101 (G8830-67001*)	SYBR/FAM Optical Cartridge	1/pack
	Option 102 (G8830-67002*)	ROX Optical Cartridge	1/pack
	Option 103 (G8830-67003*)	HEX Optical Cartridge	1/pack
	Option 104 (G8830-67004*)	CY3 Optical Cartridge	1/pack
	Option 105 (G8830-67005*)	CY5 Optical Cartridge	1/pack
	Option 106 (G8830-67006*)	ATTO425 Optical Cartridge	1/pack
Software Upgrade and PC (with instrument)	Option 300	Electronic Tracking of HRM software	1
	Option 400	HRM analysis software upgrade	1
	Option 650	AriaMx PC Kit	1
AriaMx Software Upgrade (post instrument purchase)	G5380AA	Electronic Tracking of the HRM software	1
	G5381AA	HRM analysis software upgrade only	1
Plastics	401490	AriaMx 96-well plates, skirted and low profile	1 x 25/pack
	401491	AriaMx 96-well plates, skirted and rigid	1 x 25/pack
	401494	AriaMx 96-well plates, non skirted low profile	1 x 25/pack
	401492	AriaMx adhesive plate seals	1 x 25 plates
	401493	AriaMx low profile strip tubes for PCR and qPCR applications, without caps	8/strip x 120/box
	401425	AriaMx Strip caps for PCR and qPCR applications	8/strip x 120/box
	401427	AriaMx Optical Strip Caps	Box of 60
Reagents PROBE	600880	Brilliant III Ultra-Fast qPCR Master Mix	400 rxns
SYBR	600882	Brilliant III SYBR Ultra-Fast qPCR Master Mix	400 rxns
	5190-7708	AriaMx SYBR Qualification Plate	1 plate/pack
MULTIPLEX	600553	Brilliant Multiplex qPCR Master Mix	200 rxns
HRM	5190-7827	Brilliant HRM Ultra-Fast Loci Master Mix	200 rxns
	5190-7702	AriaMx HRM Calibration Kit	1 x 96-well plate
Starter Packs (Includes cDNA synthesis kits* and recommended plastics)	600906*	AriaMx SYBR Green Starter Pack	1
	600907*	AriaMx qRT-PCR Starter Pack	1
	5190-9370	Brilliant HRM Ultra fast Starter Pack	1

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PR7000-0129

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Agilent Technologies

Agilent 7800 Quadrupole ICP-MS

FAST-TRACK YOUR METALS ANALYSIS WITH SOLUTION-READY ICP-MS

The Measure of Confidence

Agilent Technologies

TAKE A NEW LOOK AT ROUTINE METALS ANALYSIS

The new, Solution-Ready Agilent 7800 ICP-MS combines proven, robust hardware, auto-optimization tools, and Pre-set Methods to simplify routine analysis, making your laboratory more productive, and your results more reliable.

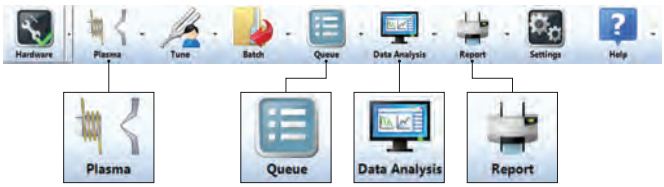
What's more, with high matrix tolerance, wide dynamic range, and effective control of polyatomic interferences, the 7800 ICP-MS takes the uncertainty out of analyzing complex or variable sample matrices.

The 7800 ICP-MS is extraordinarily easy to set up and use, so you can quickly produce reliable results in the widest range of sample types.

Fast track your ICP-MS method development

- New ICP-MS MassHunter software provides fast system setup, robust auto-optimization tools and extensive system status monitoring, to ensure consistent high performance.
- Many common methods can simply be loaded and run, with settings – from plasma conditions to analyte integration times and internal standards – predefined in a Pre-set Method. Where a specific new method is needed, the Method Wizard simplifies the setup process.
- The software includes performance, tune, QC, and sample report templates with operator tutorials for refresher or new-user training.
- Standard operating procedures (SOPs) for several common applications, guide new users in system setup and routine operation, setting you on the fast track to accurate analysis.

Solution-Ready ICP-MS
The 7800 ICP-MS includes SOPs for common applications, including drinking water, environmental waste analysis, and Elemental Impurities in pharmaceutical products.



Simplify your method setup
ICP-MS MassHunter software uses an intuitive layout with graphical toolbar Gadgets, making it easy to learn and use. The innovative Method Wizard builds a fully functional method based on your sample type and application.

AGILENT 7800 QUADRUPOLE ICP-MS

LET THE AGILENT 7800 ICP-MS STREAMLINE YOUR ANALYTICAL WORKFLOW

Maximize throughput and productivity

The optional Integrated Sample Introduction System (ISIS 3), shown, and new SPS 4 autosampler lower your cost per analysis, without compromising data quality.

Reduce sample preparation and minimize suppression

Agilent's unique High Matrix Introduction (HMI) technology, standard on the 7800 ICP-MS, lets you analyze samples containing up to 3% total dissolved solids (TDS) without dilution, reducing sample preparation and saving time.

HMI also reduces signal suppression, so high matrix samples can be measured accurately without requiring matrix matched calibration standards.

Ensure accurate data with effective interference removal

Helium (He) collision mode simplifies method development and routine operation by removing all polyatomic ion interferences under a single consistent set of conditions.

He mode avoids the need for matrix-specific or analyte-specific reaction cell conditions.

Analyze major and trace analytes in a single run

The wide dynamic range orthogonal detector system (ODS) enables direct analysis of major elements (100s or 1000s of ppm) and trace level analytes (single- or sub-ppt) in a single run, simplifying methodology.

The high upper concentration limit reduces sample reruns caused by overrange results.

For more information

Learn more
www.agilent.com/chem/7800icpms

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agilent_inquiries@agilent.com

Europe
info_agilent@agilent.com

Asia Pacific
inquiry_lsca@agilent.com

In other countries, please call your local Agilent Representative or Agilent Authorized Distributor — visit
www.agilent.com/chem/contactus

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For more information see:
www.agilent.com/chem/specsuppliesinfo

Services let you focus on what you do best

Whether you need support for a single instrument or multiple labs, Agilent can help you solve problems quickly, increase uptime, and maximize the productivity of your team with:

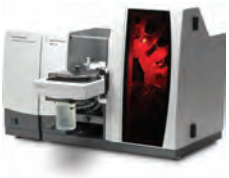
- Familiarization disk including over 20 tutorial videos.
- On-site maintenance, repair and compliance.
- Service agreements for all your systems and peripherals.
- Application training and consulting from our dedicated, worldwide network of specialists.

Agilent Service Guarantee

If your Agilent instrument requires service while covered by an Agilent service agreement, we guarantee repair or we will replace your instrument for free. No other manufacturer or service provider offers this level of commitment to keeping your lab running at maximum productivity.

Leading the way in atomic spectroscopy innovation

www.agilent.com/chem/atomic

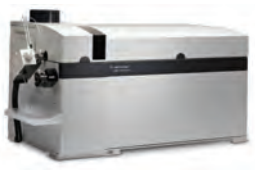


Agilent AA

Agilent MP-AES

Agilent ICP-OES

Agilent ICP-MS



Agilent ICP-QQQ

Printed in the USA June 1, 2015
5991-5874EN

Agilent Technologies

Agilent 7800 ICP-MS

Specifications and Typical Performance

Fast track metals analysis with Solution-Ready ICP-MS

The Solution-Ready Agilent 7800 Quadrupole ICP-MS combines proven, robust hardware, auto-optimization tools, and pre-set methods to simplify routine analysis, making your laboratory more productive, and your results more reliable.

What's more, with high matrix tolerance, wide dynamic range, and effective control of polyatomic interferences, the 7800 ICP-MS takes the uncertainty out of analyzing complex or variable sample matrices.

The 7800 ICP-MS is extraordinarily easy to set up and use, so you can quickly produce reliable results in the widest range of sample types.

Specifications

Sample introduction system	Peristaltic pump	10-roller, 3 channels
	Nebulizer	MicroMist (borosilicate glass)
	Spray chamber	Scott-type double-pass (quartz) Controlled temperature range: –5 °C to +20 °C
	High Matrix Introduction system (HMI)	Included
Plasma	RF generator	Solid state digital drive 27 MHz Variable-frequency impedance matching 500 W to 1600 W
	Torch	One-piece (quartz) 2.5 mm id injector ShieldTorch system
	Torch position	Horizontal and vertical position: ±2 mm, in 0.1 mm steps Sampling depth: 3 to 28 mm, in 0.1 mm steps
	Mass flow controllers (Ar)	4: Plasma, Aux., Carrier, Make up/Dilution
	5th gas line for alternative carrier gas	Optional
Interface	Sampling cone	1 mm diameter orifice Standard: Ni-tipped with Cu base Optional: Pt-tipped with Cu base
	Skimmer cone	0.4 mm diameter orifice Standard: Ni Optional: Pt-tipped with Cu base
Ion lens	Lens system	Extraction lens Off-axis Omega lens
Octopole Reaction System (ORS)	He (collision) cell gas line	Included
	H_2 (reaction) cell gas line	Optional
	3rd cell gas line (low- or high-flow rate)	Optional
Mass analyzer	Quadrupole	Frequency: 3 MHz Hyperbolic rod profile
	Mass range	2–260 u
	Mass resolution	Variable from 0.3 u to 1.0 u
	Typical mass calibration stability	< 0.05 u per day < 0.1 u per 6 months
	Abundance sensitivity (at Cs)	Low mass side: $\leq 5 \times 10^{-7}$ High mass side: $\leq 1 \times 10^{-7}$

Detector	Configuration	Orthogonal Detector System (ODS)
	Detector	Dual-mode discrete dynode electron multiplier
	Dynamic range	10 orders (0.1 cps to 4 Gcps)
	Minimum integration time	100 µs
	Minimum dwell time (TRA mode)	3 ms
Vacuum system	Configuration	Three-stage differential vacuum system
	Vacuum pump	Single split-flow turbo molecular pump Single external rotary pump
	Vacuum pump hose length	1.5 m, 3 m (optional)
Software	Instrument contol software	ICP-MS MassHunter Workstation software
	User access control software	Optional
	Chromatographic software	Optional
	Single nanoparticle application module	Optional
	Intelligent sequencing software	Optional
	Three offline user licenses	Optional

Accessories and Peripherals

Autosamplers	Agilent SPS 4 Autosampler Agilent Integrated Autosampler (I-AS)
Sample introduction	Integrated Sample Introduction System 3 PFA Inert Sample Introduction Kit Organic Solvent Introduction Kit Humidifier
Speciation kits	LC-ICP-MS Speciation Kits Arsenic Speciation Kit Chromium Speciation Kit Capillary LC Interface Kit GC-ICP-MS Interface
Peripherals	Water recirculator Water chiller Optional hood Quiet cover for rotary pump

Instrument Performance

The factory shipping specifications that are confirmed at the factory represent minimum requirements for shipping approval. The actual performance of the Agilent ICP-MS is invariably much higher. The two tables below provide the typical performance of the Agilent 7800 ICP-MS, together with the factory shipping specifications.

No Gas mode		7800 Factory Specifications[1]	7800 Typical Performance[2]
Sensitivity (Mcps/ppm)	^{7}Li	50	110
	^{59}Co		180
	^{89}Y	160	270
	^{115}In		320
	^{205}Tl	80	340
	^{238}U		540
Background	*m/z* 9	<1 cps	<0.3 cps
Detection limits	^{9}Be	<0.5 ppt	<0.1 ppt
	^{115}In	<0.1 ppt	<0.04 ppt
	^{209}Bi	<0.1 ppt	<0.04 ppt
Oxide	CeO/Ce	<1.5%	<1.8%
Doubly charged	Ce^{2+}/Ce	<3%	<2.5%
Stability	20 min	<2.0% RSD	<1.0% RSD
	2 hr	<3.0% RSD	<1.2% RSD
Isotope ratio precision	^{107}Ag/ ^{109}Ag	<0.1% RSD	<0.1% RSD

He Gas mode		7800 Typical Performance[2]
Sensitivity (Mcps/ppm)	^{59}Co	47
Background	*m/z* 9	<0.2 cps
Interference reduction factor[3]	^{59}Co/^{51}ClO	>30
Oxide	CeO/Ce	<0.5%
Detection limits[3]	^{75}As	<10 ppt

1. 7800 Factory Shipping Specifications. These specifications are detailed in the Agilent publication: Agilent 7800 ICP-MS, Specifications (Publication number: 5991-5927EN).

2. The typical performance values are not checked during the standard installation.

3. Performed in a matrix of 2% HNO_3 + 0.5% HCl.

Site Requirements and Safety

Dimensions

Mainframe	Width	730 mm (main cabinet, excluding peri-pump)
	Depth	600 mm (main cabinet, excluding power cord)
	Height	595 mm (main cabinet, excluding exhaust chimney)
	Weight	100 kg
Largest shipping container	Width	1,020 mm
	Depth	1,120 mm
	Height	1,000 mm
	Weight	148 kg

Environmental

Operating temperature	Range	15–30 °C
	Rate of change	<2 °C/hr (max. change 5 °C)
Operating humidity	Range	20-80% (non-condensing)

Utilities

Electricity supply	Voltage	Single Phase, 200-240 V, 50/60 Hz
	Current	30 A
Cooling water	Inlet temperature	15-40 °C
	Minimum flow rate	5 L/min
	Inlet pressure	230-400 kPa
Argon gas supply	Minimum purity	99.99 %
	Maximum flow rate	20 L/min
	Supply pressure	500-700 kPa
Cell gas supply	Minimum purity	99.999%
	Maximum flow rate	12 mL/min for He and 10 mL/min for H_2
	Supply pressure	90-130 kPa for He 20-60 kPa for H_2
Exhaust duct	Vent Type	Single vent, 150 mm diameter
	Flow rate	5-7 m^3/min

Regulatory Compliance

Safety	IEC 61010-1:2001 / EN 61010-1:2001 IEC 61010-2-061:2005 / EN 61010-2-061:2003 IEC 61010-2-081:2001+A1:2003 / EN 61010-2-081:2002+A1:2003 Canada: CAN/CSA C22.2 No. 61010-1-04 Canada: CAN/CSA C22.2 No. 61010-2-061-04 Canada: CAN/CSA C22.2 No. 61010-2-081-04 USA: UL 61010-1 (2nd Edition)
EMC	IEC 61326-1:2012 / EN 61326-1:2013 Canada: ICES-001:2006
ISO	Manufactured at an ISO 9001 and ISO 14001 certified facility

www.agilent.com

Published October 26, 2015
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Agilent Technologies

Agilent 7890B Gas Chromatograph

RESOLVE YOUR SEARCH FOR RELIABILITY

The Measure of Confidence

Agilent Technologies

Resolve your search for the next evolution in gas chromatography

The NEW Agilent 7890B GC

Building the world's most trusted GC system is an ongoing process. With every step, we increase speed, improve functionality, and incorporate new analytical capabilities – all while never losing sight of the most important objective: *results*.

Now, Agilent has achieved a new level of GC performance and GC/MSD system integration

Agilent's flagship 7890B GC system has everything you need to boost productivity, protect our environment through better resource management, and generate data with confidence. In addition, its seamless communication with the Agilent 5977A Series GC/MSD provides faster vent times and system protections when using hydrogen carrier gas.

