SRI Gas Chromatographs for Cannabis Testing

September 2016

SRI Offers three GC choices to measure Cannabis.

Model 420 GC **$4995.00**

The lowest cost GC available. Simple operation. Quick analysis. Perfect for growers and dispensaries to measure the CBD and THC concentration in cannabis flower or concentrates. Not for edibles, residual solvent or terpene analysis. Includes built-in hydrogen generator.

Model 310C-MM **$9995.00**

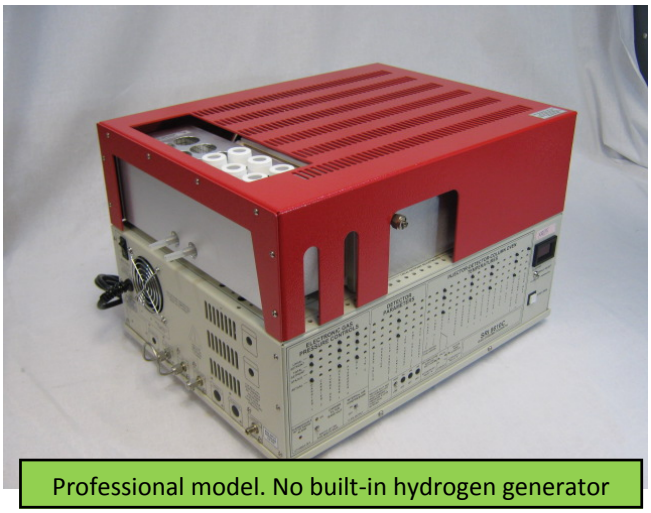
Temperature programmable column oven and easily interchangeable columns allow this GC to measure cannabinoids, residual solvents and terpenes with optional columns. Includes built-in hydrogen generator.

Model 8610C-MM **$12170.00**

SRI's professional model GC for cannabinoids, residual solvents and terpenes includes a 12 vial incubator for easier extraction of concentrates and edibles.. Does not include built-in hydrogen generator. Normally a H2 gas cylinder is used for carrier gas. Can be extensively modified with optional extra analysis channels, additional detectors and injectors.

Just needs distilled water and electric power

Temperature programmable column oven



Professional model. No built-in hydrogen generator

SRI Model 420 Low Cost ($4995.00)

Gas Chromatograph for Cannabis Potency Testing

Sept 2016

The SRI Model 420 Gas Chromatograph (GC) is an ultra low cost and easy to operate GC which measures CBD and THC in cannabis and concentrate samples with the same accuracy as vastly more expensive and complicated laboratory instruments The Model 420 is equipped with a built-in hydrogen generator so only distilled water and electricity are required for operation.

Why send samples to a lab when you can measure CBD and THC yourself in minutes at a cost of less than 25 cents per analysis.

Everything you need to begin is included in the kit except for:

A Windows computer with USB connection (laptop OK)

Distilled water from the grocery store (about $1)

Denatured alcohol from the hardware store (about $15)

You get:

An electronic balance to weigh the sample

Six extraction bottles

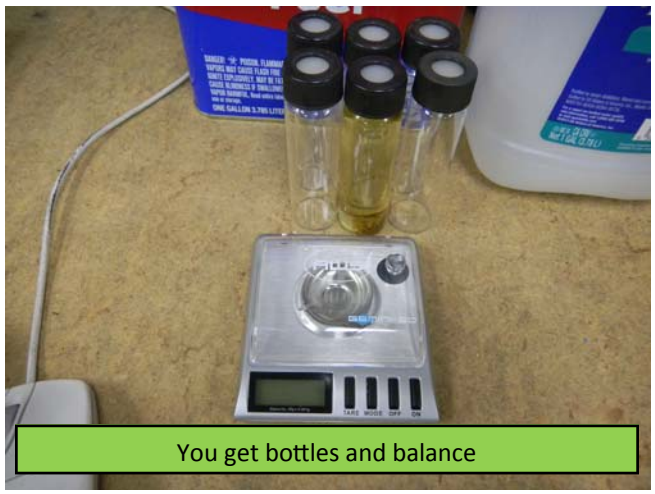
Calibration standard-enough for 400 analyses

Two injection syringes

To Order:

8610-0420 Model 420 GC kit for cannabis potency testing $4995.00

Just needs distilled water and electric power



You get bottles and balance

You get enough calibration standard for 400 analyses

SRI Model 8610C

Gas Chromatograph for Cannabis Potency Testing

SRI also manufactures more capable gas chromatographs for testing cannabis.

http://www.srigc.com/home/product_detail/medical-cannabis-cannabinoid-gc

These GCs can distinguish between CBD and CBC, and between THC and CBG which the simpler Model 420 can not do. The more capable GCs allow for more sophisticated analyses demanded by professional labs.

The SRI 8610C is the perfect size GC (gas chromatograph) for measuring CBD, CBDA, d8THC, d9THC, THCA, CBC, CBG and CBN levels in medical cannabis.

It can also be used to test for synthetic cannabinoids like SPICE, butane residuals, terpenes, aromas and edibles.

The basic cannabis testing GC is $12,170 (Sept 2016 prices) with a single FID detector and column. A simple 5 minute column change converts from cannabinoid analysis to residual solvents or terpene analysis.

With 2 or 3 FID detectors and columns, cannabinoids, residual solvents and terpene profiles can all be performed simultaneously on one GC with no hardware changes, completely avoiding downtime from column changeovers.The included built-in 50°C incubator speeds up the extraction process and is especially helpful in getting concentrates, medibles and/or butters to dissolve.

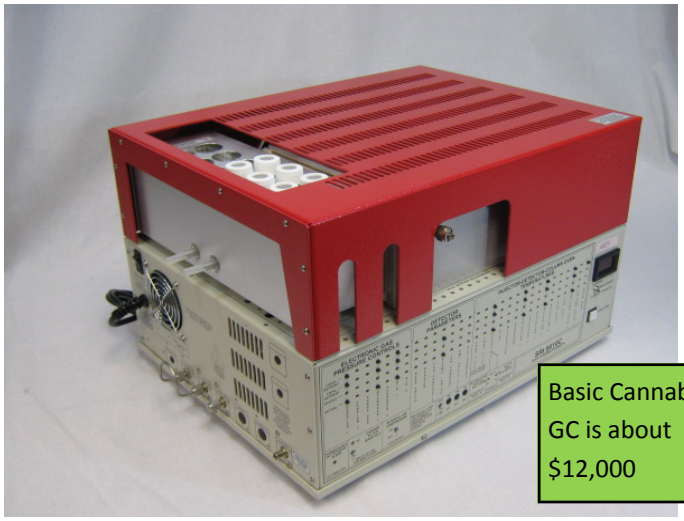
8610-0091 Basic Cannabis GC $12,170.

8610-0291 Basic Cannabis GC plus 2nd channel for residual solvents or terpenes $18,590.

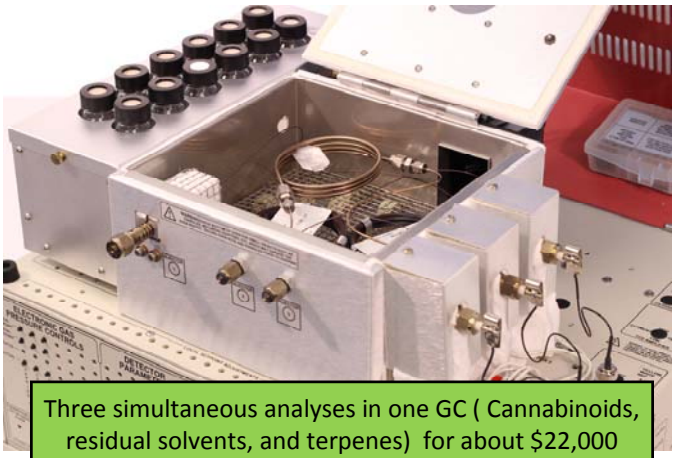
8610-0292 Basic Cannabis GC plus 2nd channel for residual solvents analysis $18,050.

8610-0391 Basic Cannabis GC plus 2nd and 3rd channels for residual solvents and terpenes simultaneously $22,500.

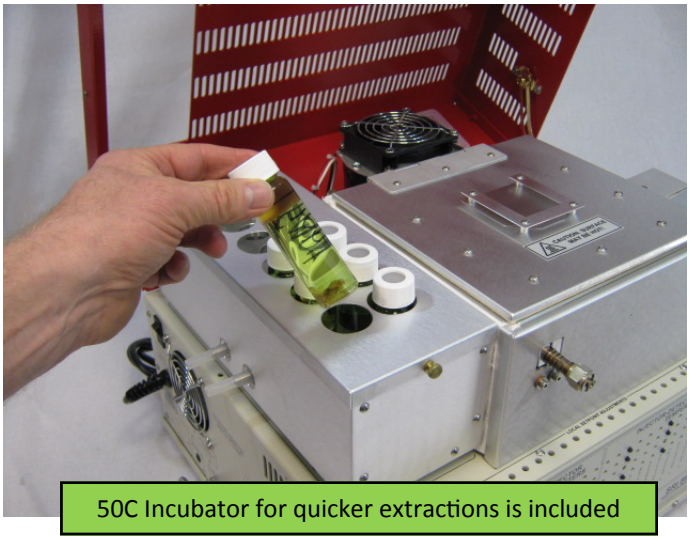
These GCs need hydrogen (from a cylinder or H2 generator to operate).



Basic Cannabis GC is about $12,000



Three simultaneous analyses in one GC (Cannabinoids, residual solvents, and terpenes) for about $22,000



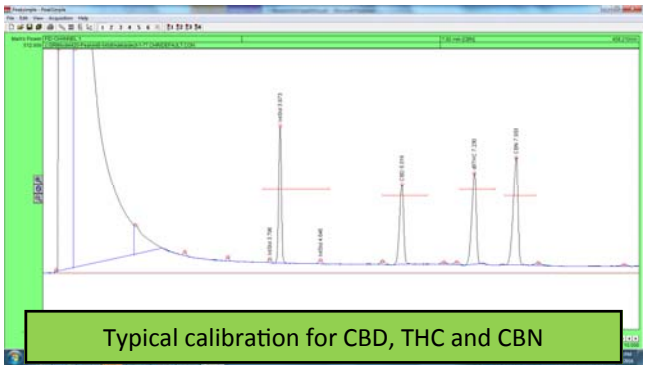
50C Incubator for quicker extractions is included

SRI Model 310C-MM

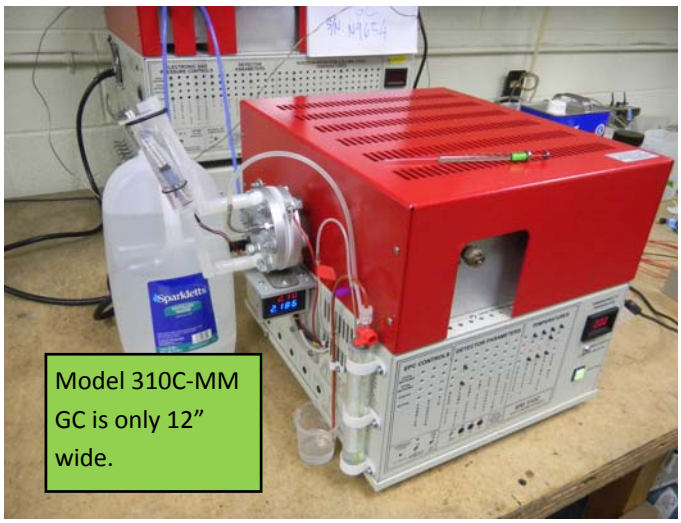
Gas Chromatograph for Cannabis Testing

The SRI Model 0310-0091 is a nice compromise between the convenience of the Model 420 and the better performance of the Model 8610C on the preceding page.