The Agilent 7890B GC adds integrated "smart" functionality and improved performance to the industry-leading GC platform.

Proven reliability meets improved performance

Agilent's 5th-generation electronic pneumatics control (EPC) and digital electronics are now complemented by improved detector specifications, making the 7890B Agilent's most dependable – and highest-performing GC – ever.

Higher sample throughput

Fast oven cool-down, new backflush capabilities, and advanced automation features help you get more done in less time, at the lowest possible cost per sample. All can easily be incorporated into your existing method.

NEW integrated intelligence

Early maintenance feedback lets you replace parts quickly, and address small problems *before* they lead to costly downtime. Built-in calculators and method translator are also integrated into the data system software to simplify method setup and system operation.

What's more, the improved GC↔MSD communication cuts venting time by up to 40%, and protects the system from damage by stopping the flow of carrier gas during shutdown events.

Expanded chromatographic capabilities

A flexible EPC design enables sophisticated analyses, while an optional 3rd detector (TCD or ECD) lets you run multiple analyses on a single GC.

Eco-friendly operation

Sleep mode reduces power and gas consumption during periods of inactivity, while **Wake mode** readies the system for high-throughput operation. You can also switch to lower-cost gases while in standby mode. ***Page 12***

Leading-edge technologies increase analytical capabilities and reliability

Faster, more intuitive software

New Agilent OpenLAB CDS is 40 times faster. Tools and wizards have also been added to help you turn results into answers, faster. ***Page 10***

End-to-end protection for active compounds

Agilent now applies our proprietary deactivation technologies to our new Split/Splitless inlet option, Ultra Inert liners, gold seals, columns, and improved detectors. So you can be sure you're getting an inert flow path from injection to detection. ***Page 9***

Enhanced inlet and detector modules

Numerous module enhancements let you customize your GC system in minutes to suit your changing application needs. ***Page 8***

New integrated system maintenance and Parts Finder tools

Reduce downtime and operating costs with simplified maintenance and status monitoring. Find consumables and replacement parts faster with a 3D graphical tool. ***Page 12***

Enhanced Capillary Flow Technology (CFT)

CFT modules enable leak-free, in-oven connections while improving throughput and reliability. An easy setup wizard gets you up and running quickly. ***Page 6***

Wide choice of system components

Configure and automate your system to increase efficiency and productivity – and expand your analytical capabilities. ***Page 14, 21***

Reduce dependency on helium

Integrated calculators help you convert helium methods to more available – and less expensive – gases like hydrogen or nitrogen. ***Page 12***

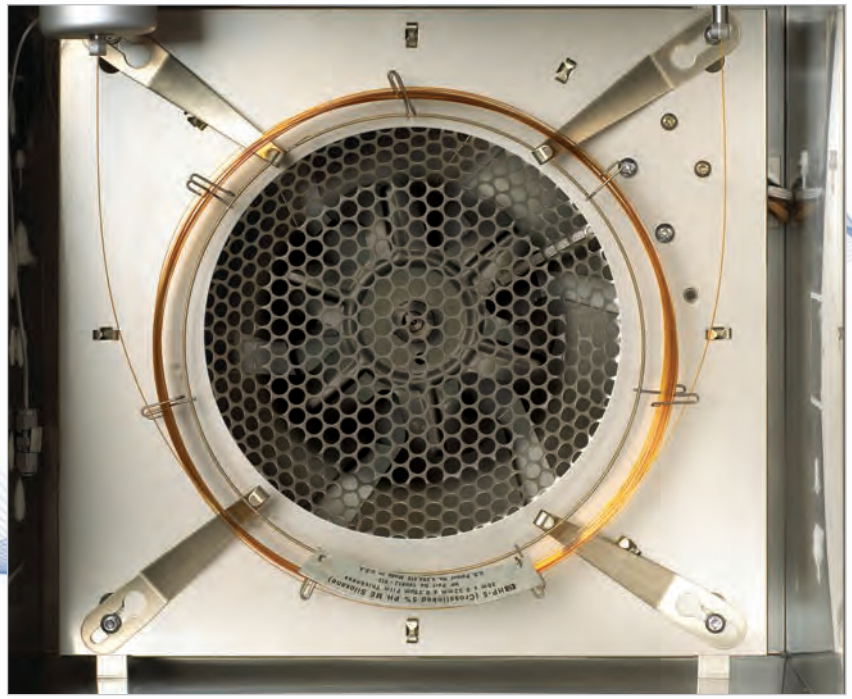
To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Advanced capabilities help you get the job done, faster

Agilent's 7890B GC builds on a 45-year tradition of leadership and innovation, providing everything you need to take your lab to the next level of GC and GC/MS productivity, performance, and resource management.

The heart of performance

Precise pneumatics and oven temperature control, combined with Agilent J&W Ultra Inert GC columns, give you outstanding resolution and retention time repeatability – the basis for all chromatographic measurement.



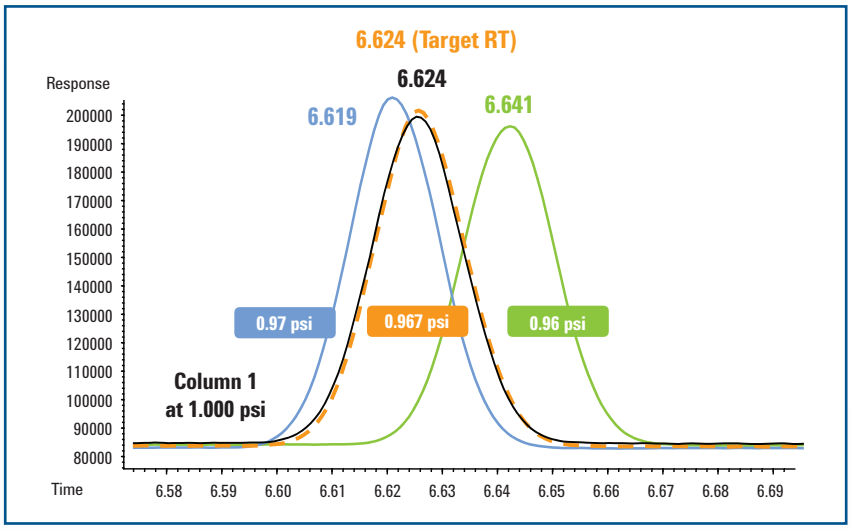
The heart of reliability

No other manufacturer has Agilent's depth of experience in electronic flow control. Our pneumatics manifold reduces the need for parts and seals, improving gas flow precision and stability. Integrated electronics and advanced mechanical design further enhance dependability and versatility.

Precise Retention Time Locking (RTL) software

RTL reproduces retention times from one Agilent GC system to another – regardless of inlet, detector, operator, or location. So you can confidently transfer methods worldwide.

Agilent's 5th generation EPC and digital electronics further improve RTL precision for low-pressure applications (to 0.001 psi actual).



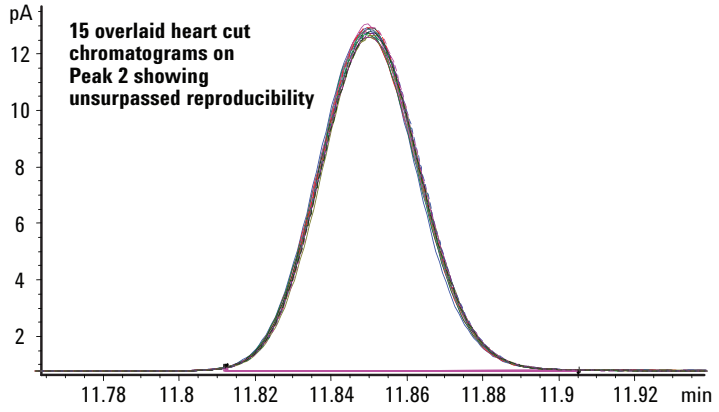
5989-8366EN: Low Pressure Retention Time Locking with the 7890 GC

Unsurpassed retention time reproducibility

5th-generation electronic pneumatics control (EPC) makes it easy to set pressure and flow – and to *keep* these setpoints consistent from run to run for retention time repeatability.

Run	Peak 1*	Peak 2*
1	9.0839 min	11.8492 min
2	9.0835	11.8492
3	9.0841	11.8494
4	9.0846	11.8496
5	9.0851	11.8507
6	9.0849	11.8502
7	9.0845	11.8504
8	9.0849	11.8500
9	9.0847	11.8504
10	9.0853	11.8502
11	9.0852	11.8502
12	9.0851	11.8508
13	9.0847	11.8503
14	9.0848	11.8507
15	9.0853	11.8506
Average	9.0847 min	11.8501 min
Standard Deviation	0.000527	0.000535

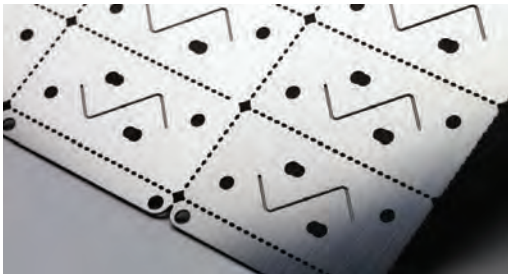
**Heart-cut from column 1.*



Achieve unsurpassed retention time reproducibility in standard applications – even with multi-dimensional applications, such as the heart-cutting example shown here.

To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Add dimension to your chromatography with Capillary Flow Technology



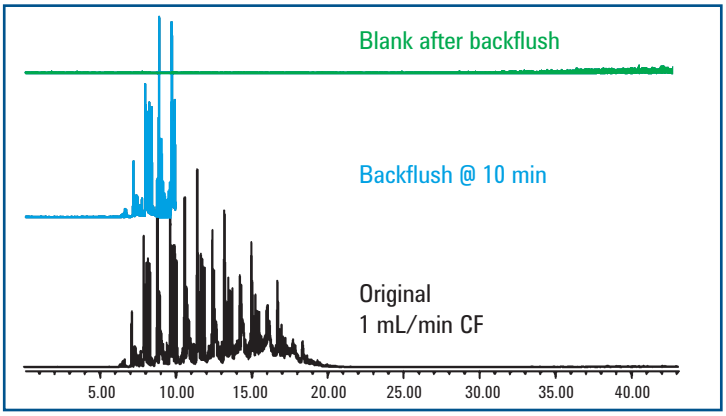
Agilent's proprietary Capillary Flow Technology (CFT) solves a problem chromatographers have been wrestling with for decades: creating leak-free capillary connections that can withstand the temperature extremes of a modern GC oven.

CFT devices are inert, with low mass and low dead volume to help you make secure connections and precisely divert your gas flow pneumatically. This opens the door to techniques that can expand analytical capabilities, improve your results, and conserve both time and resources.

CFT backflush saves you time with every run

Backflushing works by reversing the column flow immediately after the last compound of interest has eluted, thereby sweeping material backwards through the column and out the split vent.

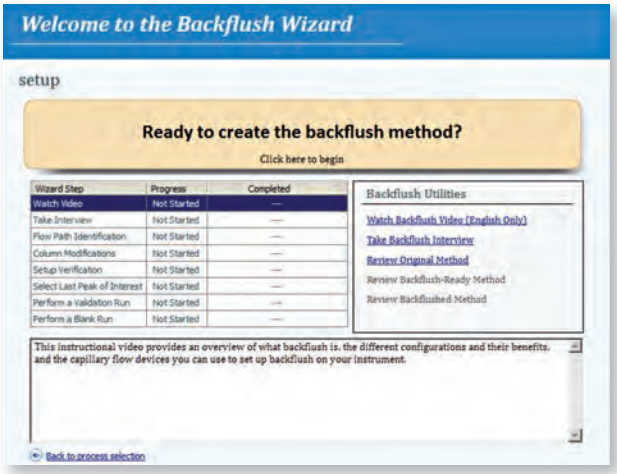
This simple technique extends column life and eliminates long bake-out times for highly retained sample components. It also prevents problems such as carryover, retention time shifts, and MSD source contamination.



5989-9804EN: Capillary Flow Technology: Backflush – Reduce Run Time and Increase Laboratory Throughput

Backflush Assistant Software Wizard guides you to greater productivity

The Backflush Assistant Software Wizard first collects information about your method and CFT device, then provides a step-by step procedure for configuring the backflush hardware and column plumbing. Once the backflush-enabled method and timing are determined, a validation protocol confirms that the method performs properly and robustly.



5991-1114EN: Capillary Flow Technology: Purged Ultimate Union – Reduce Downtime and Increase Your Lab's Productivity

Expert training: just a phone call away

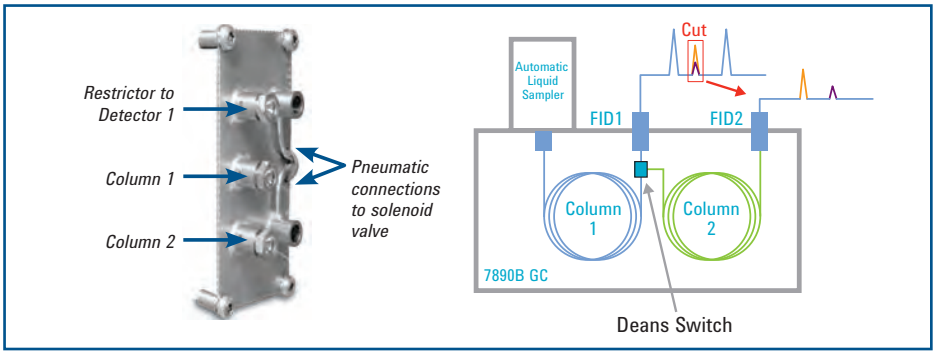
Backflush and Backflush Assistant Software Wizard training from Agilent Workflow Services can help you set up your CFT Backflush method quickly and efficiently.

Capillary Flow Technology Deans Switch and flow splitters enhance chromatographic capabilities

Valve components have been used for decades to perform GC heart cutting between two columns. However, a Capillary Flow Technology (CFT) Deans Switch, using fluidic switching, allows precise, 2-dimensional GC heart-cutting analysis of trace compounds in complex matrices.

How a Deans Switch improves selectivity for trace compounds in complex matrices

Peaks of interest from one column are "cut" onto a second column with a different stationary phase. Compounds that might co-elute with analyte on the first column are separated from analyte on the second column. In this way, selectivity is improved for trace compounds in complex matrices.

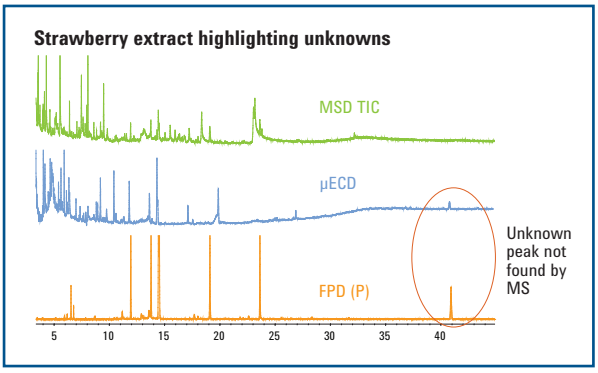


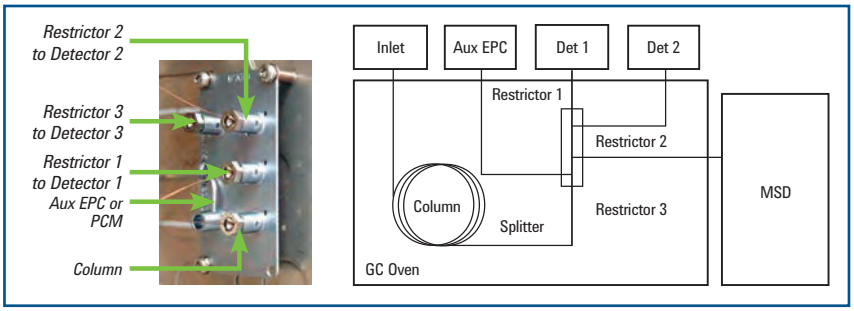
In this example, the Capillary Flow Deans Switch enabled unresolved trace components to be heart-cut onto a second column with a different stationary phase.

5989-9384EN: Capillary Flow Technology: Deans Switch – Increase the Resolving Power of Your GC

Flow splitting can help you pull the most data from your samples

Flow splitting – sending the sample to multiple detectors – maximizes the data collected in a single run, and is especially valuable for analyzing compounds in complex matrices. This technique can also help you identify peaks of interest more quickly, improve peak integration, and identify unknowns with greater confidence.





Agilent CFT devices provide easy-to-make, low-volume, connections for better chromatography.

5989-9667EN: Capillary Flow Technology: Splitters – Get More Information in Less Time

TIP: Agilent UltiMetal Plus Flexible Metal ferrules improve the reliability of your GC column connections. Learn more at **www.agilent.com/chem/flexiferrule**

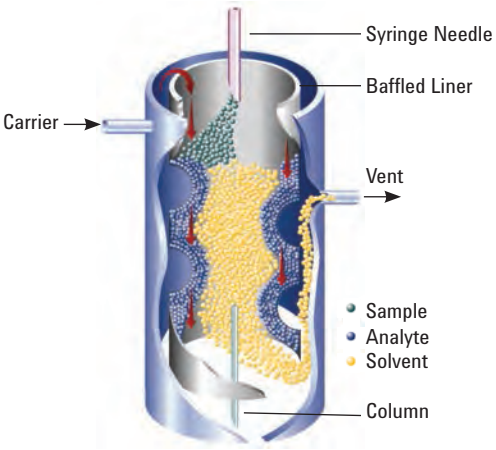
To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Keep your lab running at peak performance – now, and in the future

The modular Agilent 7890B GC system lets you choose from the industry's widest selection of inlets, detectors, columns, and automated sample introduction techniques. Entire injector and detector modules can be changed in minutes, while injector and detector components can be swapped independently of pneumatics and electronics – saving your lab money.

Versatile Multimode Inlet (MMI)

Agilent's MMI combines spit/splitless operation (cold, hot, and pulsed), temperature programming, and large-volume injection with a solvent vent mode. Benefits include higher system sensitivity, robust handling of dirty samples, and the ability to analyze thermally labile compounds.



5990-3954EN: Agilent Multimode Inlet for Gas Chromatography

Full dynamic range FID

Our state-of-the-art digital electrometer delivers a linear dynamic range of 10^7, seamlessly integrated into a single run.

Sensitive and selective element detection

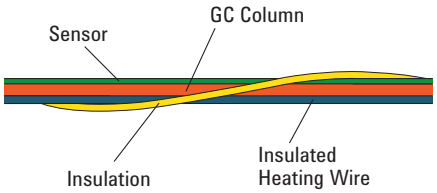
Agilent offers several element-selective detectors, including our new Flame Photometric Detector (FPD) with improved sensitivity and a temperature range up to 400 °C. For demanding applications, Sulfur Chemiluminescence Detectors (SCD) and Nitrogen Chemiluminescence Detectors (NCD) provide the highest sensitivity and selectivity.

5990-3237EN: Dual Channel Simulated Distillation of Carbon and Sulfur with the Agilent 7890A GC and 355 Sulfur Chemiluminescence Detector

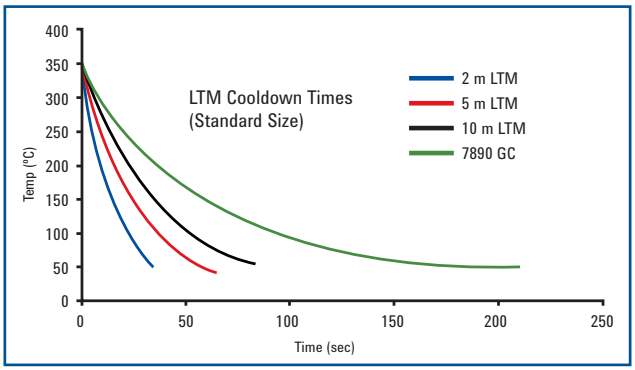
Low Thermal Mass (LTM) technology for faster cycle times

LTM technology for GC and GC/MS promotes direct, rapid heating and cooling for faster GC analyses and higher sample throughput. With its independent temperature control of up to four column modules, LTM technology also enables multidimensional GC and integration with Capillary Flow Technology for reduced column maintenance.

Note, too, that LTM systems consume far less power than a conventional GC platform. To simplify method transfer, most Agilent J&W GC columns are available for LTM modules.



The key to LTM technology: *weaving direct heating and temperature-sensing components around a standard fused-silica capillary column (up to 30 meters) for rapid heating and cooling.*



Typical cooling times for standard (5-inch) LTM column modules are significantly faster than a conventional GC oven.

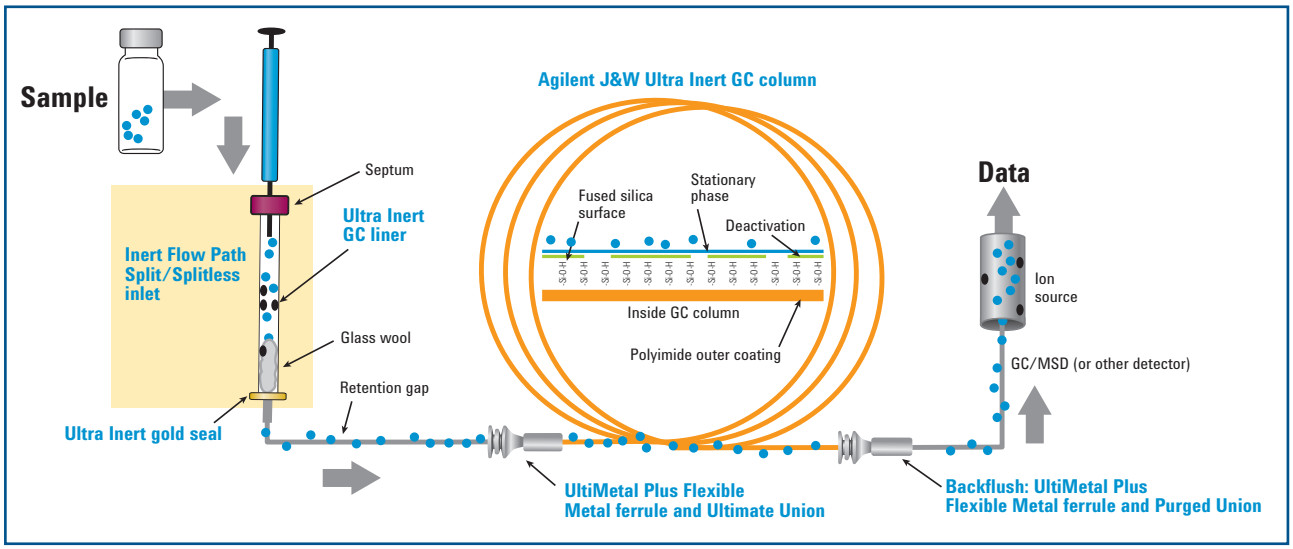
5990-7688EN: Agilent Low Thermal Mass (LTM) Series II System for Gas Chromatography

Ensuring an inert flow path has never been more critical

As samples become smaller, increasingly active, and more complex, you simply cannot afford losses caused by flow path activity.

For starters, having to repeat or verify suspect analyses wastes valuable resources, hinders productivity, and hurts your bottom line. And with trace amounts of active analytes, you might not even get a second chance, because there may be no more sample left to analyze.

Agilent's Inert Flow Path Split/Splitless inlet option ensures the inertness of flow path surfaces, allowing analytes to safely pass from injector to detector.



An integrated approach to inertness: The Agilent advantage

As the GC industry's premier measurement company, Agilent is uniquely positioned to help ensure the inertness of every surface that touches your sample, so you can achieve the parts-per-billion – or parts-per trillion – detection levels that today's analyses demand.

- **Agilent J&W Ultra Inert GC columns** are tested with the industry's toughest test probe mixture to ensure consistent column inertness and exceptionally low column bleed.
- **Ultra Inert liners** deliver a robust, reproducible and reliable inert flow path – with or without glass wool.
- **Inert Flow Path Split/Splitless inlet option** provides an extra measure of inertness to the sample pathway.
- **Ultra Inert gold seals** feature deactivation chemistry applied *on top* of their gold plating for the most inert surface and highest-quality seal.
- **UltiMetal Plus Flexible Metal ferrules** are compatible with Capillary Flow Technology fittings, promoting a leak-free seal that requires less torque – and reduces the risk of column breakage.
- **Gas Clean filter systems** deliver the cleanest possible gas, reducing column damage, sensitivity loss, and downtime.
- **GC detectors** allow the selectivity or sensitivity that your application requires – and the ability to handle your data with a unified platform.

For more information about creating an inert GC flow path, visit **www.agilent.com/chem/inert**

Intuitive software tools simplify operations and boost productivity for every user

Integrated method development tools and calculators take the guesswork out of tasks such as changing carrier gas, selecting the right liner, or changing to a column of different dimensions.

Interactive graphical consumables and parts identification tool quickly locates key parts on the GC system, and provides part numbers and descriptions for easy ordering.

Consumables database simplifies method development by minimizing tracking errors and automatically populating analytical methods with key configuration information.

Resource conservation tools, such as automatic sleep and wake modes, reduce gas and power consumption, while making sure the system is ready to run when you need it.

GC/MS MassHunter with MSD ChemStation Data Analysis: Agilent's newest platform designed to resolve your search for data

Quickly and confidently find the answers you seek for routine quantitation and more challenging discovery applications.

Choose either MassHunter or MSD ChemStation Data Analysis – the traditional choice for GC/MS analysis.

Common instrument control for Agilent GC/MS systems simplify your laboratory operation.

Agilent's Barcode Printing Bundle (G9201AA) has everything you need to print labels for the 7693 ALS and 7697A Headspace Samplers.

OpenLAB

CAPTURE • ANALYZE • SHARE

OpenLAB CDS resolves your search for speed with updated data analysis and reporting

OpenLAB CDS is available in **ChemStation** and **EZChrom Editions**. Both retain their familiar look and feel, but with significant improvements that will make your work routine more efficient. These include:

- Easy, intuitive custom reporting with new OpenLAB Intelligent Reporting – featuring graphical "drag and drop" capability
- Powerful data analysis speeds up results review and enables you to process large data sets faster
- Optimized control, data acquisition, and data processing for your Agilent 7890B GC
- Better management of user privileges and password protection

Centralized data storage is also available through Agilent OpenLAB Data Store and OpenLAB ECM software.

Flexible architecture expands from a single instrument to lab-wide implementation.

Advanced data analysis and reporting drives greater throughput and productivity.

A trusted upgrade path preserves your investment in workflows, data, and methods.

Networked OpenLAB CDS allows you to get your work done from anywhere in the lab – and simplifies the administration of methods, user roles, and permissions.

To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Resolve your search for integration

Smart features take supportability, performance, and safety to new heights

Integrated GC↔MSD communication and safety controls

Direct communication between the 7890B GC and 5977A Series GC/MSD enhances and protects your investment:

- If the MSD vents... the system increases the flow of carrier gas, shortening vent times by up to 40%
- If the pump fails... the system shuts off the carrier gas, saving expensive helium or avoiding hydrogen build-up
- If communications are lost... the system shuts down the GC thermal zones

Eco-friendly

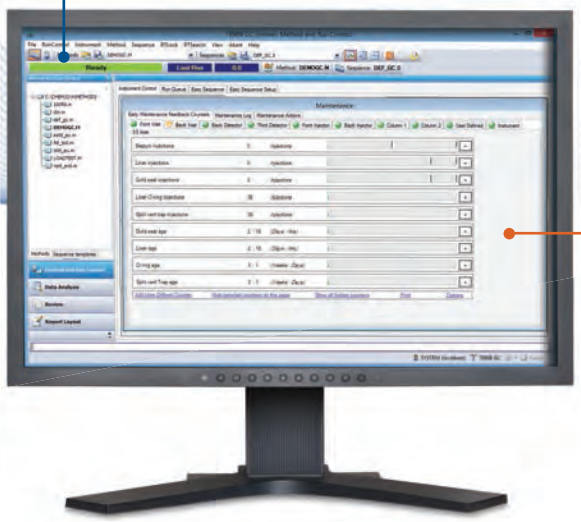
- Can also be used with hydrogen or nitrogen carrier gas to reduce operating costs
- Sleep/wake modes reduce gas and energy consumption

Parts information at your fingertips

- Easily locate part numbers for consumables and supplies with Parts Finder, an interactive 3D graphical tool
- Instantly see parts and consumables specific to *your* instrument configuration. You can then print or email purchase orders, or import directly into your Agilent.com cart
- Keep track of columns and supplies with an optional barcode reader, and auto-import accurate configuration information into your GC and analytical method
- Parts ID tool quickly identifies parts and part numbers for easy re-ordering

Optimize productivity

- Early-maintenance feedback allows you to plan routine maintenance tasks and reduce unnecessary downtime
- Agilent Data Systems easily develop and optimize methods through:
  - Integrated GC Calculators, including method translator and vapor volume calculator
  - Auto transfer of calculated values to the method editor
  - Setup and status of maintenance tracking counters



To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Agilent autosamplers: the perfect partners for your 7890B GC

With its 16-vial capacity and dual simultaneous injection, the Agilent 7693 Series Automatic Liquid Sampler (ALS) delivers the fastest injection times of any GC autosampler. For large-capacity labs, the 7693A platform offers a 16- or 150-vial capacity. Enhanced capabilities – such as automated dilution, internal standard addition, heating, mixing, and solvent addition – help eliminate variability and rework.

If your lab processes fewer than 50 samples per day, the Agilent 7650A ALS is a robust, lower-cost option for optimizing workflows and maximizing sample throughput.

Boost your lab's output with advanced sample preparation capabilities

The Agilent PAL Autosampler is ideal for liquid injection, headspace, and solid-phase microextraction (SPME) applications. Although this versatile platform can be configured solely for liquid injection, it also offers many capabilities – including large-volume injection (LVI), multiple vial sizes, and extended sample vial capacity.

Automatically introduce volatile compounds from virtually any sample matrix

Agilent's 7697A Headspace Sampler ensures an inert sample pathway for superior GC system performance without analyte degradation or loss. Electronic Pneumatics Control (EPC), a 111-vial capacity, and three exchangeable 36-vial racks make the 7697A an ideal choice for high-throughput labs. In addition, the Agilent 7697A Headspace Sampler is the industry's only dedicated headspace unit that supports the use of hydrogen as a carrier gas.