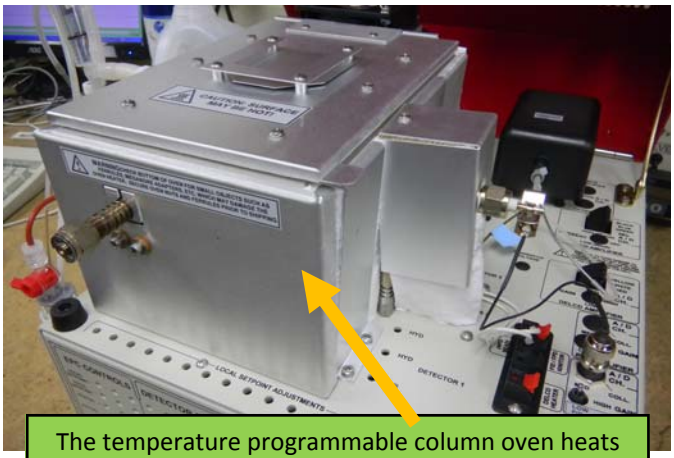
This GC gives you temperature programming and easily changeable columns (for residual solvent or terpene analysis) along with the same handy built-in hydrogen generator found on the Model 420. Only distilled water and a Windows PC are required for operation.



Typical calibration for CBD, THC and CBN



Model 310C-MM GC is only 12" wide.



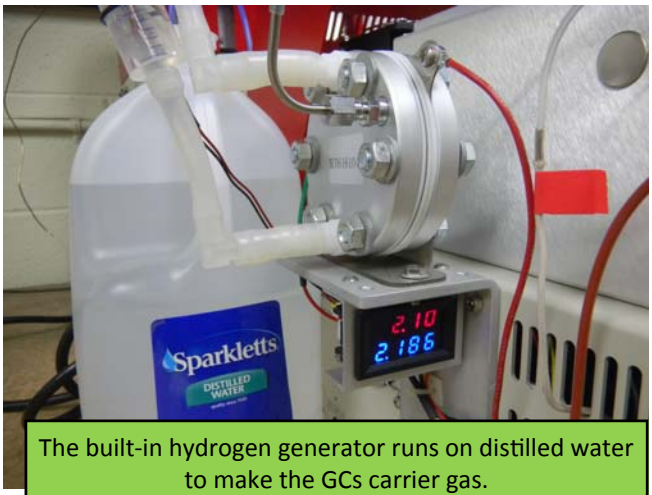
The temperature programmable column oven heats from ambient to 400C.

Includes 15meter MXT500 column

To Order:

0310-0091 Model 310C-MM GC configured with 15MXT500 column for cannabis analysis and built-in hydrogen generator. Includes all the same accessories as the Model 420

$ 9995.00

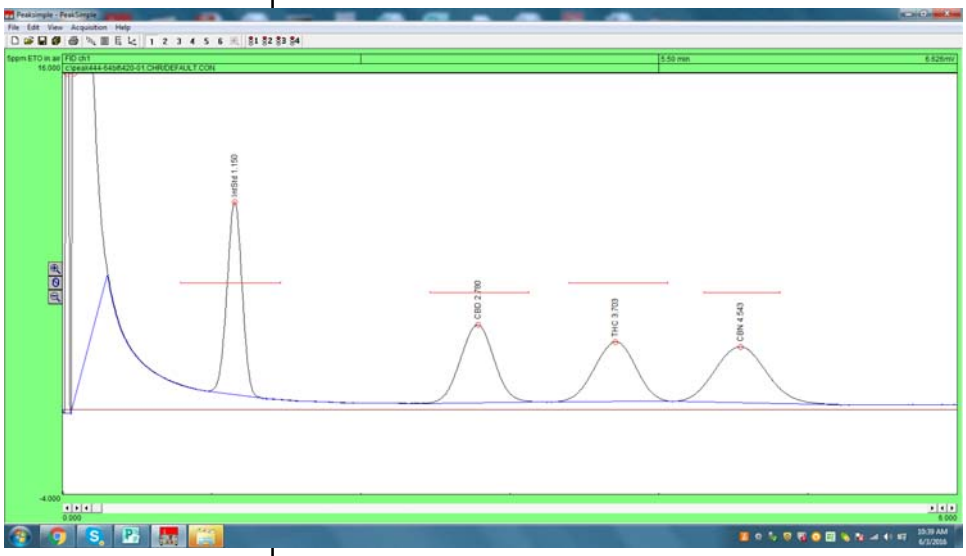


The built-in hydrogen generator runs on distilled water to make the GCs carrier gas.

SRI Model 8610C

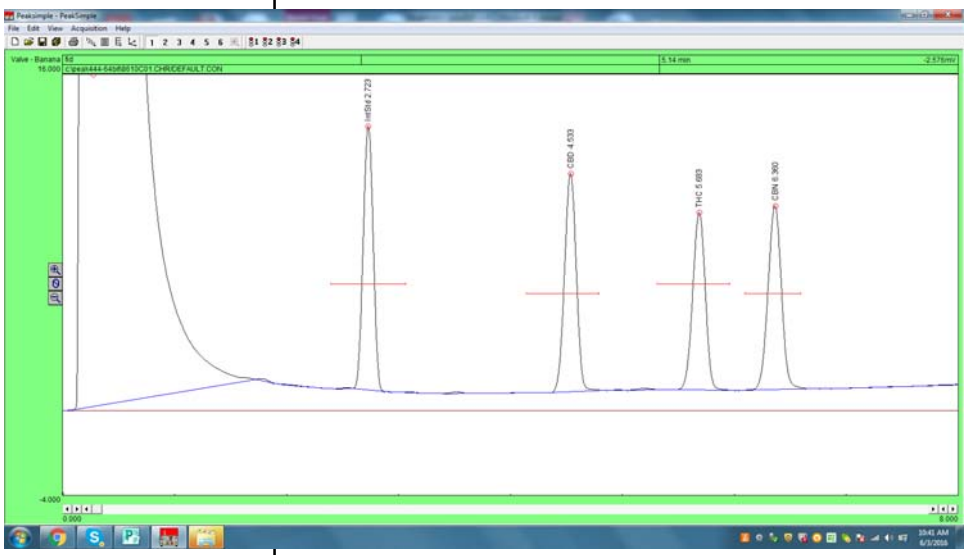
Gas Chromatograph for Cannabis Potency Testing

This chromatogram shows the injection of a calibration chromatogram with CBD, THC and CBN on the $4995.00 Model 420 GC.



This shows the same calibration sample on the twelve thousand dollar Model 8610C configured for cannabis testing. This is the GC we suggest for professional labs.

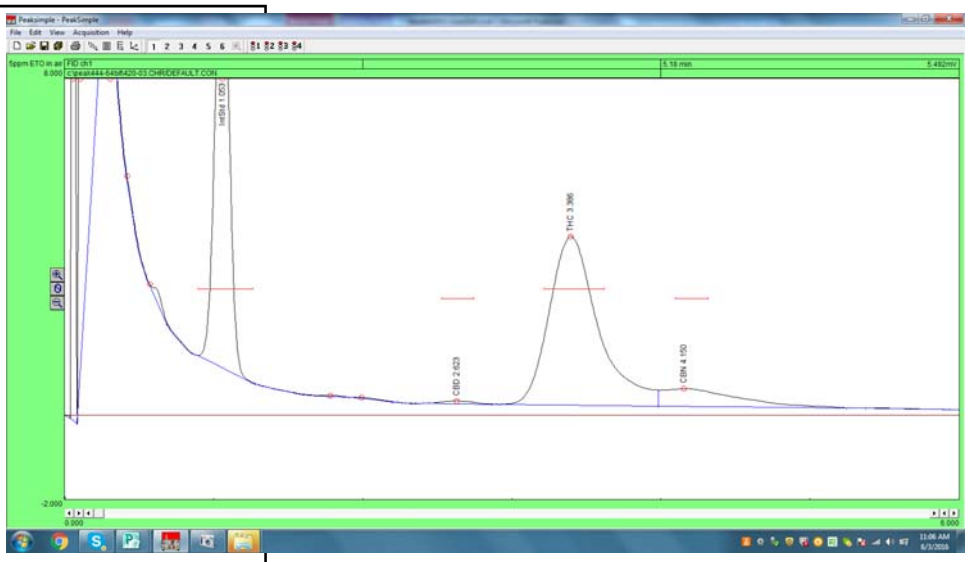
The peaks are a little sharper but aside from that, there is no major difference.



SRI Model 8610C

Gas Chromatograph for Cannabis Potency Testing

This chromatogram shows a real cannabis sample on the Model 420 GC.

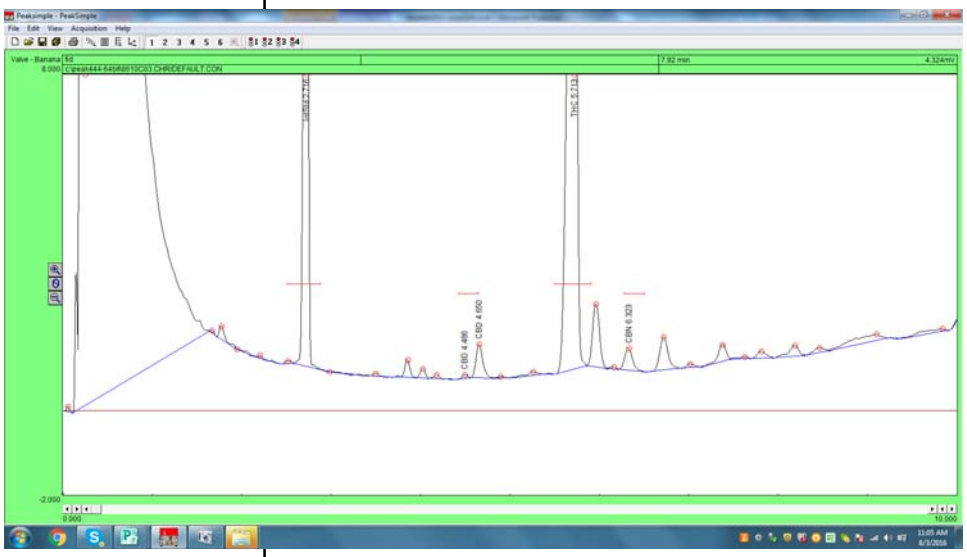


This is the same sample on the 8610C GC.