Protect your instrument – and the integrity of your samples – with Agilent's industry-leading vials, caps, and syringes

√ Optimize your productivity √ Extend the life of your system √ Maximize your uptime

View the Agilent Sample Introduction brochure at **www.agilent.com/chem/library** and search for 5991-1287EN.

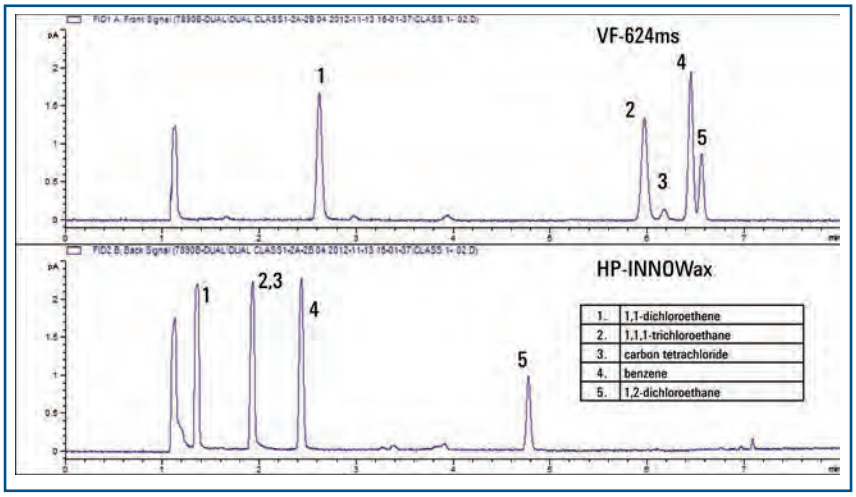
Pharmaceutical applications

Confidently detect impurities at very low levels

Gas chromatography, coupled with static headspace sampling, is an easy-to-use, high-throughput tool for determining residual solvent impurities in pharmaceutical products. Sample preparation is relatively simple, and the method is easily validated. In addition, headspace sampling allows you to avoid large-water injections that can cause column degradation and coelution.

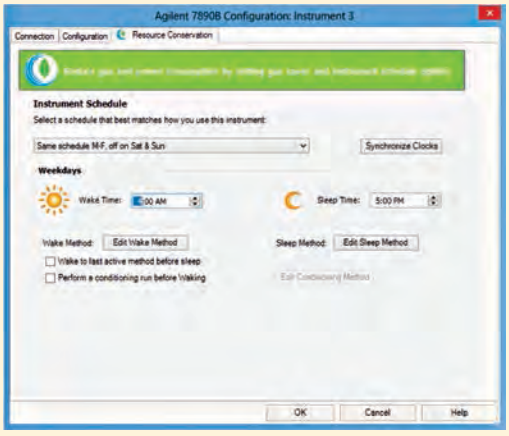
Residual solvent analysis using an Agilent 7890B GC system with an Agilent 7697A Headspace Sampler

Excellent chromatographic performance was achieved for residual solvents at USP <467> specified limits, as shown in this example for Procedure A - Class 1 Solvents.

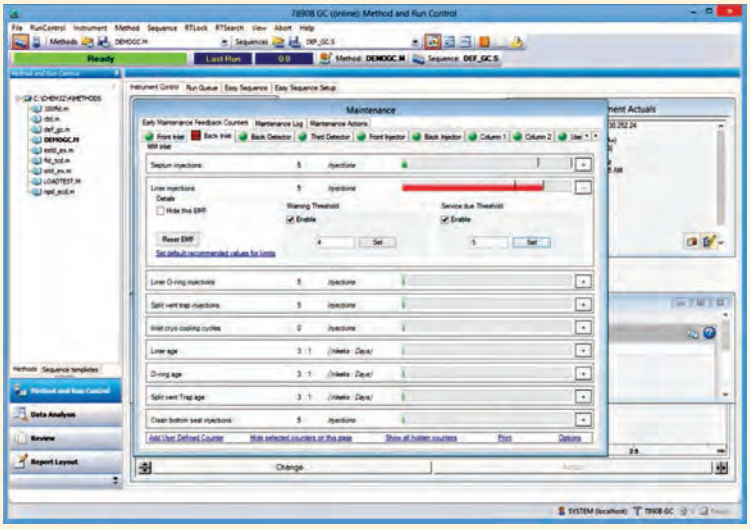


Agilent 7890A GC methods and equivalent results will transfer directly to the 7890B GC.

5991-1834EN: "Analysis of USP <467> Residual Solvents using the 7697A Headspace Sampler with the 7890B Gas Chromatograph"



Save energy and conserve valuable resources. *Sleep/wake mode lets you put your system to sleep when not in use, and have it awaken exactly when you need it.*



Early maintenance feedback (EMF) *keeps track of injections and consumable usage, so you can establish maintenance SOPs.*

To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Energy and chemical applications

Take your lab to a higher level of reliability and productivity

If your lab still uses an "old workhorse" GC just because it gives you "acceptable results," perhaps it's time to consider the transformative advantages of Agilent's 7890B GC. It goes beyond "acceptable results" to give you increased productivity, safety, cost effectiveness, and environmental friendliness – all with greater precision and reliability than instruments past their prime.

Technology innovations expand your range of analyses:

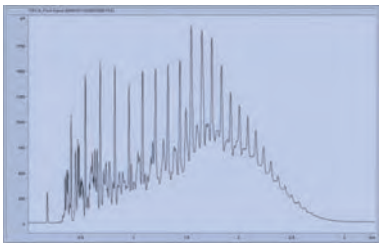
- LTM technology that reduces cycle time for Simulated Distillation.
- An isothermal oven that enables rapid RGA with H_2S and O_2 separation.
- Pre-configured hardware and method-specific separation tools that let you focus on calibration and validation per your lab's SOPs.

Factory-configured analyzers let you start your analysis immediately after installation

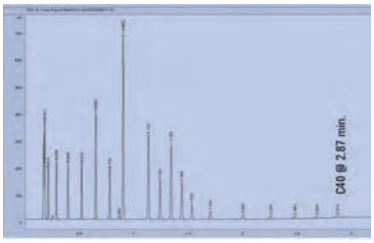
Our extensive portfolio of pre-tested, pre-configured GC and GC/MS analyzers let you focus on calibration and validation per your lab's SOPs.They are designed specifically for energy and chemical applications such as refinery gas, natural gas, TOGA, standard, and alternative fuels.

Fast Simulated Distillation using Low Thermal Mass Module (LTM)

ASTM D2887 Reference Oil



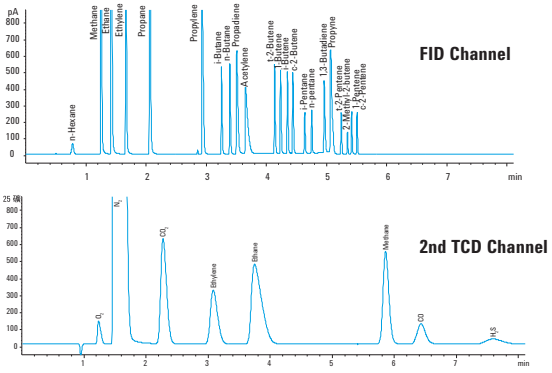
Calibration sample C5-C40



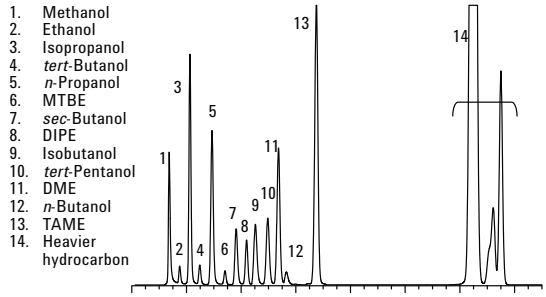
The simulated distillation results for ASTM D2887 RGO agree with the RGO specification of ASTM D2887, with RSDs of 0.12 to 0.47 percent across the reported percent off range.

5990-3174EN: Fast Hydrocarbon and Sulfur Simulated Distillation Using the Agilent Low Thermal Mass (LTM) System on the 7890 GC and 355 Sulfur Chemiluminescence Detector

Fast RGA Analysis



Oxygenates in finished gasoline per ASTM D4815

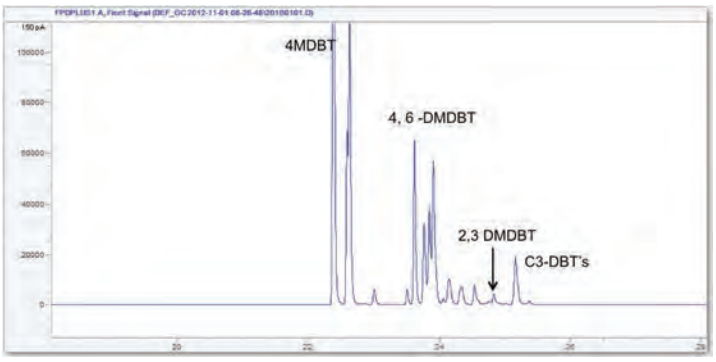


5991-1561EN: Analyzer Solution Guide for Energy & Chemicals Industry

Conform to industry requirements for sulfur levels

Sulfur distribution in feedstocks is critical to the refining industry as it adjusts to meet clean fuel requirements. Agilent's new Flame Photometric Detector, with its high temperature capability and improved sensitivity, is an ideal tool for determining sulfur in blending stocks, such as light cycle oil (LCO). Profiling dibenzothiophenes is particularly important for achieving the lowest sulfur levels in the final products.

For optimal results, the FPD must be operated at temperatures above 300 °C.



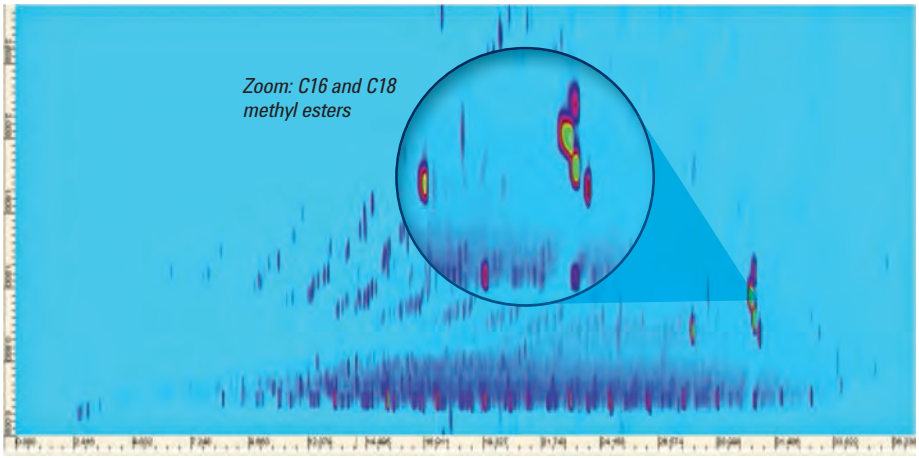
Analysis of substituted dibenzothiophenes in light cycle oil (LCO) using a CFT Deans Switch system with an Agilent 7890B FPD. This enhanced separation reduces the possibility for quenching caused by co-elution with hydrocarbons.

5991-1752EN: An Improved Flame Photometric Detector For the Analysis of Alkyldibenzothiophenes in Light Cycle Oil, and Gas Oil Feedstocks using the 7890B

Reliable trace sulfur analysis. *Excellent reproducibility was achieved by coupling the Agilent 7890B GC with our sensitive, high-temperature FPD.*

Comprehensive GC flow modulation

The Agilent 7890B GC uses Capillary Flow Technology to enable flow modulation without the need for complicated – and costly – cryo-focusing techniques. This analysis of diesel fuel shows the normal boiling point distribution in the first dimension, and functional group clusters in the second dimension.



GC x GC of a B20 Biodiesel showing separation of the C16 and C18 methyl esters. Column 1: 20 m x 0.18 mm x 0.18 µm DB1, Column 2: 4 m x 0.24 mm x 0.25 µm HP-INNOWax. Modulation period: 2.800 seconds.

5989-9889EN: Capillary Flow Technology: GC x GC Flow Modulator: Get a Second Dimension of Information on Complex Mixtures

To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Environmental applications

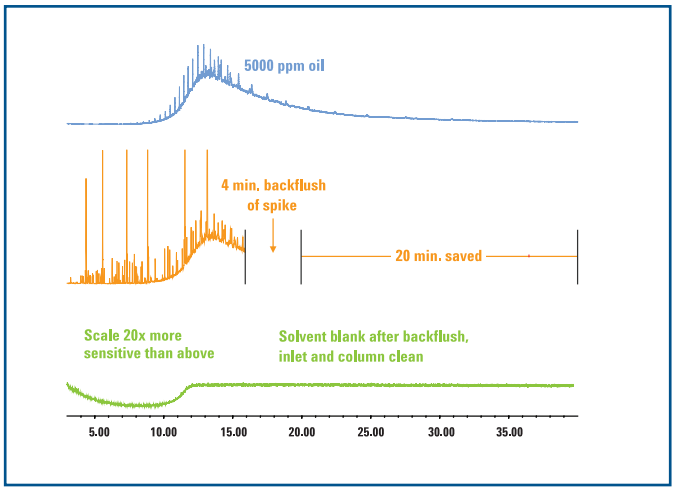
Simplify and accelerate complex screening methods

US EPA Method 8270 is widely used to determine the concentration of semi-volatile organic compounds in environmental matrices – many of which contain a mix of acids, bases, and neutrals. This method can be challenging, due to interactions between analytes and flow path surfaces.

Semi-volatiles analysis

Here, a 5 ppm EPA 8270 standard run was spiked into 5000 ppm of heavy oil to simulate interference from hazardous waste.

During the first run, peaks of interest eluted in less than 16 minutes, but a 24-minute bake-out at 320 °C was required to elute heavy components. The sample was rerun with a 4-minute backflush, which cut the cycle time by 20 minutes per run – a 50% total cycle time savings. ALS overlap and faster cool down saved an additional 4 minutes per cycle.

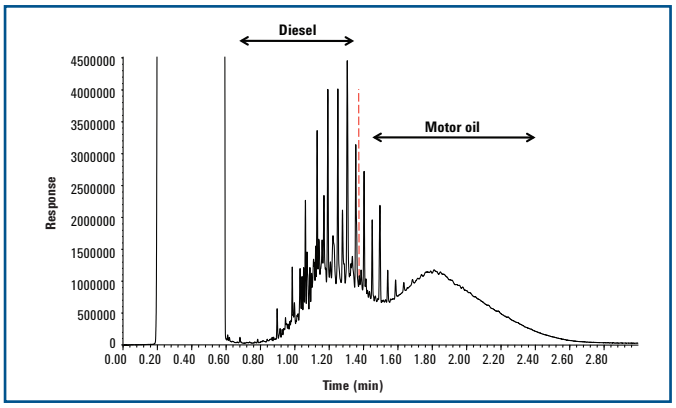


5989-6026EN: Significant Cycle Time Reduction Using the Agilent 7890/5975 GC/MSD for EPA Method 8270

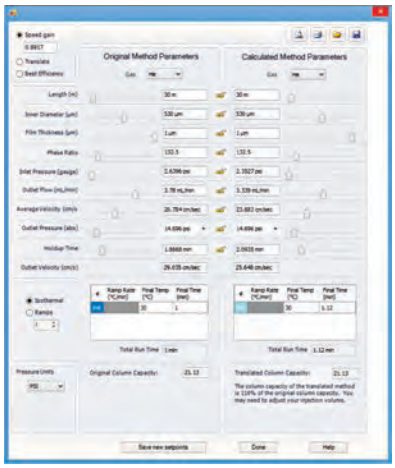
Analysis of TPH (Mineral Oil)

Fast oven temperature programming using a low-thermal-mass system reduces cycle time and increases sensitivity for GC-FID analysis of mineral oil in environmental samples.