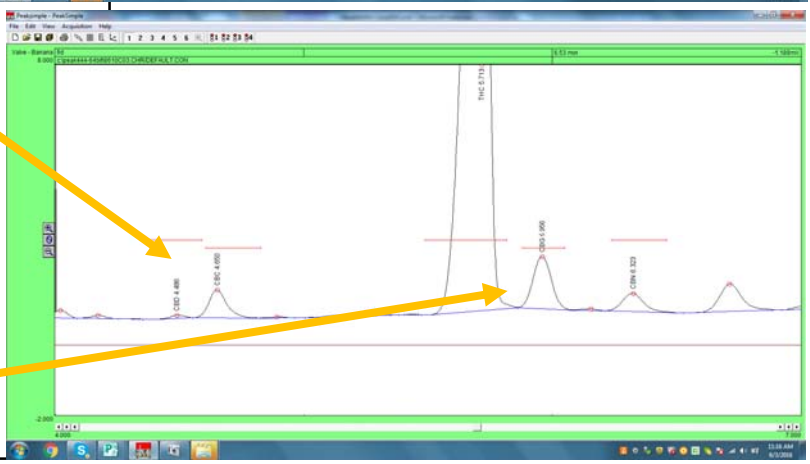
Notice that there are many more peaks which are separated.

These are all real cannabinoid peaks which the more expensive GC can resolve but which the Model 420 can not.

Especially note that the CBD peak is immediately next to the CBC peak.



And the CBG peak is well resolved from the THC. You can't expect to get this level of detail from the Model 420 because it uses a very short column and its not temperature programmable.



Step by step Cannabis Potency Testing using the SRI Model 420 GC Sept 2016

The Model 420 GC comes in this re-usable shipping container.

Keep the box in case you need to return the Model 420 GC to the factory for service. You can fly with the Model 420 as airline baggage.

The shipping box is 20” x 14” x 16” and weighs 30 pounds (14 kilogams) with the GC inside.

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Step 1:

Buy a gallon of denatured alcohol at the hardware store (Home Depot etc). The usual cost is about $15 for the gallon. Denatured alcohol is used for stove fuel in boat stoves and is a mix of 50/50 methanol and ethanol. Its poisonous to drink and flammable so use it in a well ventilated area away from flames and don't smoke around it.

Don't pour any of the denatured alcohol into another container unless you are sure it is well marked (so nobody drinks it)and totally child-proof.

Step 2:

Find the white internal standard powder. There will be about 1 gram or more of methyl stearate in a plastic cup or bag supplied with the GC. Methyl Stearate is made from palm oil and is commonly found in cosmetics like lipstick, and hand cream, so its safe to touch. Wash your hands after handling it and don't eat it either. The MSDS data sheet for Methyl Stearate can be found here or many other web sites. http:www.tcichemicals.com/

Step 3:

Weigh out 946 milligrams (250mg per liter x 3.785 liter per gallon = 946) and pour into a freshly opened gallon of denatured alcohol. Don't spill any. Use a popsicle stick or Q-tip to sweep all of it into the gallon container. It takes a while to dissolve if the denatured alcohol is cold, so put the denatured alcohol in the sun to warm up and shake it one or twice once it is warm. Remember its flammable so don't put it in the oven or on the stove.

It can take several hours for the methyl Stearate to completely dissolve if its cold.

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Step 4:

Set up the balance (scale) which comes with the Model 420 GC. You have to put in the batteries and check the calibration with the little 10gram weight which comes with it.

If you have a more expensive balance then you can use that instead. The import thing is that the balance can read the weight down to 1 milligram (.001 gram). A balance like the one shown is about $200 on Amazon.

Step 5:

Weigh approximately 100milligrams of cannabis into the little weighing dish. It does not have to be exactly 100milligrams as long as you record the actual weight. In the photo, it reads 107 milligrams

For concentrates, weigh 50milligrams of concentrate instead of 100 milligrams. An easy way to do this is to put a little strip of paper on the balance, tare the balance to read 000 and then dab about 50milligrams of concentrate on the paper.

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Step 6:

Put the 100 milligrams of cannabis (or 50milligrams of concentrate) into the 40 milliliter bottle. Be careful not to spill any as the weight of the cannabis is important to getting an accurate answer.

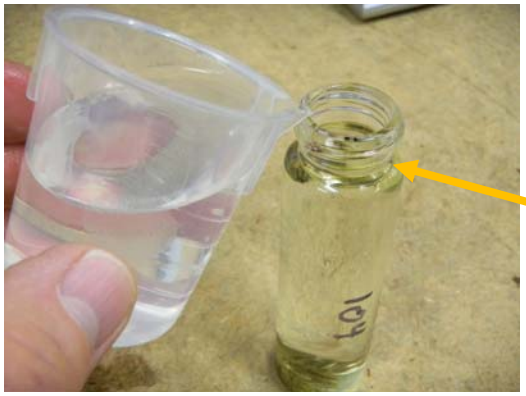
Write the name of the sample and the weight on the bottle with a magic marker.

Step 7:

Pour some of the alcohol with the dissolved methyl stearate internal standard into the beaker which comes with the Model 420. The beaker makes it less likely you will spill and makes it easier to fill the 40ml bottle (the gallon is heavy).

Put the cap on the 40ml vial, give it a shake, and let it sit on the table for at least 15 minutes. This gives the alcohol time to dissolve the THC and CBD etc.

Remember to keep the bottles away from children.



Fill the 40ml bottle to the neck where the glass narrows.

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Step 8:

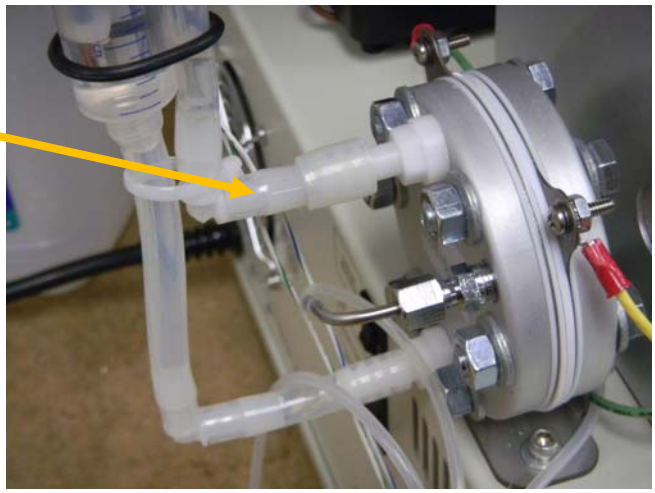
Buy a gallon of distilled water at the grocery store (about $1). Make sure it says " Distilled Water" , not "purified" water or "de-ionized" water. Do not use household tap water.

Fill the water reservoir with the distilled water. The water reservoir holds 20 milliliters which is enough for about 6 hours of operation.

Make sure the water reservoir is full before turning on the Model 420 power.

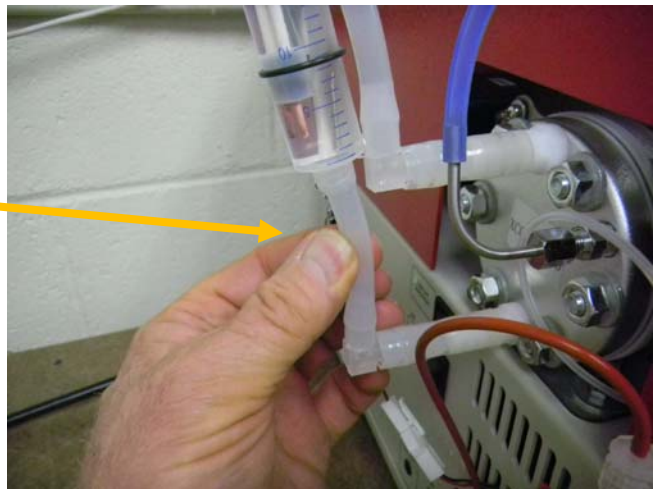
The hydrogen generator (which is built-in to the Model 420) produces hydrogen gas and oxygen gas. The oxygen gas and extra water bubbles up through the return tube and back into the water reservoir.

Oxygen bubbles up through this tube along with extra water back into the reservoir



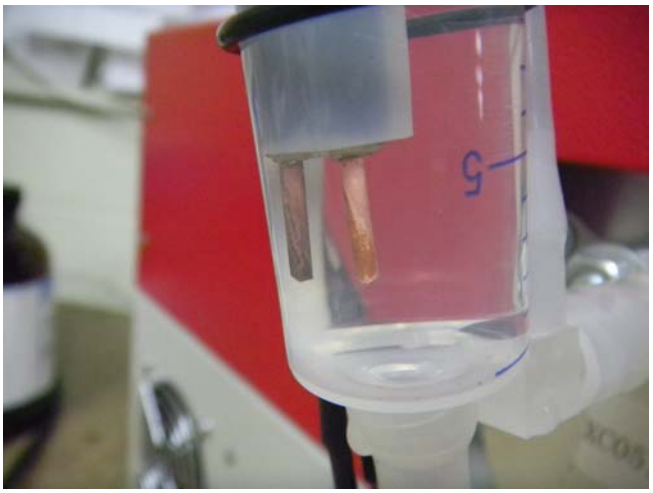
Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Pinch this tube with your fingers a few times to make sure the H2 generator cell is filled with water before turning on the power.



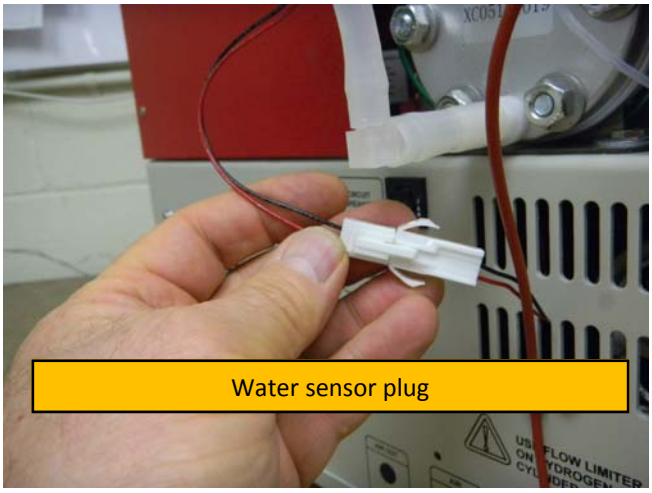
The water reservoir should tilt slightly to the left to make sure the oxygen side water drips back into the reservoir. If you make the reservoir perfectly vertical, water may drip on the table.

There are two copper wires mounted close to the bottom of the reservoir to sense if the water level is low.



Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

To empty the water reservoir, tilt it into a beaker.



If there is no water, or you unplug the water sensor then the meter will indicate about 15 volts and zero current as shown in the photo. No hydrogen is produced when this happens.

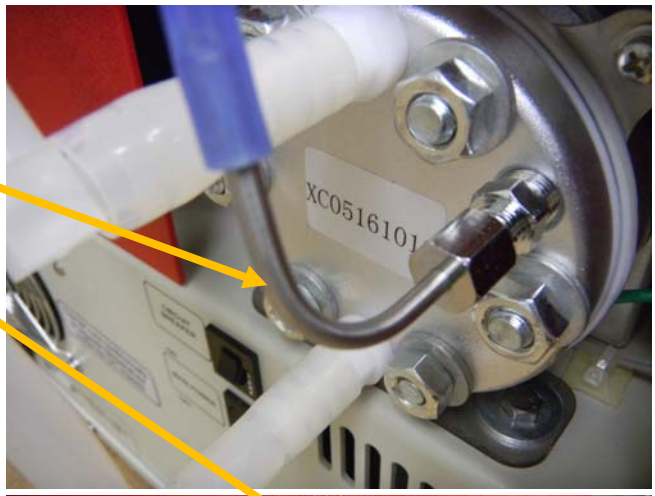
If there is water in the reservoir and the sensor is plugged in, then the meter will indicate about 2 volts (the top number in red) and about 2 amps of current (the bottom number in blue). The current should be the same every day, but the voltage reading may change slightly up or down.

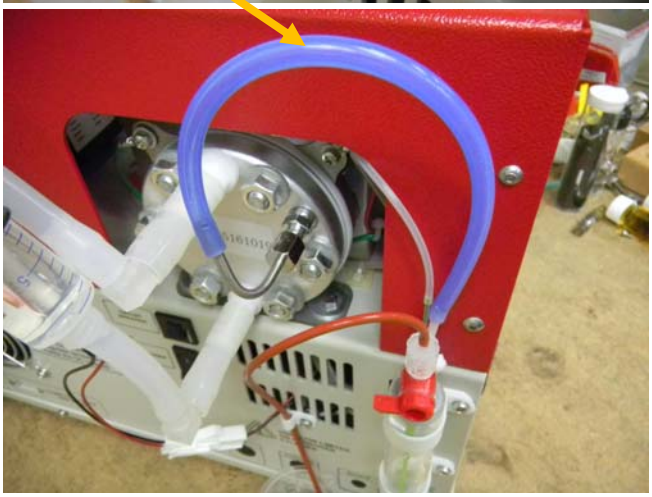
Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

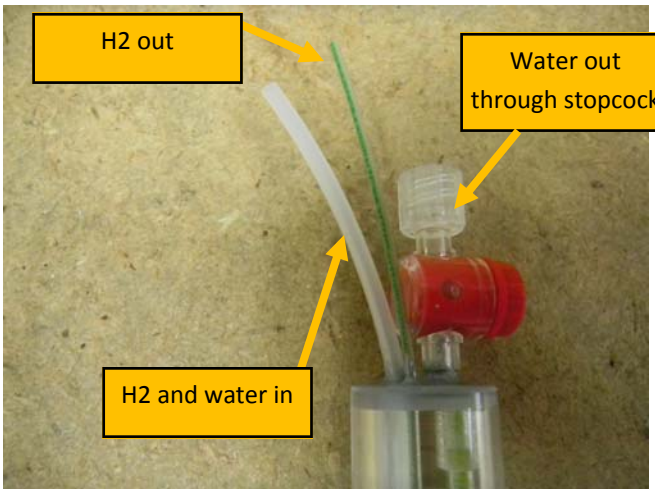
Hydrogen exits the hydrogen generator along with extra water from the 1/8” metal tube.

The hydrogen and water flow (through the blue silicone tube) into a water separator mounted on the left side of the Model 420.

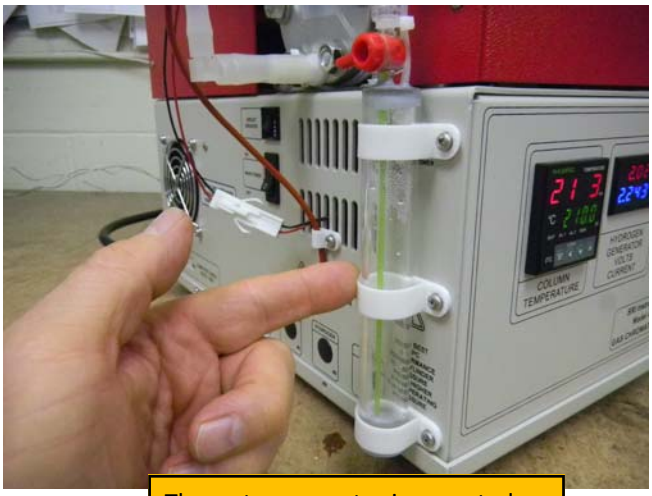
Water gradually accumulates in the water separator.







Every time the water reservoir is filled, the accumulated water in the water separator must be drained by turning the red stopcock.

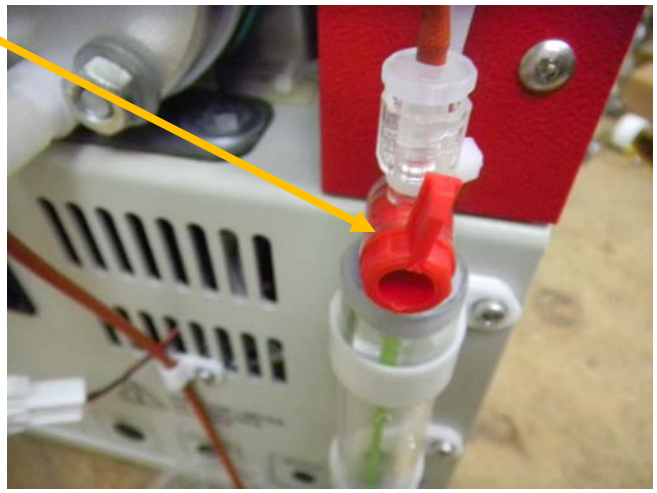


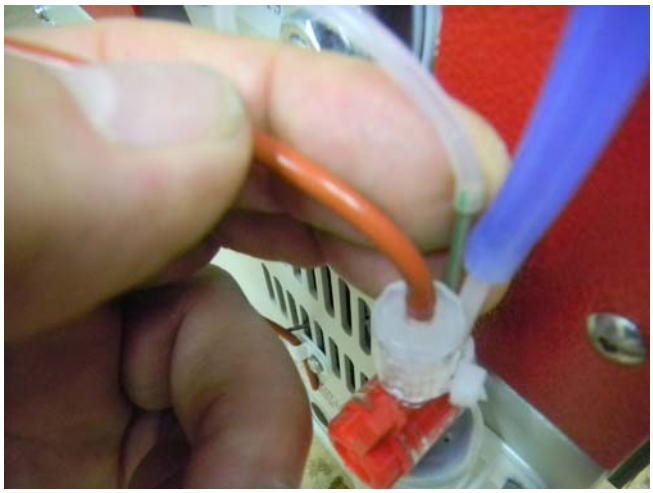
The water separator is mounted on the left front of the GC

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

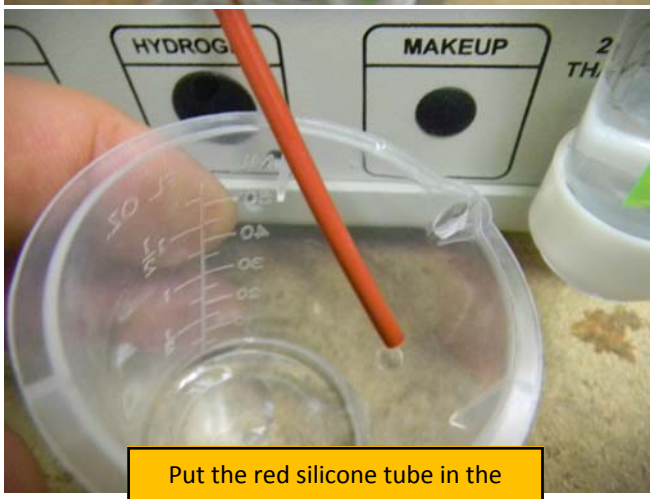
When the red stopcock is in this position hydrogen is going to the GC. This is the normal operating position.

To drain the water turn the stopcock to this position.





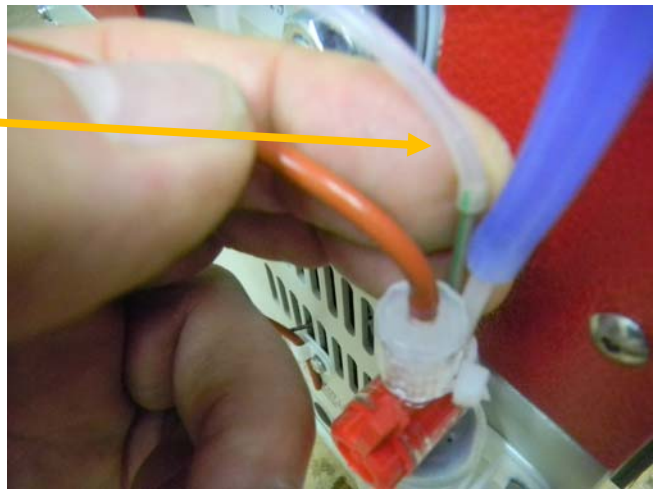
The water in the trap will flow out the red silicone tube and into the beaker provided. Pour the water down the sink. Don't re-use it.