This technique meets regulated method requirements for analyzing the C10-C40 hydrocarbon fraction in soil and water extracts using splitless injection. The total analytical cycle time was *less than five minutes.*



5990-9104EN: High Throughput Mineral Oil Analysis (Hydrocarbon Oil Index) by GC-FID using the Agilent Low Thermal Mass (LTM II) System



Method Calculator makes it easy to set up a method that shortens analysis time or facilitates the changing of carrier gas.

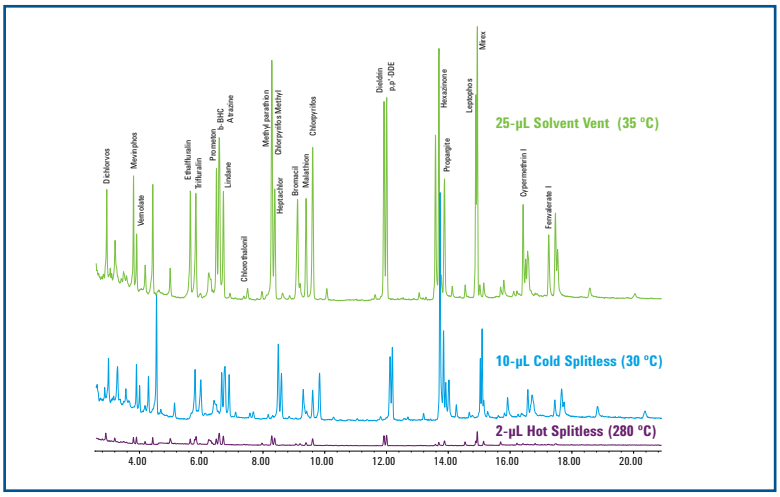
Food applications

Confidently execute your most specialized analyses

Lower your pesticide detection limits with the Agilent Multimode Inlet (MMI)

Agilent's MMI has the same form factor and uses the same consumables (such as liners, O-rings, and septa) as our split/splitless inlet, so you can replicate your existing hot splitless methods. Its temperature programmability also lets you perform both cold splitless and large-volume injection (LVI) methods for improved detection limits.

In addition, an integrated Solvent Elimination Calculator provides a complete set of initial conditions for easy LVI method development.



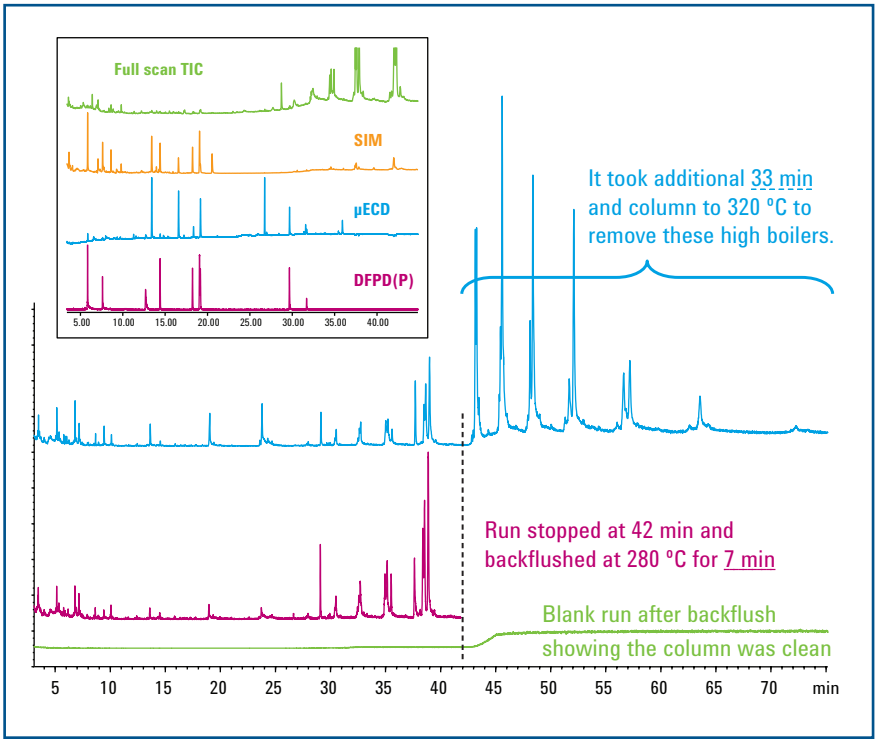
Total ion chromatogram comparing a 25-µL solvent vent injection with a 2-µL hot splitless injection for 40-ppb pesticides. Note the significant signal-to-noise improvement (lower detection limits).

5990-4169EN: Achieving Lower Detection Limits Easily with the Agilent Multimode Inlet (MMI)

Pesticides in milk extract: Flow splitting enables multiple detectors – increasing productivity

Agilent's flow splitting device proportionally splits column effluent to multiple detectors: MSD, DFPD and µECD. Full-scan TIC from the MSD provides quantitation and confirmation, while element-specific GC signals highlight trace-level compounds to be identified by the MSD.

The splitter also provides backflush capabilities to shorten cycle time and increase column life. Backflushing reduces ion source contamination by preventing column bleed and stopping heavy residues from being introduced into the MSD. It also eliminates carryover from any sample that accumulates at the column head, improving data integrity.



Four chromatograms collected simultaneously from a single injection of milk extract.

5989-6018EN: Improving Productivity and Extending Column Life with Backflush

To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Forensic/toxicology applications

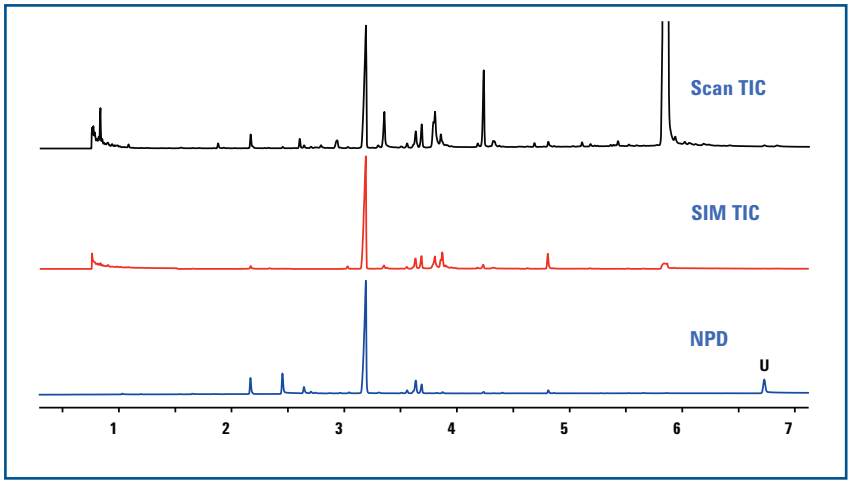
Screen and quantitate target compounds in complex matrices

Rapid drug screening: Obtain more information in less time

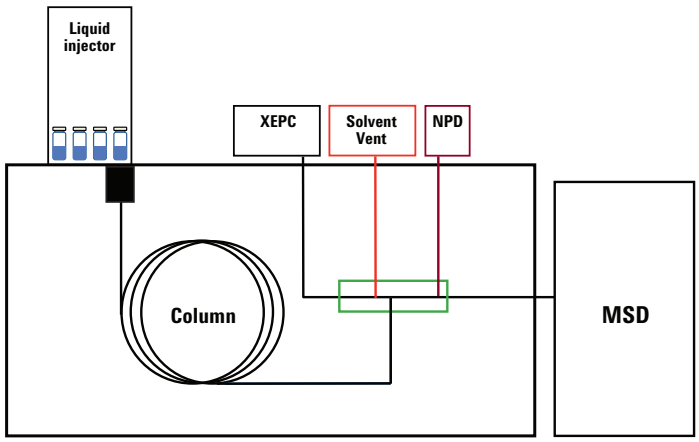
GC/NPD/MSD with simultaneous SIM/Scan offers advantages such as broad-range screening for unlimited targets, full-spectrum identity confirmation, and non-target identification through Deconvolution Reporting Software (DRS) library searches.

This system collects Scan, SIM, and NPD data simultaneously. Scan is used to screen for 725 tox compounds. SIM is used for select low-level targets. NPD is used for confirmation aid and highlighting suspicious non-targets.

An Agilent Capillary Flow device splits column eluent, allowing the simultaneous acquisition of NPD and MSD data – and eliminating the need for multiple runs on different GCs. CFT Backflush further reduces cycle time and stabilizes retention times.

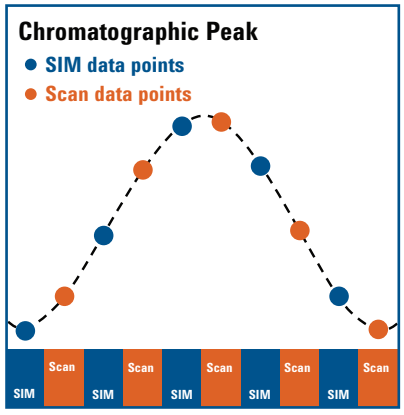


Toxicology screen on real blood extract.



The GC/NPD/MSD configuration allows:
(1) Splitting column effluent to NPD and MSD
(2) Solvent venting
(3) Backflushing
(4) No-vent column changing

(Note: The MSD shown here is for illustration only. The MSD is actually on the left side of the GC).



MSD SIM and Scan data points are alternately collected, with two separate data signals constructed at the end of the run. Each data signal can be processed like a SIM or Scan signal collected separately.

5989-8582EN: Improved Toxicology Screening Using a GC/MS/NPD System with a 725-Compound DRS Database

Inlets, detectors, and accessories expand the possibilities of system configuration

A wide inlet selection lets you optimize your system for *your* analysis

- Split/splitless (SSL) capillary
- Inert flow path split/splitless (ISSL) capillary
- Multimode inlet (MMI)
- Purged packed injection port (PPIP)
- Cool on-column (COC)
- Cool on-column with solvent vapor exit (COC-SVE)
- Programmable temperature vaporizing (PTV)
- Volatiles interface (VI)
- High-pressure gas sample injection
- Gas sampling valve (GSV)
- Liquid sampling valve (LSV)

The Agilent 7890B GC provides a versatile platform for all system configurations.

High-sensitivity detectors accommodate every sample type

- Mass selective detector (MSD)
- Triple Quadrupole MS
- Q-TOF MS
- Ion Trap MS
- ICP-MS
- Flame ionization (FID)
- Thermal conductivity (TCD)
- Micro-electron capture (Micro ECD)
- Flame photometric, single- or dual-wavelength (FPD)
- Nitrogen-phosphorus (NPD)
- Sulfur chemiluminescence (SCD)
- Nitrogen chemiluminescence (NCD)
- Atomic emission (AED)*
- Pulsed flame photometric (PFPD)*
- Photoionization (PID)*
- Electrolytic conductivity (ELCD)*
- Halogen Specific Detector (XSD)*
- Oxygenate Flame Ionization Detector (O-FID)*
- Pulsed Discharge Helium Ionization Detector (PDHID)*

** Available through Agilent Channel Partners. Contact Agilent for other custom configurations, and additional solutions available through Agilent Channel Partners*

GC and GC/MS Analyzers let you focus on system validation and data generation... not method development

Agilent GC and GC/MS Analyzers are factory configured and chemically tested to meet method requirements, and get you on the "Fast Track" to producing quality data and processing sample backlogs.

More than just instruments, Agilent Analyzers are complete workflow solutions that incorporate advanced technologies, such as Capillary Flow Technology and target compound databases that allow us to optimize your system for your unique application.

Each Analyzer arrives ready to perform with pre-set chromatography and checkout samples to verify separation capabilities. That means your team can work toward system validation as soon as installation is complete – and significantly reduce your method development costs. And as always, our support team is available, should any problems arise.

To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

Sample Preparation

Reliably extract and concentrate samples from complex matrices

Agilent Bond Elut QuEChERS Kits make sample preparation easier and more reliable

Pre-packaged Agilent QuEChERS Kits capture the time-saving benefits of QuEChERS sample preparation.

- **Extraction kits** with pre-weighed salts in anhydrous packets allow you to add salts *after* you add organic solvent to your sample – avoiding an exothermic reaction that can compromise analyte recovery
- **Dispersive kits** with sorbents and salts supplied in 2 mL or 15 mL centrifuge tubes accommodate the aliquot volumes specified by current AOAC and EN methodologies
- **Ceramic homogenizers** break up salt agglomerates, promoting consistent sample extraction and increasing product recovery during extraction and dispersion

Agilent Bond Elut SPE: A full line of sample preparation products to support your lab

Bond Elut SPE products deliver the quality and performance you expect from the industry's leading manufacturer of chromatography instruments, columns, and supplies.

- **A wide selection** of polymer, silica, and other sorbents in formats ranging from multiple cartridge sizes to 96-well plates
- **Tri-functional silica bonding** provides greater stability than monomeric bonding, while increasing solvent compatibility
- **Industry-leading quality control processes** ensure consistent particle size, so you get superior flow-through and performance
- **A variety of vacuum manifolds and accessories** help you meet all your SPE challenges

To learn more, visit **www.agilent.com/chem/sampleprep**

Agilent stands behind every instrument with unmatched service and support

Compliance

With over 100,000 qualification deliveries, and decades of quality testing experience, Agilent is your trusted source for the system qualification and proof of calibration you need for regulatory compliance.

Real-time support and reporting

Agilent Remote Advisor is a remote monitoring, diagnostic, and reporting feature now included in all Agilent Advantage service plans. It can help you preempt instrument problems to maximize your uptime and productivity.

Workflow Services

Capillary Flow Technology (CFT) Backflush and Backflush Assistant Software Wizard training are available through Agilent Workflow Services. Expert assistance in setting up your CFT Backflush method is just a phone call away.

Agilent Value Promise

We guarantee you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of the system toward an upgraded model.

Agilent Service Guarantee

If your Agilent instrument requires service while covered by an Agilent service agreement, we guarantee the repair, or we will replace your instrument for free.