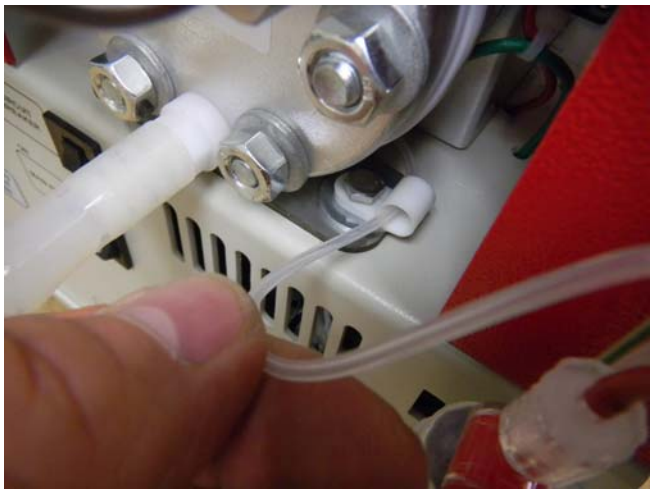
Put the red silicone tube in the beaker so the drained water collects in the beaker.

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

The H2 exits the water trap from the smaller 1/16” brown/green tubing and clear silicone tube.

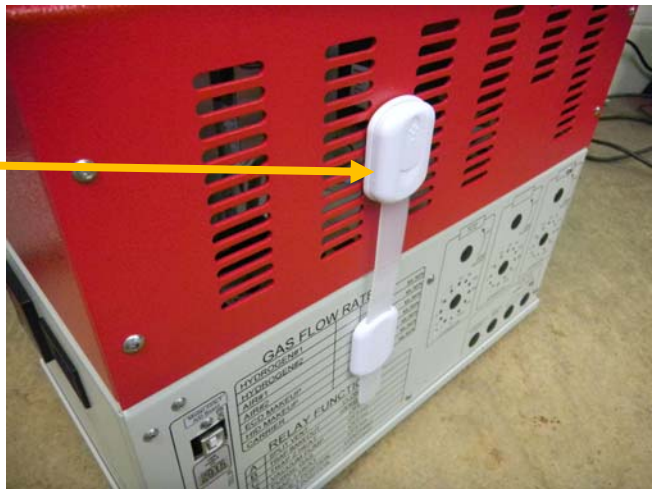


Make sure the clear silicone tube is routed so that the red lid can not pinch it when the lid is closed.



Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

The red lid is secured in the closed position by this “baby latch”.



It takes two hands to slide the catch up.

And at the same time pull to the right.

The “baby latch” is a safety feature. Please do not defeat it. Under the red lid is a very hot oven. Do not allow children or un-trained adults access to the GC.

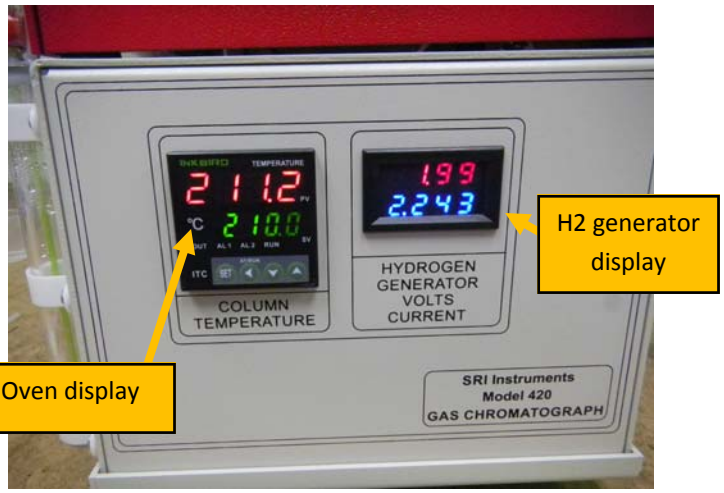
Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Step 9:

Turn on the main power switch located on the left side of the Model 420. The displays on the front will illuminate. The left side display controls the GC's column operating temperature. This is normally set to 210 degrees Centigrade and fluctuates about 2 degrees up or down after it heats up. The green digits on the bottom is the setpoint and the red digits at the top is the actual temperature. The red digits will change a little, but not more than about 2 degrees.

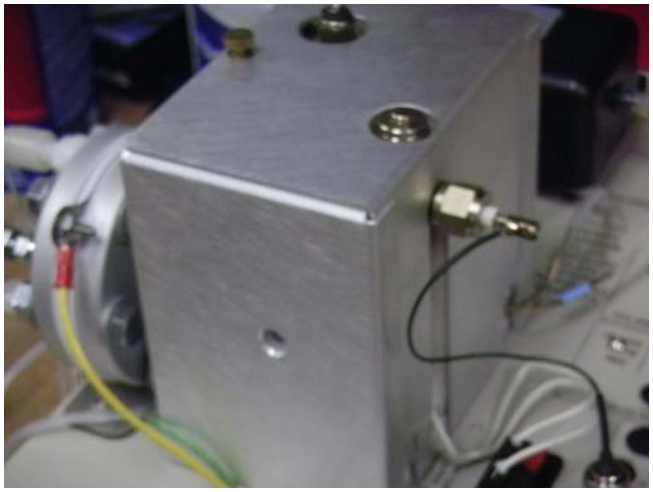
The right side display shows the hydrogen generator voltage (the red digits at the top) and the current (amps) (blue digits at bottom). When the hydrogen generator is operating correctly the values will be as shown in the photo.

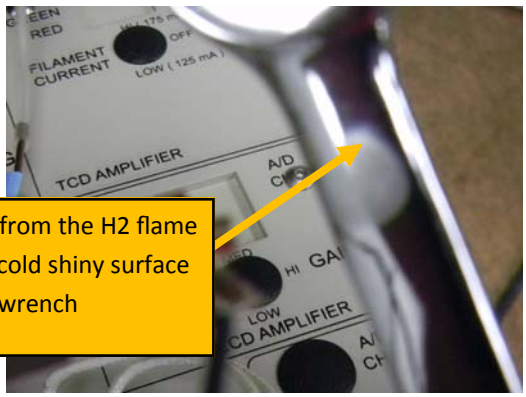
Under the Model 420's red lid is the GC oven, injector and FID (flame ionization)detector. The FID detector has a tiny hydrogen flame which burns inside the stainless steel body. When hydrogen burns it makes water which shows up as water vapor on the side of the 40ml bottle or even better on a shiny wrench or other smooth surface.



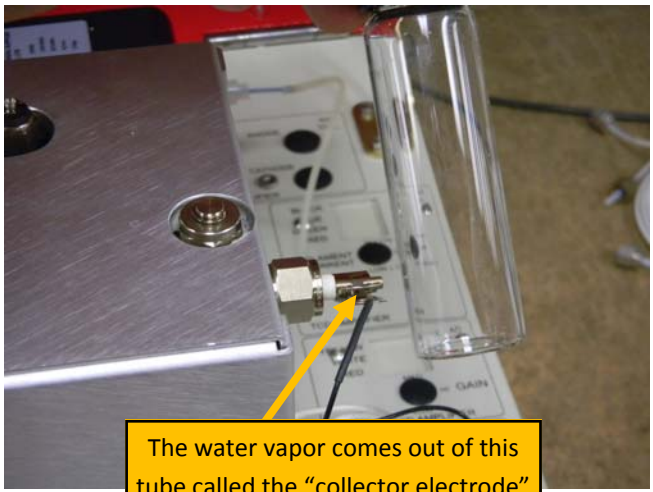
Oven display

H2 generator display





The water vapor from the H2 flame condenses on a cold shiny surface like a wrench



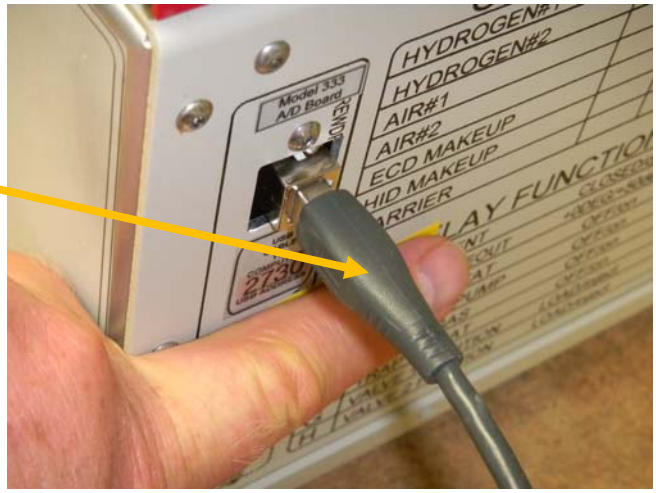
The water vapor comes out of this tube called the "collector electrode"

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Step 10:

Plug the Model 420 into your Windows XP or later computer using the provided USB cable.

Any USB cable will works.



Download the PeakSimple software from SRI's web-site.

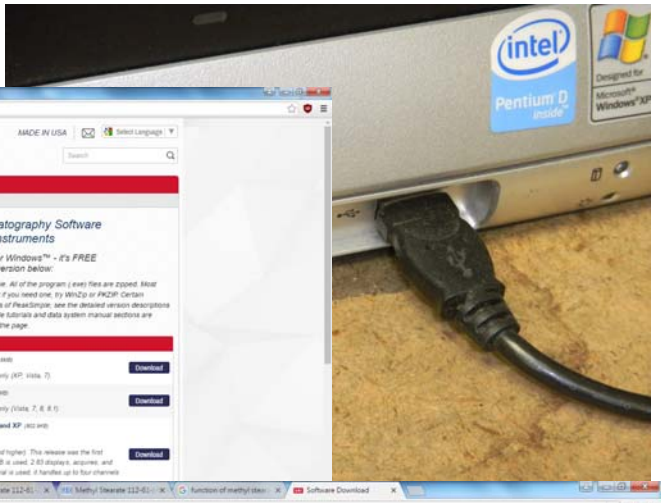
[Click here to download PeakSimple]

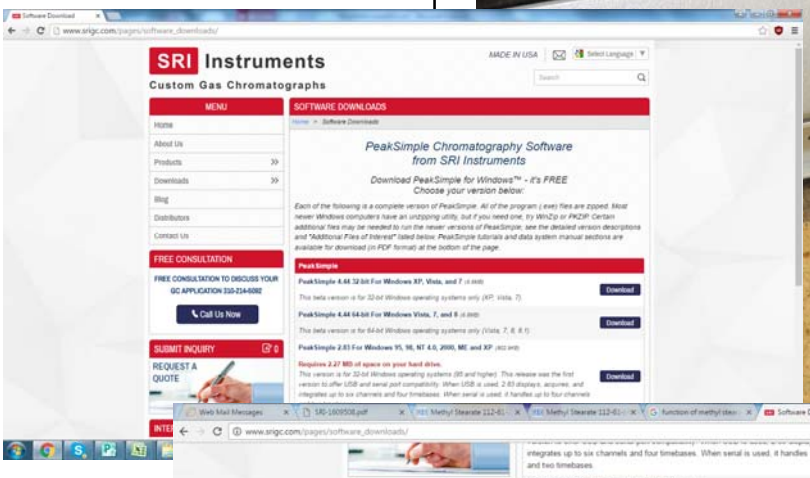
Or type:

http://www.srigc.com/pages/software_downloads/

Into your browser.