To learn more about the Agilent 7890B GC, visit **www.agilent.com/chem/7890B**

The Agilent 7890B Series GC

Resolve your search for integration, reliability, and intelligence

- **Powerful software tools** for data acquisition, analysis, and reporting help you get the most out of your instrument
- **Integrated Parts Finder tool and database** makes it easy to find and order columns, supplies, and parts
- **Agilent Inert Flow Path solutions** ensure a reliably inert GC flow path for higher sensitivity, accuracy, and reproducibility – especially at trace levels
- **5th-generation electronic pneumatics control**, combined with improved specifications, raises the bar on GC performance
- **Direct GC↔MSD communication** minimizes downtime while conserving power and gas
- **Eco-friendly features**, such as sleep/wake modes, conserve electricity and other resources
- **Early maintenance feedback** keeps the system performing at its best
- **Fast oven cool-down**, new backflush capabilities, and advanced automation boost your productivity

360° Interactive View

Experience the most feature rich and advanced 7890B GC and 5977A Series GC/MSD at **www.agilent.com/chem/resolve**

For more information

Learn more
www.agilent.com/chem/7890B

U.S. and Canada
1-800-227-9770
agilent_inquiries@agilent.com

In other countries, please call your local Agilent Representative or Agilent Authorized Distributor – visit **www.agilent.com/chem/contactus**

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Agilent Technologies

Agilent 7010B and 7000D Triple Quadrupole GC/MS Systems

EXPAND YOUR LAB IN MULTIPLE DIMENSIONS

Agilent Technologies

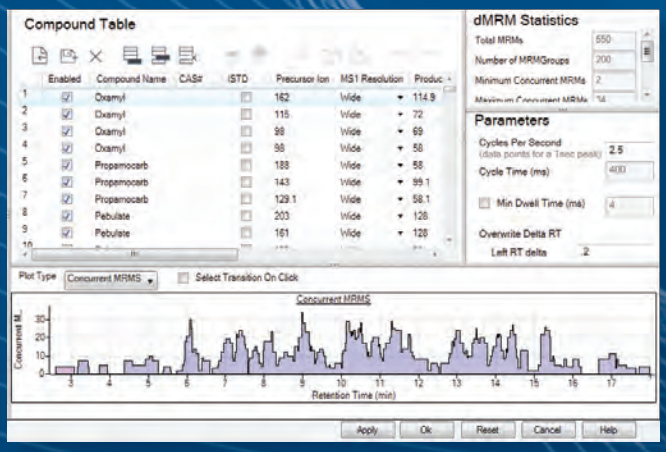
MORE POWER, LESS EFFORT. ON A PROVEN PLATFORM.

Tandem mass spectrometry is the undisputed best way to do targeted quantitative analysis. Now take your lab to higher levels of efficiency and productivity for more confidence in your results at a lower cost of ownership. Renowned as the best performing and most reliable triple quadrupole GC/MS systems available, the new Agilent 7000D and 7010B now offer dMRM for expanded capabilities and unprecedented ease of use.

Expand your CAPABILITY with easy, robust MS/MS

Dynamic multiple reaction monitoring (dMRM) provides a more intuitive way for you to specify the characteristics of the MS part of an overall GC/MS/MS method. Further, dMRM greatly improves the ease with which methods can be modified, enabling larger target lists in a single run for more efficient use of instrument time.

- Convert time-segment-based methods to dMRM methods for easier method maintenance and better performance.
- Use with the Agilent Pesticides and Environmental Pollutants Database (G9250AA) or create your own database
- Achieve faster maximum scan speeds in combined scan/MRM mode for simultaneous analysis of nontarget ions

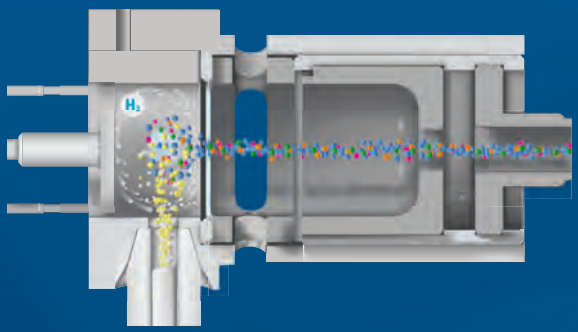


Choose the level of MS/MS sensitivity you need

For ultimate performance, Agilent offers the 7010B with its High Efficiency Source (HES), capable of measuring down to 0.5 fg or less for octafluoronaphthalene (OFN). Or, for more routine analysis, choose the 7000D with a sensitivity of 4.0 fg or less for OFN.

Automated, self-cleaning ion source

The Agilent JetClean self-cleaning ion source keeps your Agilent single or triple quadrupole GC/MS system free of matrix deposits that would otherwise build up over time and degrade instrument performance. Using a carefully controlled hydrogen flow, Agilent JetClean technology significantly reduces, or even eliminates, the need for cleaning the ion source, resulting in greater efficiency and lower cost per analysis.

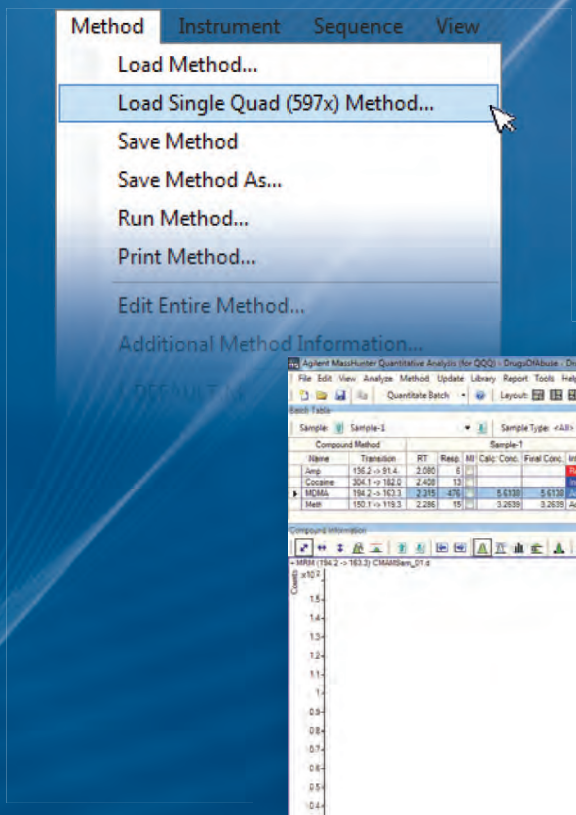


Expand your CAPACITY by running SIM and scan methods on your triple quad

If you already own a single quad GC/MS, it's probably an Agilent 5973, 5975, or 5977 system, the most popular GC/MS in history. Now you can distribute your total laboratory workload to whichever instrument is available, even your 7000 or 7010 system, if it's not already busy doing MS/MS!

Load your method and go

There's no need for you to run a method translation program or do manual tweaking. Just load your single quad method and start your analysis. Only Agilent offers this level of simplicity and harmony.



Take advantage of the world's best GC for GC/MS

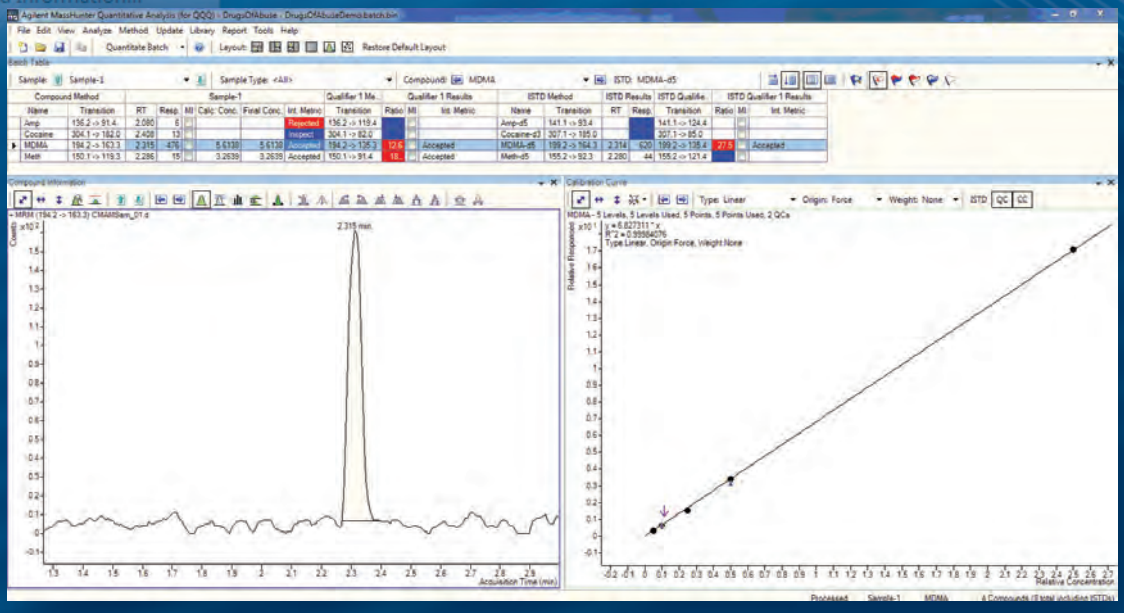
In addition to its versatile selection of inlets, totally inert flow path, and Ultra Inert columns, its automated retention time locking (RTL) capability lets you get the most out of dMRM.

Simplify your entire measurement workflow with integrated software tools

From instrument settings to data analysis and reporting, Agilent MassHunter software puts you in control – and makes your GC/MS analysis routine. Built-in GC calculators and translators reduce time needed for method development while the Parts Finder tool quickly identifies parts and part numbers for easy re-ordering.

Get the most from your GC/MS investment

Agilent CrossLab offers comprehensive instrument and enterprise services as well as a full curriculum of Agilent University learning solutions to maximize uptime, simplify administration and protect the investments in your laboratory.



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5991-7198EN

Agilent Technologies

The Agilent 6470 Triple Quadrupole LC/MS System

ROCK SOLID PERFORMANCE FOR CONFIDENT QUANTITATION

The Measure of Confidence

Agilent Technologies

INSTRUMENT RELIABILITY AND PERFORMANCE: THE KEY TO A GOOD DAY IN THE LAB

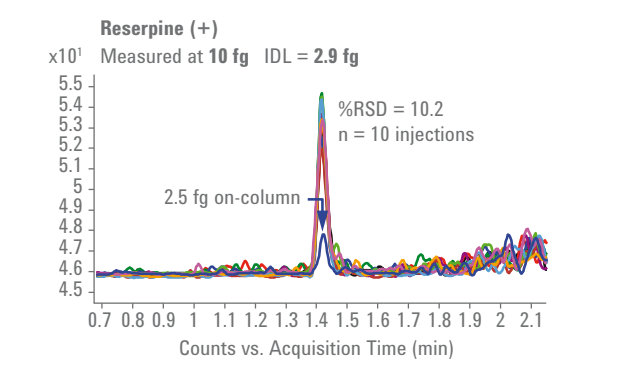
Whether you work in food testing or environmental analysis, drug development or clinical research, you need to meet the requirements for stringent quantification in the face of challenges such as time-consuming sample preparation, limited amounts of sample, complex matrices, and the need for efficient throughput.

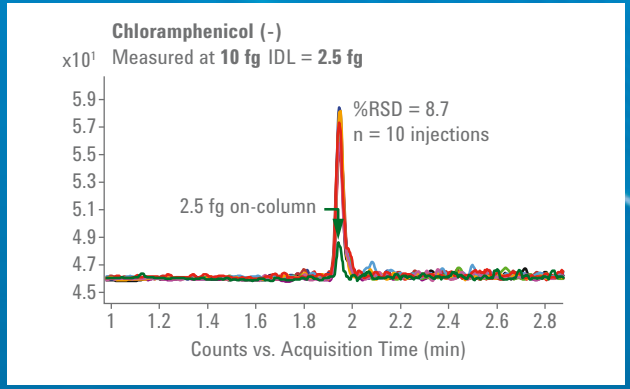
The Agilent 6470 Triple Quadrupole LC/MS system provides improved sensitivity, precision, and scan speed, allowing you to streamline analytical workflows. Dilute or use less sample and still have complete confidence in the accuracy of your results. The system's proven robustness and reliability mean less maintenance and more uninterrupted laboratory productivity.

ANALYTICAL CHALLENGE	AGILENT 6470 SYSTEM
More to do, fewer people to do it Complex matrices challenge analysis	Design innovations increase performance, for high sensitivity and simpler workflows while allowing for less maintenance and increased instrument uptime
Increased demands on instruments	Reliable and consistent performance enables the analysis of large sample batches over longer periods of time
Ensure instrumentation can meet future analytical needs	The broadest range of ion sources; the flexibility to upgrade to advanced iFunnel technology

The accuracy of the Instrument Detection Limit

Today's high-performance LC/MS detection demands a more accurate, rigorous, and statistically based performance standard than classic signal-to-noise ratios. The Instrument Detection Limit (IDL) follows guidelines established by the International Union of Pure and Applied Chemistry, the U.S. Environmental Protection Agency, and other organizations. IDL is measured at realistically low analytical levels and is a practical indicator of sensitivity for your quantitative assays. For more information about IDL, see Agilent publication 5991-4089EN.





WHAT IS ROBUST LC/MS?

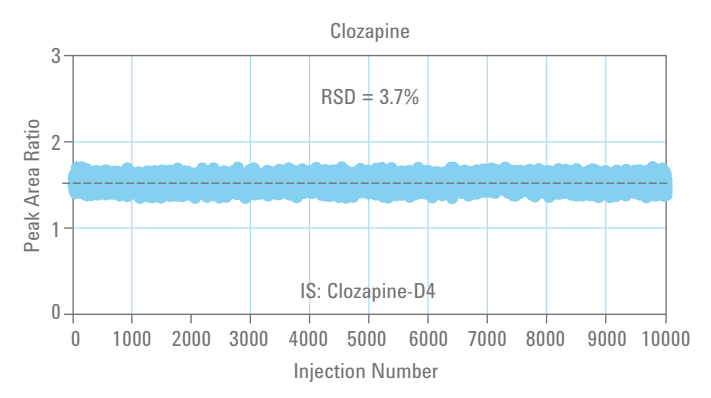
At Agilent, we put instrument reliability and robustness at the forefront of our R&D efforts.

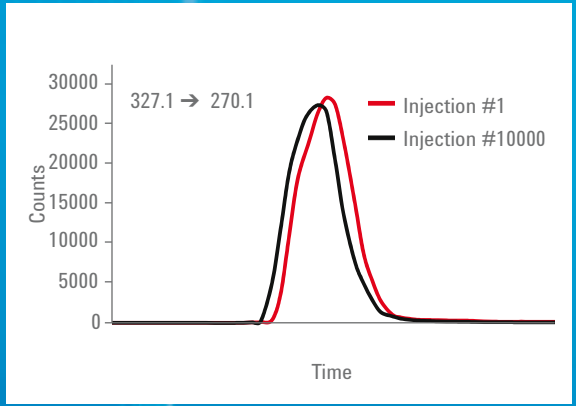
If you've ever tried an Agilent LC or LC/MS instrument, you've experienced the results of that focus. But even if you know what to expect, the 6470 may surprise you.

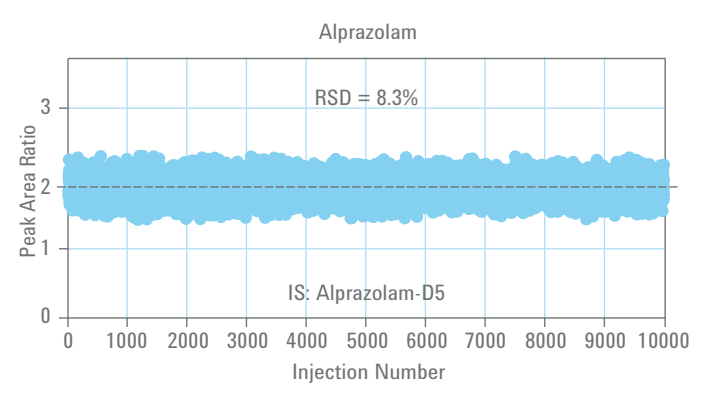
" Agilent's instruments are rocks in terms of reliability—very robust."

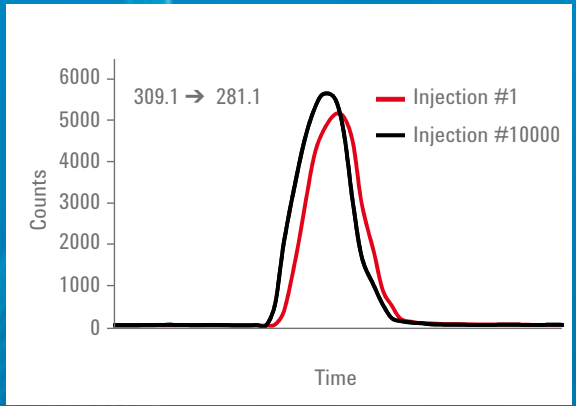
- GREG MCINTIRE, PH.D,
DIRECTOR OF R&D, AMERITOX

The 6470 with RapidFire
Robustness test data with 10,000 injections









RELIABLE, SECURE, AND TRUSTED SEPARATION

Agilent 1290 Infinity II and Agilent 1260 Infinity LC System

All around the world, more than a million Agilent LCs are hard at work, delivering unmatched performance, productivity, and reliability.

"It just never fails."

That's how users perceive our top-selling LCs. Every system is packed with the highest quality parts for the highest uptime and longest maintenance intervals. What's more, our built-in diagnostics and maintenance tools ensure reliable and secure operation.

The 1260 Infinity LC systems give you UHPLC capabilities at the price of an HPLC system. What's more, you get outstanding sensitivity and 100 percent compatibility with all your HPLC methods, ensuring risk-free replacement of existing instruments.

The 1290 Infinity II LC sets new standards in analytical and laboratory efficiency. Whatever your application, from research to quality control, the 1290 Infinity II delivers the performance, flexibility, and reliability you need.

ENHANCED PERFORMANCE IN A SMALL PACKAGE

Agilent 6470 Triple Quadrupole LC/MS system

The 6470's innovative design incorporates a curved collision cell, giving the system a small benchtop footprint. The 6470 is, in fact, 30% smaller than the 6460. But the really exciting part is that the new 6470 delivers unmatched performance in its class.

The design innovations incorporated in the 6470 work in concert to deliver sensitive, precise, robust, and reliable quantitation over a wide linear dynamic range and at enhanced acquisition speed.

Built-in **Jet Stream** technology delivers 5x the sensitivity of traditional ESI.

An ion detector with a **high-energy conversion dynode and low noise characteristics** enables more efficient positive and negative ion dectection across a wide *m/z* range.

A curved and tapered **hexapole collision cell** enables effective collection and transmission of ions.

Enhanced Q1 ion optics with optimized prefilter geometry increases ion transmission while minimizing contamination.

Upgradeability! Add our exclusive **iFunnel technology**, effectively transforming your 6470 into a top-of-the-line 6495 with unprecedented sensitivity—without having to buy a whole new system.

A FASTER ROUTE TO INSIGHT

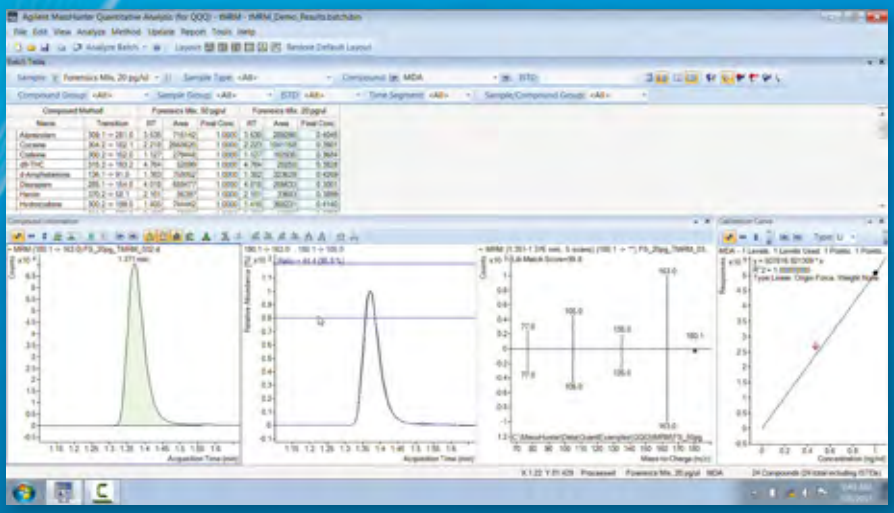
MassHunter software

Agilent MassHunter Workstation software simplifies sample management, MS method optimization, data processing, and data reporting for quantitative analyses. Powerful tools support pharmaceutical and other regulated lab environments:

- Dynamic MRM (dMRM) ensures the best possible quantitative results for multianalyte assays compatible with fast UHPLC separation, by specifying cycle times and allowing the software to determine the maximum dwell time for each MRM transition.
- Triggered MRM (tMRM) databases and applications kits simplify your assay development and minimize the need for tedious manual adjustments. With tMRM kits, you get chemical standards, pretested methods, tMRM database and library, and all the information you need to setup screening methods.

"The extra information that triggered MRM provides is a huge benefit when it comes to compound identification because it increases our confidence. We cannot make avoidable mistakes."

- KATE MASTOVSKA, PH.D,
ASSOCIATE SCIENTIFIC DIRECTOR,
NUTRITIONAL CHEMISTRY
AND FOOD SAFETY



Here MassHunter acquisition software triggers the collection of a third and fourth transition because the primary transition signal was greater than the threshold set in the tMRM protocol.

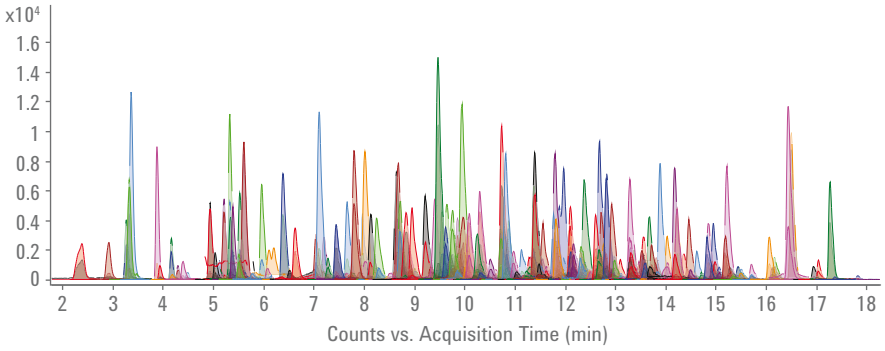
STREAMLINE YOUR WORKFLOW FOR FOOD-SAFETY TESTING

Complex multi-residue pesticide analysis

The sensitivity of the Agilent 6470 enables a higher degree of sample dilution while still achieving the maximum residue levels (MRLs) stipulated by the European Union. High speed acquisition is also possible without compromising sensitivity, enabling one multi-residue analysis to handle hundreds of super-sharp peaks delivered through 1290 UHPLC.

The 6470 also supports triggered MRM (tMRM) spectral acquisition which can provide the extra confidence many labs now seek when assessing detections from a multi-residue screen.

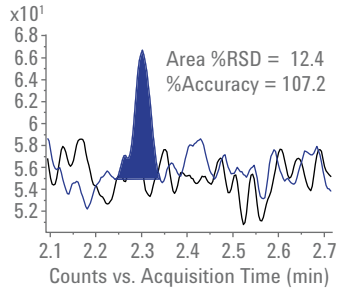
The 6470 delivers this spectral acquisition at a much higher level of speed and sensitivity than alternative product ion scanning approaches, allowing pesticides (and other contaminants) to be confirmed at lower concentrations.



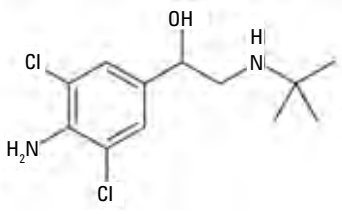
MRM chromatograms of 20-fold dilution of more than 250 pesticides spiked into black tea at the MRL of 10 µg/kg

Pesticides	LLOQ (pg/mL)	IDL (pg/mL)
Dimethoate	10	2.76
Oxaml	2	0.94
Carbendazim	10	3.70
Methomyl	10	4.11
Carbaryl	20	12.02
Methamidophos	5	2.71
Pirimicarb	2	0.77

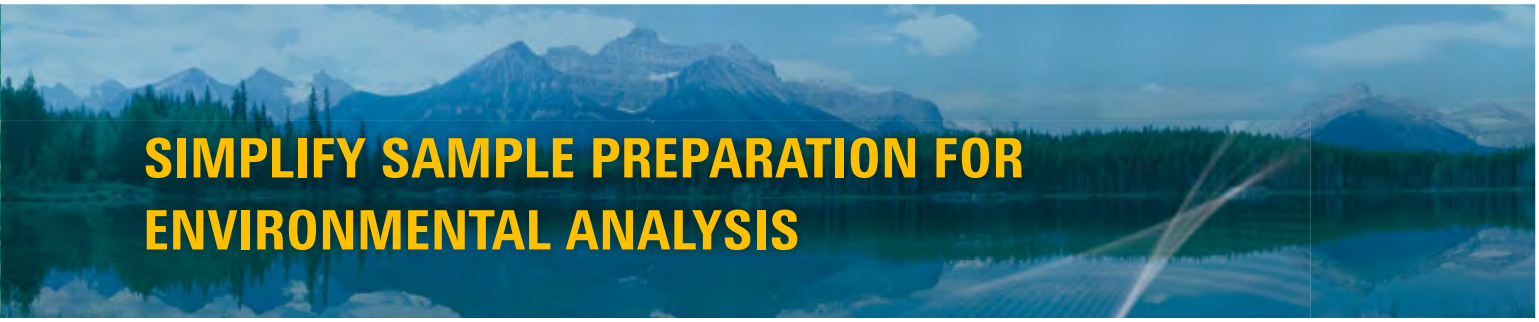
Performance Spotlight: Improved Sensitivity and Precision Yield Attogram Level Lower Limits of Detection and Quantitation



LLOQ of **Clenbuterol**
500 attogram on-column
Blank



500 attograms of clenbuterol is detected clearly

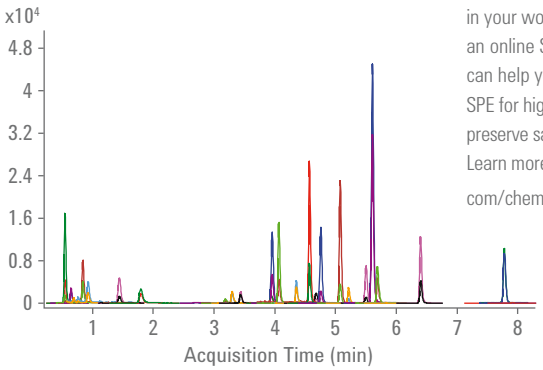


SIMPLIFY SAMPLE PREPARATION FOR ENVIRONMENTAL ANALYSIS

Direct analysis of pharmaceuticals in drinking water

Time-consuming sample enrichment by solid phase extraction (SPE) is often required before LC/MS analysis. The Agilent 6470 streamlines analysis, enabling you to accurately quantify pharmaceuticals and personal care products (PPCPs) at sub-ng/L levels with excellent assay precision, reproducibility, and robustness, with direct injection.

Reproducible Performance at High Speed



Overlaid MRM chromatograms of PPCPs spiked in water at 10 ng/L.

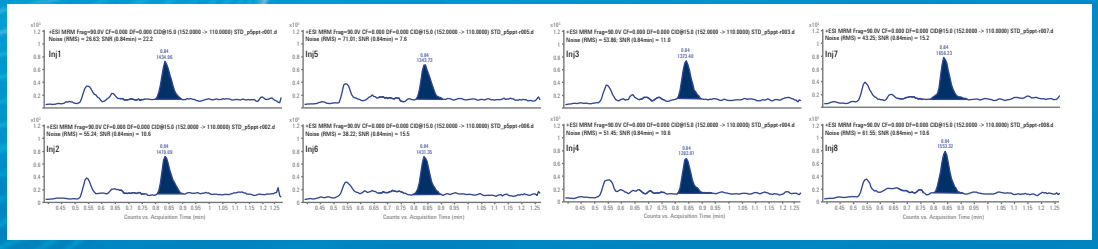
Automated SPE

If you prefer to include SPE in your workflow, Agilent has an online SPE solution that can help you automate your SPE for higher throughput, and preserve sample for analysis. Learn more at www.agilent.com/chem/onlineSPE

PPCPs	LLQQ (ng/L)	IDL (ng/L)	PPCPs	LLQQ (ng/L)	IDL (ng/L)
Acetaminophen	0.5	0.120	Erythromicin	1.0	0.140
Atenolol	1.0	0.450	Fluridone	0.1	0.012
Atrazine	0.5	0.280	Gabapentin	5.0	1.050
Bupropion	0.2	0.044	Lamotrigine	2.0	0.940
Caffeine	1.0	0.250	Metoprolol	1.0	0.290
Carbamazepine	0.5	0.082	Propranolol	1.0	0.091
Clarithromycin	5.0	1.140	Sucralose	20.0	3.560
Cotinine	0.5	0.068	Sulfamethoxazole	1.0	0.410
DEET	0.2	0.022	Trimethoprim	1.0	0.390
Dextrorphan	1.0	0.150	Venlafaxine	0.5	0.076
Diazinon	0.5	0.071	2,4-D	20.0	8.690
Diltiazem	0.2	0.030	Gemfibrozil	20.0	11.500
Diphenhydramine	0.2	0.052	Triclopyr	50.0	16.300
Diuron	1.0	0.280	Triclosan	20.0	5.320

Performance Spotlight: Excellent precision and reproducibility at the lowest levels

Acetaminophen amount measured	Replicates	%RSD	t(99%)	Acetaminophen
0.5 pg/mL (LLQQ)	8	8.3	2.998	0.12 ng/L
IDL = t x (%RSD/100) x Amount = 2.998 x (8.3/100) x 0.5 pg/mL = 0.12 pg/mL				

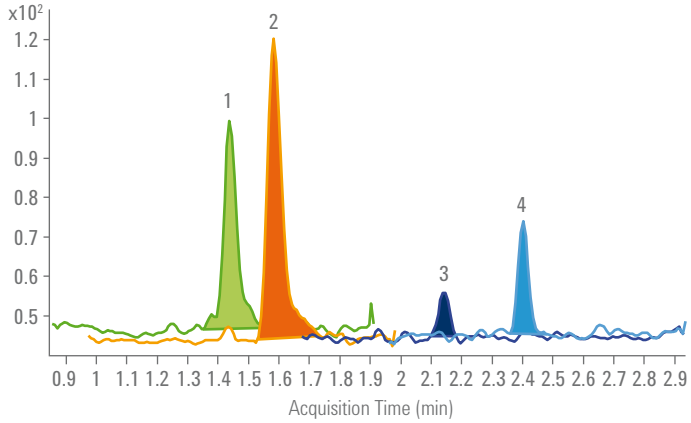


Sample LLQQ level chromatograms (8 replicates) demonstrate the excellent peak area %RSD and reproducibility.