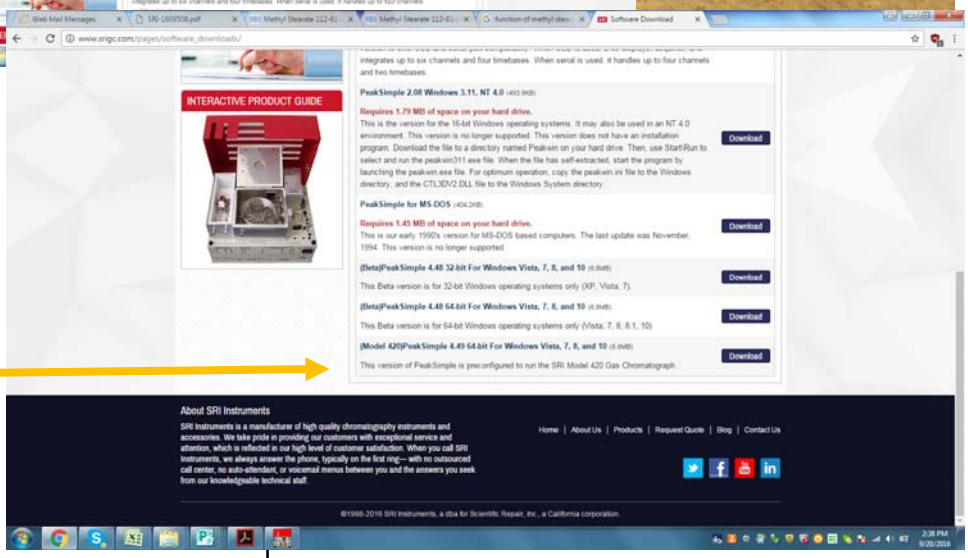
Click Dowload/ Software and then scroll to the bottom of the page.





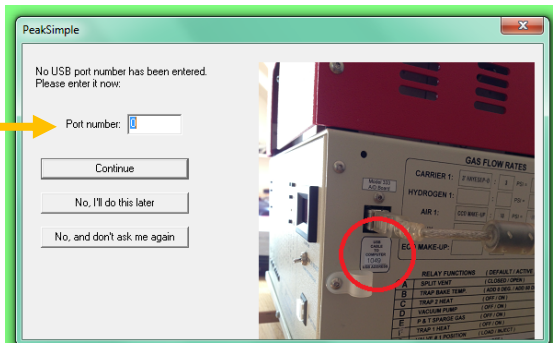
There will be a special version of the software which has everything already set up for the CBD and THC analysis. This is at the bottom of the Software Down-load Page and is labelled:

(Model 420)PeakSimple 4.49 64-bit For Windows Vista, 7, 8, and 10



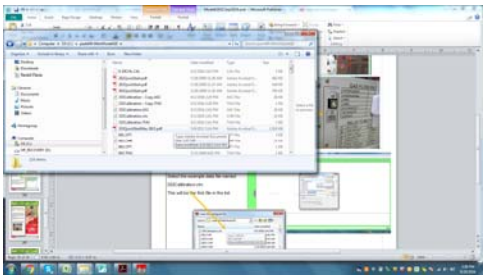
Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

When PeakSimple software launches for the first time it prompts you to enter the USB device ID number printed on the left side of the GC.

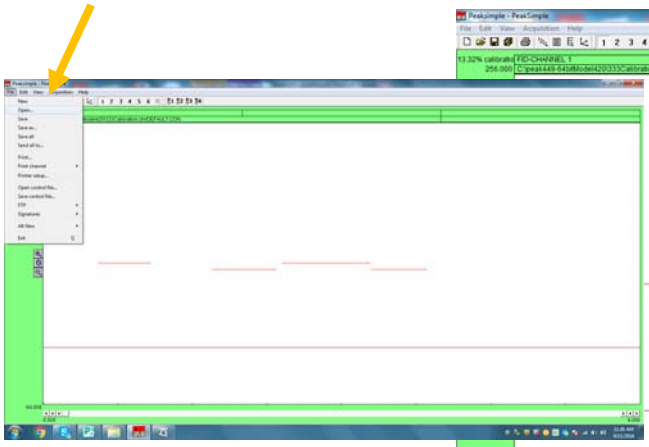


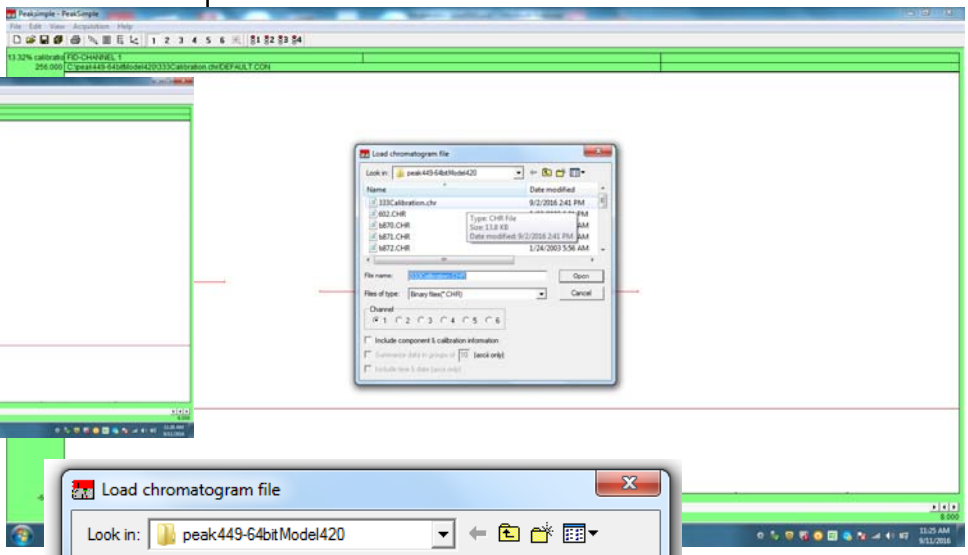
Each GC has a different USB device ID number which is printed here.

See the Model 333 Quick Start document in the C:\Peak449 folder for step by step setup directions.



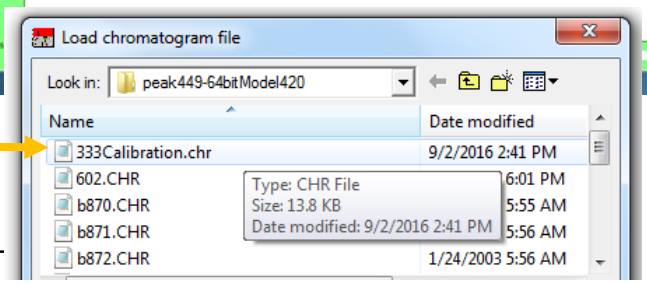
Once PeakSimple has established communication with the Model 420 GC, click on File and then Open





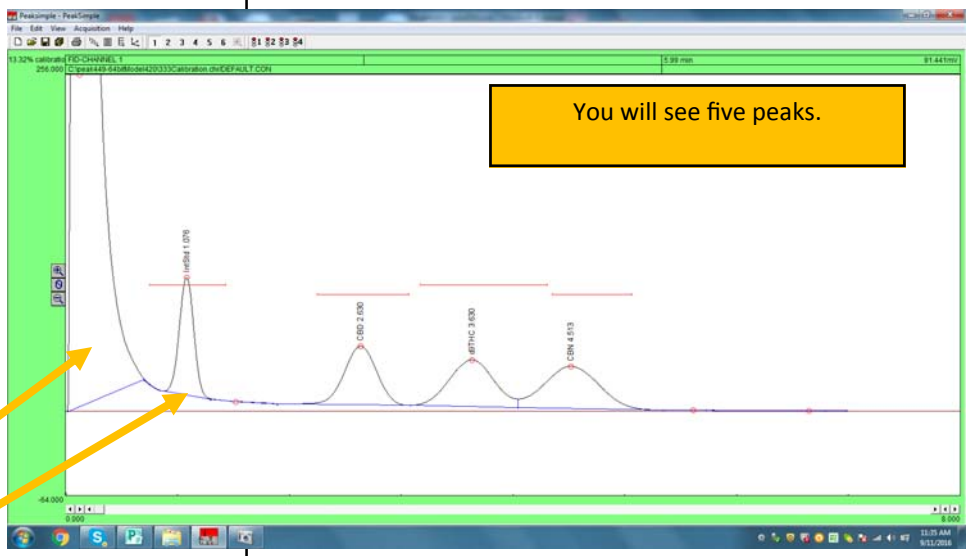
Select the example data file named 333Calibration.chr.

This will be the first file in the list.



Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

You will see this chromatogram on the screen.



This is what the factory calibration looks like.

The first very large peak is the denatured alcohol solvent

The second peak is the 250 nanograms of methyl stearate internal standard.

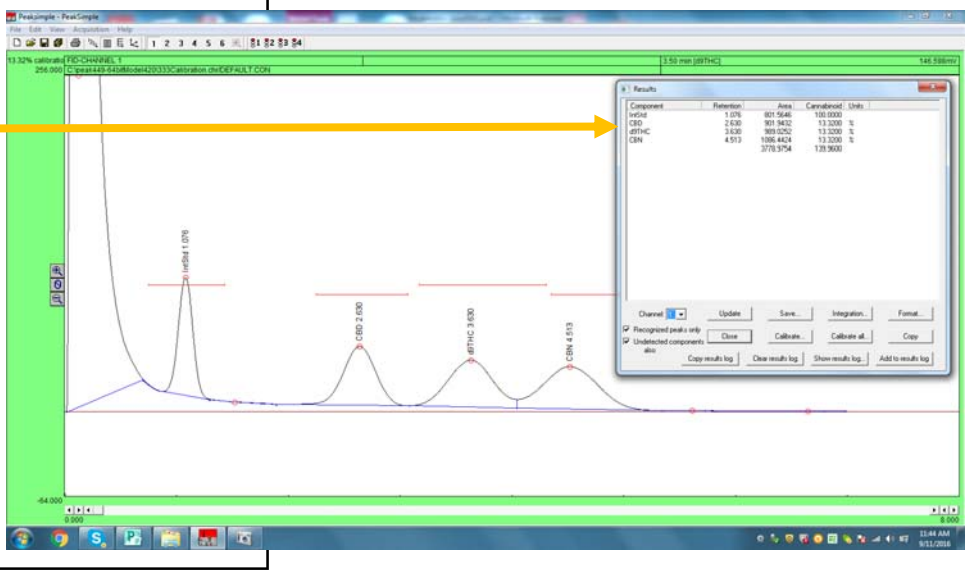
The third peak is 333 nanograms (ng) CBD.