QUANTIFY DRUGS AND METABOLITES MORE QUICKLY AND RELIABLY

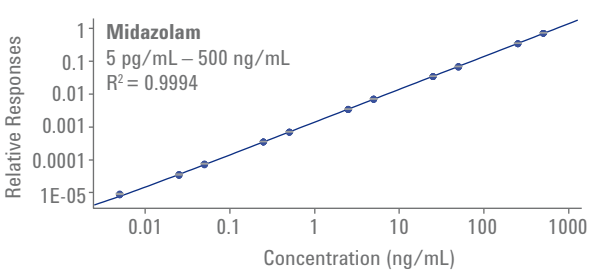
Increased sensitivity and robustness make it happen

The Agilent 6470 enables you to reliably detect drugs and metabolites at the picoMolar (pM) level in human plasma while achieving wide linear dynamic range. With the use of a low-carryover, high-capacity Agilent 1290 Infinity II LC system, the robust performance of the 6470 ensures that you can analyze thousands of biological samples with unattended operation.

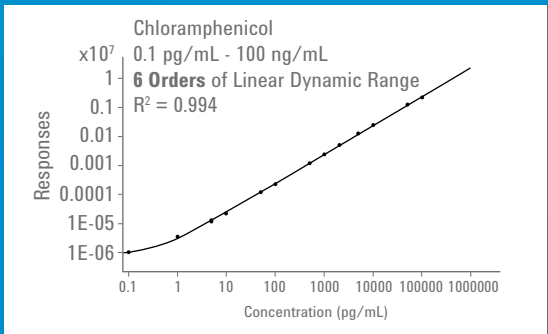


Overlaid MRM chromatograms of benzodiazepines and metabolites spiked in human plasma at 5 ppt. At right, results over five orders of linear dynamic range.

ID	Analyte	LLQQ (pg/mL)	%RSD (n = 7)	IDL (pg/mL)
1	alpha-Hydroxymidazolam	5	6.90	1.08
2	Midazolam	5	5.32	0.84
3	alpha-Hydroxyalprazolam	5	9.87	1.55
4	Alprazolam	5	7.98	1.18



Performance Spotlight: More Information from Every Experiment



This calibration curve demonstrates the rigorousness of the data collected over six orders of linear dynamic range.

Levels	% RSD (n = 5)	% Accuracy
0.1 pg/mL	12.10	98.7
1 pg/mL	8.90	114.5
5 pg/mL	7.50	94.4
10 pg/mL	4.50	92.4
50 pg/mL	1.40	98.9
100 pg/mL	1.00	93.3
0.5 pg/mL	0.91	100.8
1 ng/mL	0.46	96.5
2 ng/mL	0.23	105.5
5 ng/mL	0.95	107.9
10 ng/mL	0.39	103.9
50 ng/mL	0.89	102.4
100 ng/mL	0.74	90.8

THE ION SOURCE TECHNOLOGY LEADER

Agilent instruments offer the widest selection of alternate sources—all compatible with your 6470 system—to meet the needs of your varying analyses. Most Agilent sources have a novel low maintenance orthogonal spray geometry, which reduces contamination in the inlet and contributes to instrument robustness.

Jet Stream
Standard on all 6470 instruments, with 5x the sensitivity of ESI.

Electrospray (ESI)
Softest ionization available, suitable for wide range of polarities and sizes of analytes.

Multimode
An APCI and ESI source in one! Choose between one mode or simultaneous ionization by both techniques.

Nano-ESI
Use your own nanoflow columns with a flexible source that has three spray positions.

APCI
Ideal for ionizing lower polarity compounds, less sensitive to solution chemistry than ESI, and allows for higher LC flow rates.

APPI
Able to ionize nonpolar compounds with little dependency on solvent chemistry.

Complete your analysis with Agilent Poroshell 120 columns

Poroshell 120 columns give you fast UHPLC separations, and are more forgiving for complex samples, enabling long column lifetimes. Available in scalable particle sizes and more than 12 chemistries including Poroshell HPH for high pH separations. More information at www.agilent.com/chem/discoverporoshell

The Agilent value promise: 10 years of guaranteed performance

In addition to our continually evolving products, Agilent offers the industry's only 10-year value guarantee. Agilent guarantees you at least 10 years of instrument use from your date of purchase, or we will credit you with the residual value of that system toward an upgraded model.

It's our way of assuring you of a safe purchase now, and protecting your investment into the future.

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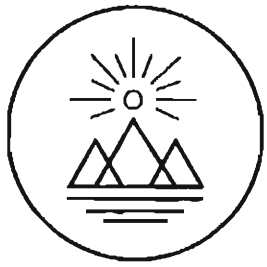
Attachment G – Safety and Security Plan



GROWING COMUNITY

A HEALTH & WELLNESS CENTER

SAFETY AND SECURITY PLAN

Safety and Security Plan

Prepared in coordination with
W. A. Monroe & Associates Security Consulting and Investigations

825 9th Street, Professional Plaza Suite H.
Marysville, CA 9590
Www.monroeassociates.us
Marysville: (530) 763-4953
Fax: (530) 763-5684

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Purpose

This Safety and Security Plan has been created to meet or exceed the City of Nevada City's Municipal Code, California state law, and any applicable regulations, and it is prepared with the specific purpose of promoting and protecting with the health, welfare and safety of the City of Nevada City. The policies, procedures, and systems contained herein are designed not only to provide physical protection, but to include training, security, and written procedures to ensure compliance, observe, monitor, detect and report any actions and situations that threaten the operation or community's safety.

This Plan was created in accordance California's Compassionate Use Act of 1996, as modified by the Medical and Adult-Use Cannabis Regulation and Safety Act ("MAUCRSA"), as well as the Attorney General Guidelines for the Security and Non-Diversion of Marijuana Grown for Medical Use, the Nevada City Municipal Code. Additionally, the Bureau of Cannabis Control's proposed medical regulations are considered persuasive authority but are not yet mandatory at the time of drafting the instant Safety and Security Plan.

This document contains a comprehensive overview of Written and Physical Mechanisms regarding specified situations, and incorporates any other relevant plans and procedure in the **Management and Operations Manual** and/or **Employee Handbook** herein by reference. Where the Safety and Security Plan conflicts with those documents, the Safety and Security Plan supersedes all other documents unless and until these written procedures are revised accordingly.

Our Board, Executive Director, and all employees shall be familiar with the information and procedures associated with this Plan. We will also seek input from our Advisory Council and Neighborhood Committee on these and related procedures.

Overview of Safety and Security Plan

Our policies, procedures and systems are designed not only to provide physical protection, but to include training to observe, monitor, detect and report any actions and situations that threaten the operation. This Security Plan is written utilizing benchmarks and establishing new standards above and beyond what is currently required by the applicable acts, laws and ordinances. Our plans meet and exceed all requirements put forth as related to physical security, loss prevention, safety, and emergency management ensuring safe and secure operations for the dispensary.

Local Security Firm Resume

W.A. Monroe & Associates Security Consulting and Investigations is a local security, consulting and investigations firm based in Marysville, California, who provided compliance, oversight, and inspection, functions, providing Growing Community, Inc. with a comprehensive Safety and a Security Plan to ensure all staff and patients are complying with retail dispensary policies. The firm is a California Licensed Security Consulting and Investigations Agency **CA P.I. No. 27594**, and was tasked with ensuring Growing Community's operations, as detailed in their Application to the City of Nevada City, are in compliance with all established policies and procedures, laws and ordinances, and any other instructions provided by the State of California, and the City of Nevada City. As the safety and security of our community is constantly evolving, this document should be updated in accordance with any later issued laws or regulations.

The firm is insured and has been in good standing since 2010. It has significant experience in providing the public, private and corporate communities with a broad range of security and investigations consultation services relating to cannabis dispensaries, delivery services, and related business which are designed to protect our clients from losses, and preserve the health and integrity of the local community.

Collectively, W.A. Monroe & Associates Security Consulting and Investigations staff has over 50 years of supervisory and executive command level law enforcement experience.

Applicable Law

The following is a non-exhaustive list of a local and state laws applicable to the instant Safety and Security Plan: City of Nevada City Municipal Code Sections 9.22, 17.142, inter alia, the Compassionate Use Act, the Medical and Adult-Use Regulation and Safety Act ["MAUCRSA"], those portions of the Medical Cannabis Regulation and Safety Act which were not superseded by MAUCRSA (see, Assembly Bills 243 and 266, and Senate Bill 643, as signed Oct. 11,

2015), and those relevant portions of the Medical Marijuana Program (MMP) (Senate Bill 420).

Growing Community further abides by the relevant portions the Attorney General Guidelines for the Security and Non-Diversion of Marijuana Grown for Medical Use, issued in 2008, and looks forward to the issuance of the Bureau of Cannabis Control's impending emergency regulations regarding cannabis retail dispensaries.

Part I. Detailed Safety Plan

A. Fire Prevention/Suppression

Growing Community sought out local resident Barry Dorland, recently retired from Patterson Fire Equipment here in Nevada City, who performed an initial prevention and suppression analysis at 440 Lower Grass Valley, Nevada City, and recommended a finalized analysis be completed that would address the following:

1. Specifics of changes to the upper and lower portions of the property were required to ensure emergency responders have appropriate avenues of ingress and egress to property.

    a. Lower Portion of Property: The turnaround/roundabout located on the lower portion of the property will be maintained as a fire lane and consequently, and parking will be disallowed in this area. The driveway will be widened and limited amounts of vegetation will be cleared to ensure access in the event emergency responders need to quickly enter or leave the property.

    b. [redacted]

2. [redacted]

3.

4. [redacted]
5.
6.
7.

8. Fire extinguishers with a minimum rating of 2A10BC will be required. The location of fire extinguishers will depend upon the final layout, but generally, they will be located near points of ingress and egress, and will not intrude into exit pathways. A minimum of five fire extinguishers will be located on site, with at least one downstairs. Signage indicating the presence of an extinguisher will be posted for all units as well.

9. Even if there is no public access, one-hour rated sheetrock/tape will be installed downstairs to protect the upstairs portion of the property. In addition, a smoke/carbon monoxide detector will be installed in the downstairs portion of the property, equipped with an upstairs notification. The downstairs portion of the building will be equipped with a fire extinguisher with a minimum 4A60BC rating.

10. All existing smoke detectors will be replaced by smoke/carbon monoxide detectors with voice notifications. All such detectors will be hardwired with a battery backup.

11. [redacted]

12. An interior sprinkler system is being considered, and may be installed prior to, or shortly after, operations commence.

13. Any and all area separations will consist of non-combustible materials.

14. All staff will undergo fire suppression and safety training. This training will include hazardous materials mitigation and emergency preparation. Material Safety Data Sheets ("MSDS"). A Department of Transportation hazmat guidebook will be kept on site.

15. All staff will be trained on proper evacuation, including exiting the building safely to predetermined locations and fire extinguisher usage. In addition, staff will be trained with how to handle active-shooter situations, including pre-determined staff functions and response to emergency situations.

16. Written and physical mechanisms to deal with each specific situation shall be in place and attached hereto, or incorporated from other related documents by reference.

B. Heating, ventilation, and air conditioning (HVAC)

Growing Community will source a state of the art exhaust air filtration system with an activated carbon scrubber that will prevent any odors from escaping the building. We will also install an air system that creates negative air pressure between the interior and exterior of the building. Prior to installation, Growing Community will consult with the City Manager to verify that the system exceeds the City's requirements.

This will be in accordance with the odor control policy in the **Management and General Operations Manual** and discussed throughout numerous documents submitted in this Application.

The following is an example of the numerous written mechanisms currently in place to deal with HVAC maintenance and odor control:

[redacted]

The security personell shall be employed to monitor site activity, control loitering and site access, and to serve as a visual deterrent to unlawful activities.

Roles and Responsibilities

The Executive Director, Security Representative/Liaison, and designated security manager on site, will additionally monitor all areas, as well as CCTV systems, in an effort to support our security personnel.

Training staff on emergency procedures

The ED, in coordination with Security Manager, will create educational materials and programs for staff on Growing Community's emergency procedures. These will include the use of alarms and panic buttons, evacuation of staff and patients and other procedures in case of an emergency.

Our education materials and staff programs will further include training on interacting with first responders and emergency law enforcement support.

The ED will have responsibility for ensuring the training of Security staff on security procedures, including coordination between dispensary and security staff in case of an emergency.

The ED, in coordination with Security, are responsible for training Dispensary staff on emergency procedures, including the location and use of alarms and panic buttons and evacuation of staff and patients and other procedures in case of an emergency. Staff will be trained upon hiring, and procedures will be reviewed at regular intervals, and as needed when procedures change.

Traffic and Parking

Consideration has been given to reducing the number of public entrances to one with an additional emergency vehicle entryway off Nevada City Highway.

All vehicles will be parked in the secured area located in the front of the building. The area will be secured by Security officers and security devices that will be used at the vehicle entrance in a manner to be determined in conjunction with our neighbors.

Site Security/Security Manager

The ED and Designative Security Representative/Liaison will be responsible for identifying facility-specific positions, roles and responsibilities for security-related tasks. The ED will be responsible for meeting or delegating via written procedures all contacts for all first-

access is limited to the dispensary operator, the permit holder, and/or his/her designated representative(s).

A display monitor with a minimum screen size of twelve inches shall be connected to the video surveillance system at all times. If a "quad" video display splitter is utilized, the display monitor shall have a minimum screen size of fifteen inches.

The operator of the dispensary or his/her designated representative shall keep a video surveillance maintenance log documenting all inspections and repairs to the system. Any technical problems or inoperable equipment shall be repaired as soon as possible, not to exceed fifteen days from discovery of the problem. The video surveillance system and maintenance log are subject to periodic inspection by the police department, in order to ensure compliance with this section.

Primary Emergency Responses

911 Emergency Response

Nevada City Police Department
317 Broad Street
Nevada City, CA 95959
Phone: 530-265-4700
Dispatch: 530-265-7880
Emergency: 911

Nevada City Fire Department
201 Providence Mine Road
Nevada City, CA 95959
Phone: 530-265-2351

Nevada County Emergency Services
10014 N Bloomfield Rd
Nevada City, CA 95959
Phone: 530-265-1515

Sierra Nevada Memorial Hospital
155 Glasson Way
Grass Valley, CA 95945
Phone: 855-824-0272

Western Sierra Medical Clinic
Urgent Care
844 Old Tunnel Road
Grass Valley, CA 95945
Phone: 530-274-9762

YubaDocs Urgent Care
2090 Nevada City Highway
Grass Valley, CA 95945
Phone: 530-274-5020

Attachment H – ISO/IEC 17025:2017 Accreditation

Attachment I – Standard Operating Procedures

Attachment J – Financial Pro Forma – 3 Year Projections

Financial Pro Forma

Cannabis Testing Laboratory

Nevada City, CA

Prepared For:

THE HIGHER COMMITMENT
ANALYTICAL LAB

Date: January 10, 2018

begreenlegal

Conclusion

Although the cannabis industry has been volatile and unsafe for investors from other industries since it was first legalized in 1996, recent changes in state law have provided the regulatory framework needed to secure businesses and provide a significant level of confidence to investors. Of the available types of businesses to choose from for investment, testing laboratories are and will remain at the top of the list, given the huge potential for demand from not only growth in the adult use sector, but also in the existing medical cannabis market.

For a more detailed assessment of our analysis, the reader is encouraged to review the accompanying Excel work book.