The fourth peak is 333 ng off THC

The fifth peak is 333 ng of CBN

333 nanograms is the amount of CBD, THC or CBN which correlates to 13.32 percent in the starting sample of 100 milligrams in 40 milliliters of solvent.

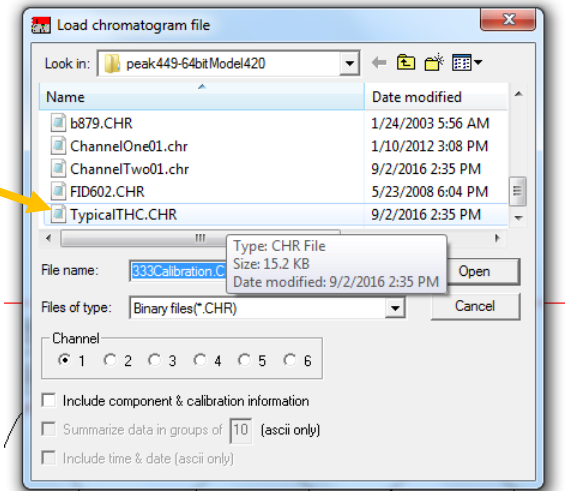
Click View/Results to see the Results Screen. This is the calibrated answer and should equal 13.32% for each of the cannabinoid peaks.



The internal standard peak will always show a result of 100.

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Click File/Open again and this time open the chromatogram labelled " Typical THC.chr". This is the very bottom file in the list.



You will see this chromatogram which is typical medical grade cannabis flower.

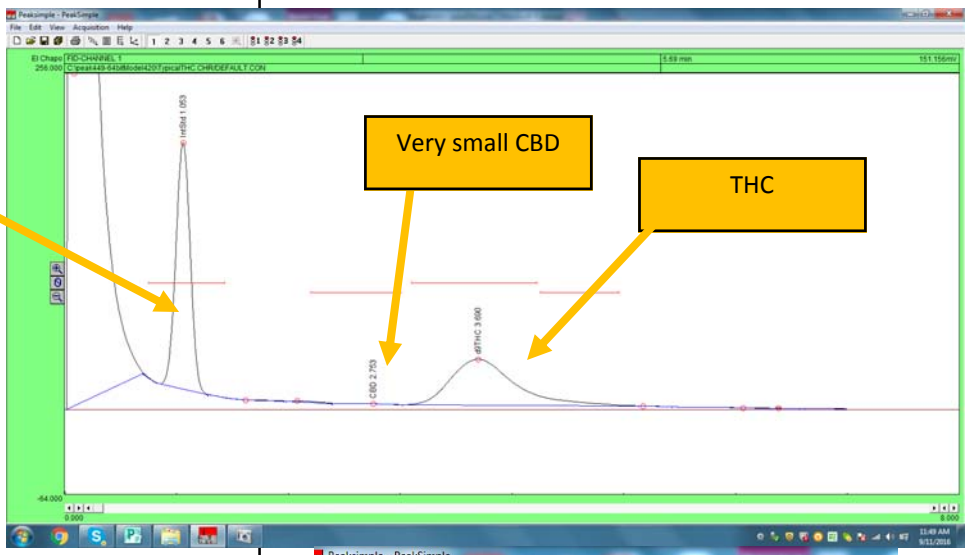
The first peak is the denatured alcohol solvent just like in the calibration standard.

The second peak is the internal standard peak (methyl stearate)

The third (very small) peak is CBD.

The fourth peak is THC

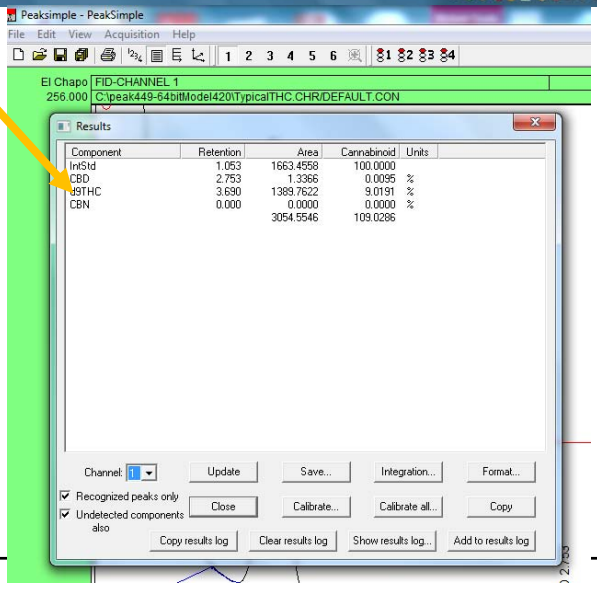
There is no detectable peak for CBN.



If you click on View/Results again, it shows the CBD peak calculates out to be .0095% and the THC peak calculates out to be 9.0191%.

This is typical of medical cannabis except for certain strains which are bred to have high amounts of CBD.

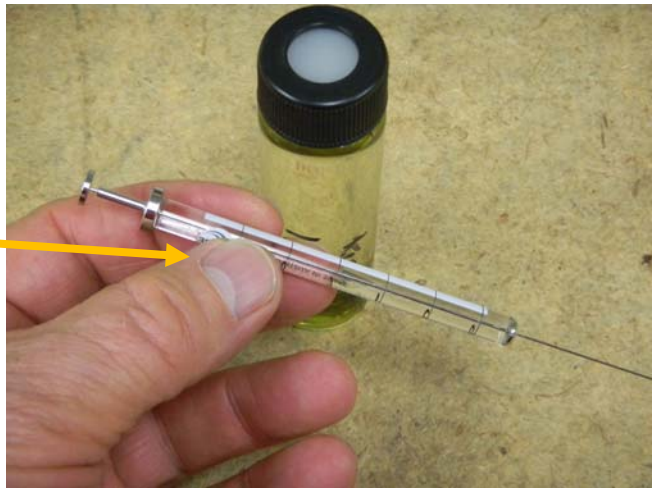
Most strains have almost no CBD or CBN.



Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

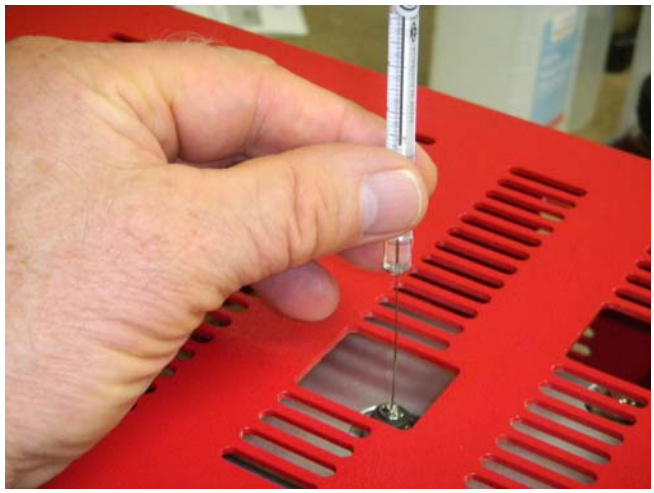
Step 11:

Use the provided 10 ul (10 microliter) syringe to suck up 1 ul (1 microliter) of the cannabis extract you previously prepared. This may have a greenish color by now.

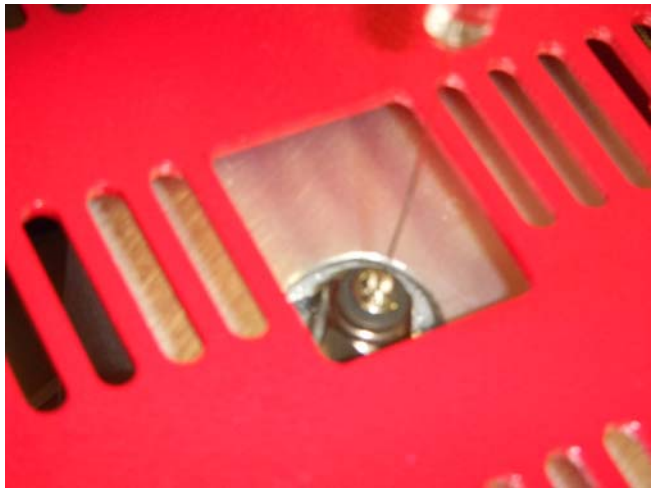


Its not critical to measure exactly 1 ul, but try to be somewhat close to 1 ul. Pull the syringe plunger back after you fill the 1ul so there is some air in the syringe needle. This makes it less likely to lose some sample if you accidentally touch the plunger while making the injection.

Position the syringe in the injector but do not push it down yet. You will feel the rubber septum when the tip of the syringe touches it.



When you are ready, press the computer's spacebar to start the analysis and within a few seconds push the syringe down all the way and depress the plunger.

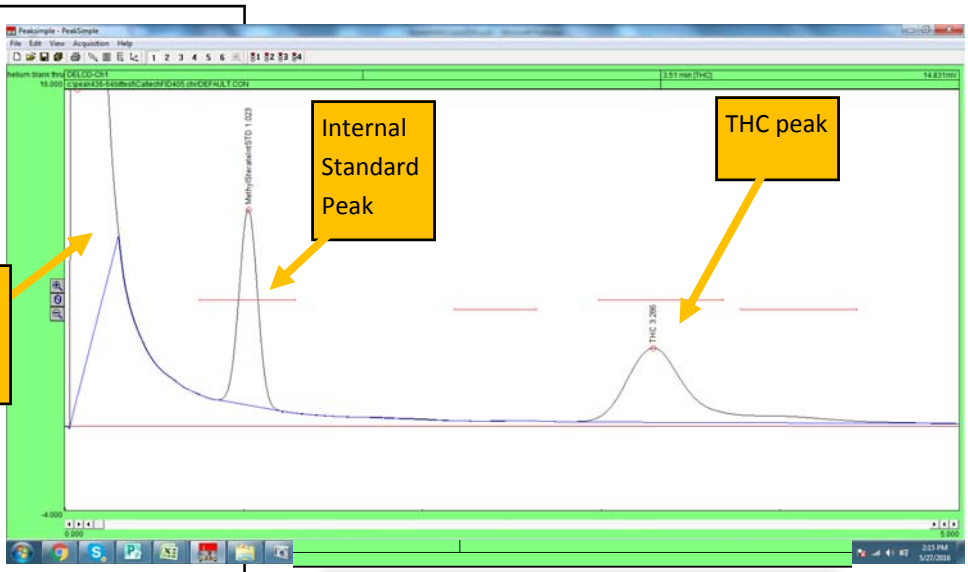


This injects the 1ul of cannabis extract into the GC.

Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

Step 12:

A chromatogram will appear on the computer screen which looks something like this. It takes about 5 minutes altogether.

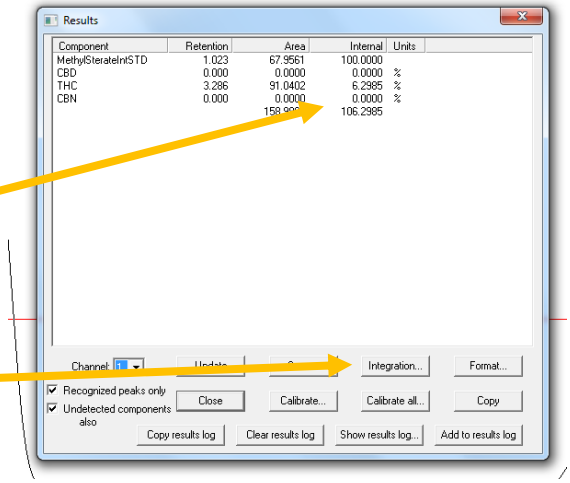


The first peak is very large and appears almost immediately. This is the denatured alcohol peak.

The second peak is the methyl stearate internal standard peak.

The 3rd peak is the THC peak.

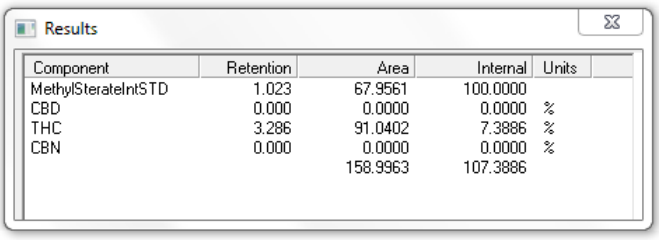
The PeakSimple software calculates the size of the THC peak (the area under the curve, not the height) and compares it to the size of the Internal Standard peak. This gives you the answer which shows up in the software's Results screen.

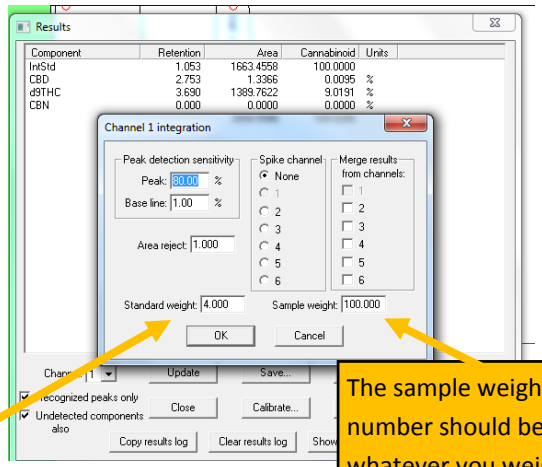


The Integration button at the bottom of the Results Screen lets you enter the actual weight of the cannabis we put in the 40 ml bottle (104 milligrams) back in Step 6 on page 7 of this document.

Enter the number 104 in this box and that corrects the answer.

In this case the answer comes out to be 7.38% THC.





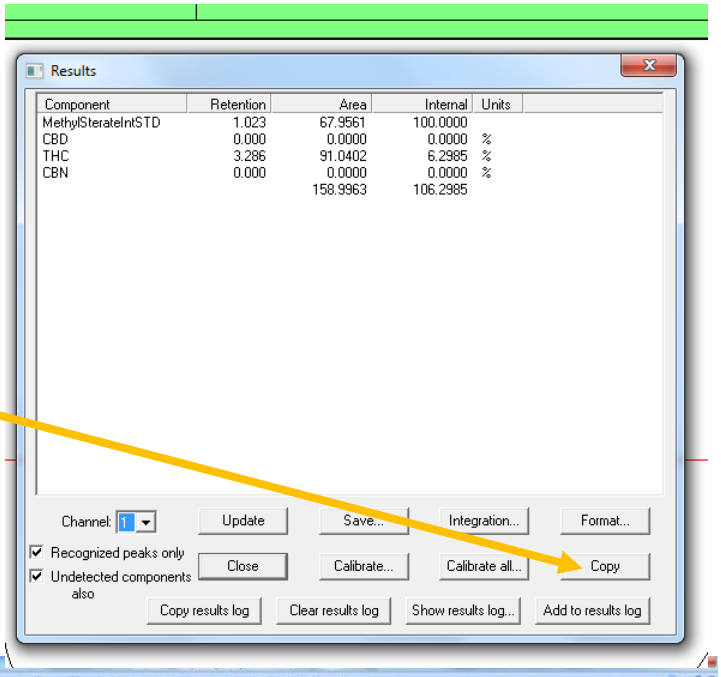
The standard weight number should always be 4

The sample weight number should be whatever you weighed into the 40 ml bottle

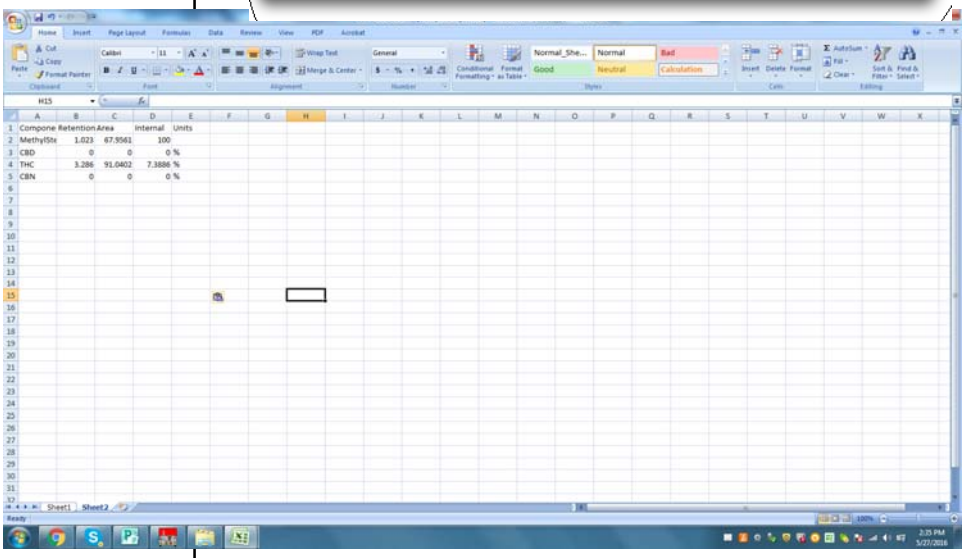
Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

You can copy the results into Excel or Word or any Windows program. Many labs copy the results into a Word document which has the lab's logo, photo of the sample and discussion of the results.

To copy the results click the Copy button at the bottom of the results screen.



Then open Excel, Word etc and click Paste

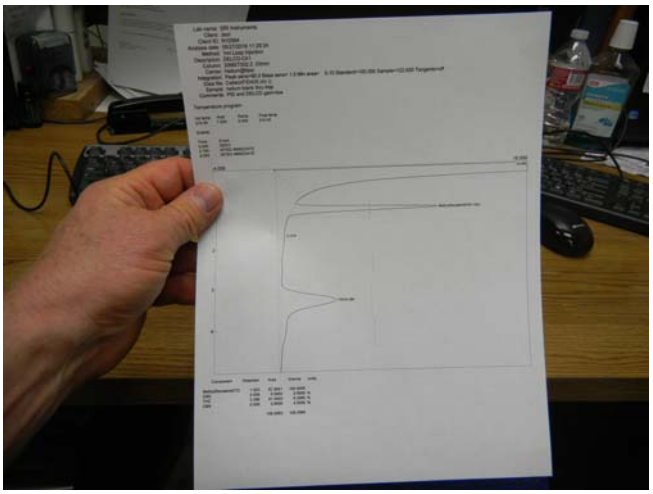


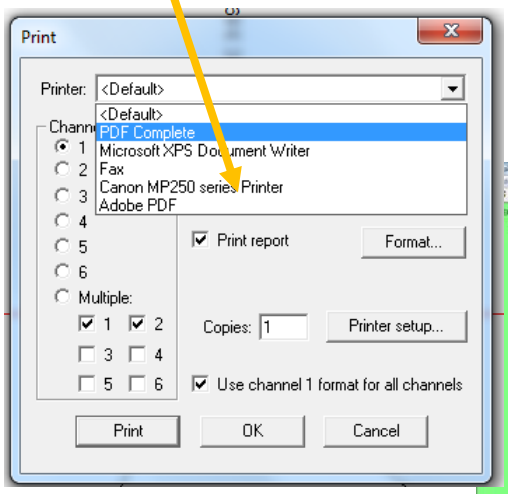
Step by step Cannabis Potency Testing using the SRI Model 420 GC June 2016

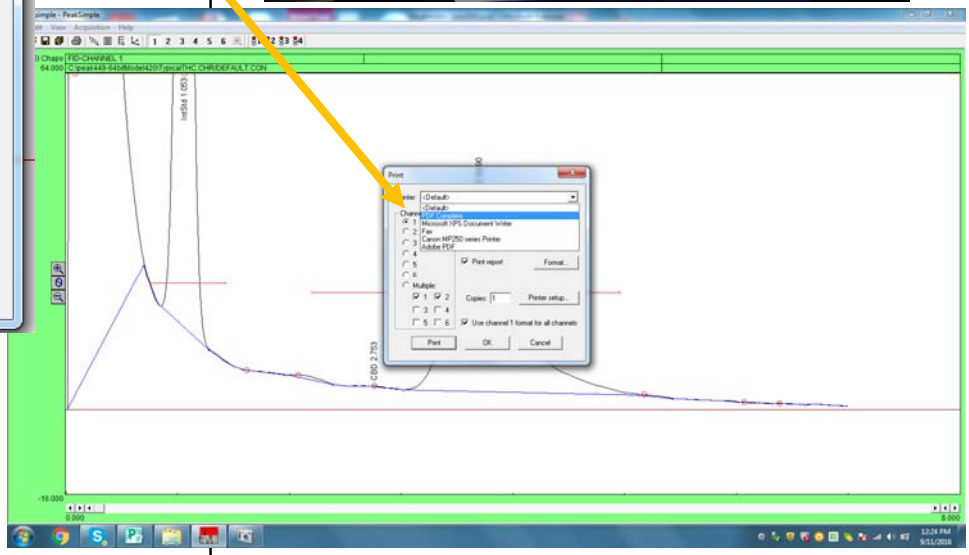
To Print to a paper printer or to a PDF file, click File/ Print.

The Print screen has a drop-down screen at the top.

If you have a PDF program installed it should be selectable here







The Model 420 is now ready to analyze another sample. Return to Step 11 on page 20 and inject another extract.