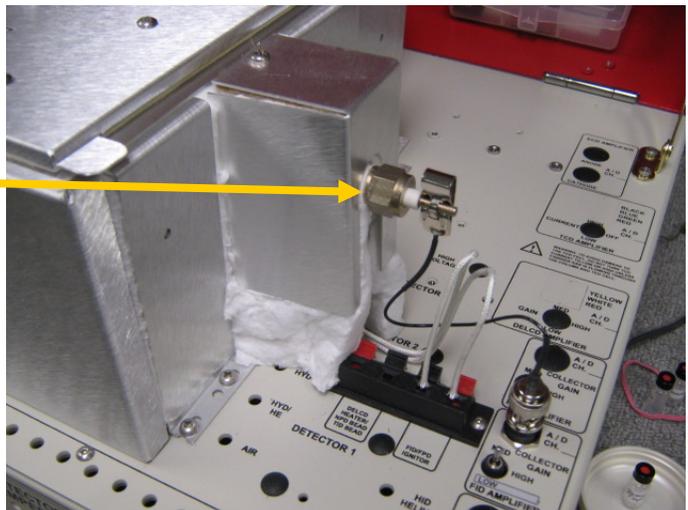
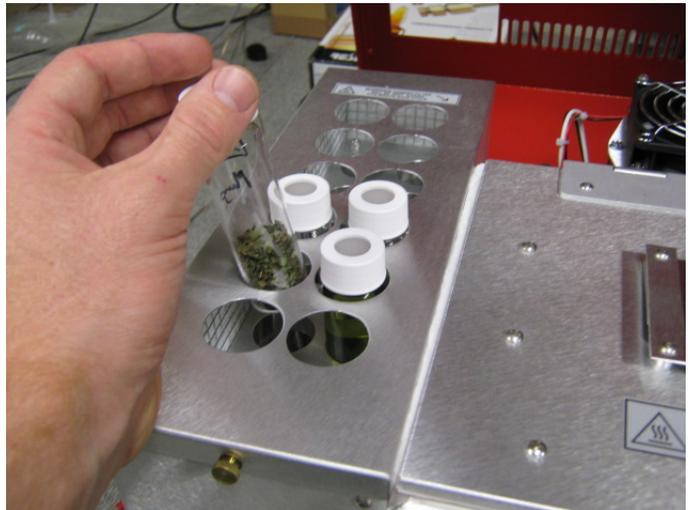
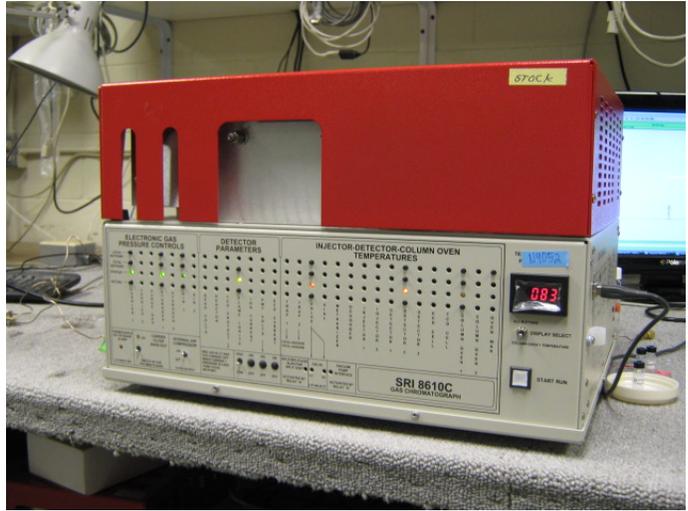


# Residual Solvents in medical cannabis analysis using the SRI 8610C FID GC Jan 2017

The SRI Medical Herb Potency 8610C GC is shown at right. This GC can also be used to test for residual solvents (i.e. butane, acetone, gasoline residue, etc.) in medical cannabis. These solvents are used in the extraction process to create medical cannabis hash oils and concentrates.

The 12 vial sample heater (incubator) aids in extraction of samples for potency testing, but can also be helpful in residual solvent analysis. The added heat helps release any solvents trapped in the sample into the headspace of the vial.

The GC includes SRI's Flame Ionization Detector (FID) which is sensitive to hydrocarbons ( e.g., solvents, terpenes, and cannabinoid molecules ).



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Solvents used to make cannabis extractions include:

Propane  
isoButane  
normalButane  
Methanol  
Ethanol  
isoPropanol  
Acetone  
Acetonitrile  
Hexane  
Heptane

These are the solvents which the State of Washington wants tested as of January 2017.

Many types of columns could be used to separate some or most of these molecules, but with almost all columns, normalButane and Ethanol co-elute. Since these two molecules are the most commonly used solvents, it makes sense to use a column which separates these two molecules well.

SRI has found that a 3 foot Haysep-D ( non-polar ) in series with a 3 foot Haysep-R ( mid-polarity ) separates all the molecules on the State of Washington's "must test for" list and others like Benzene too.

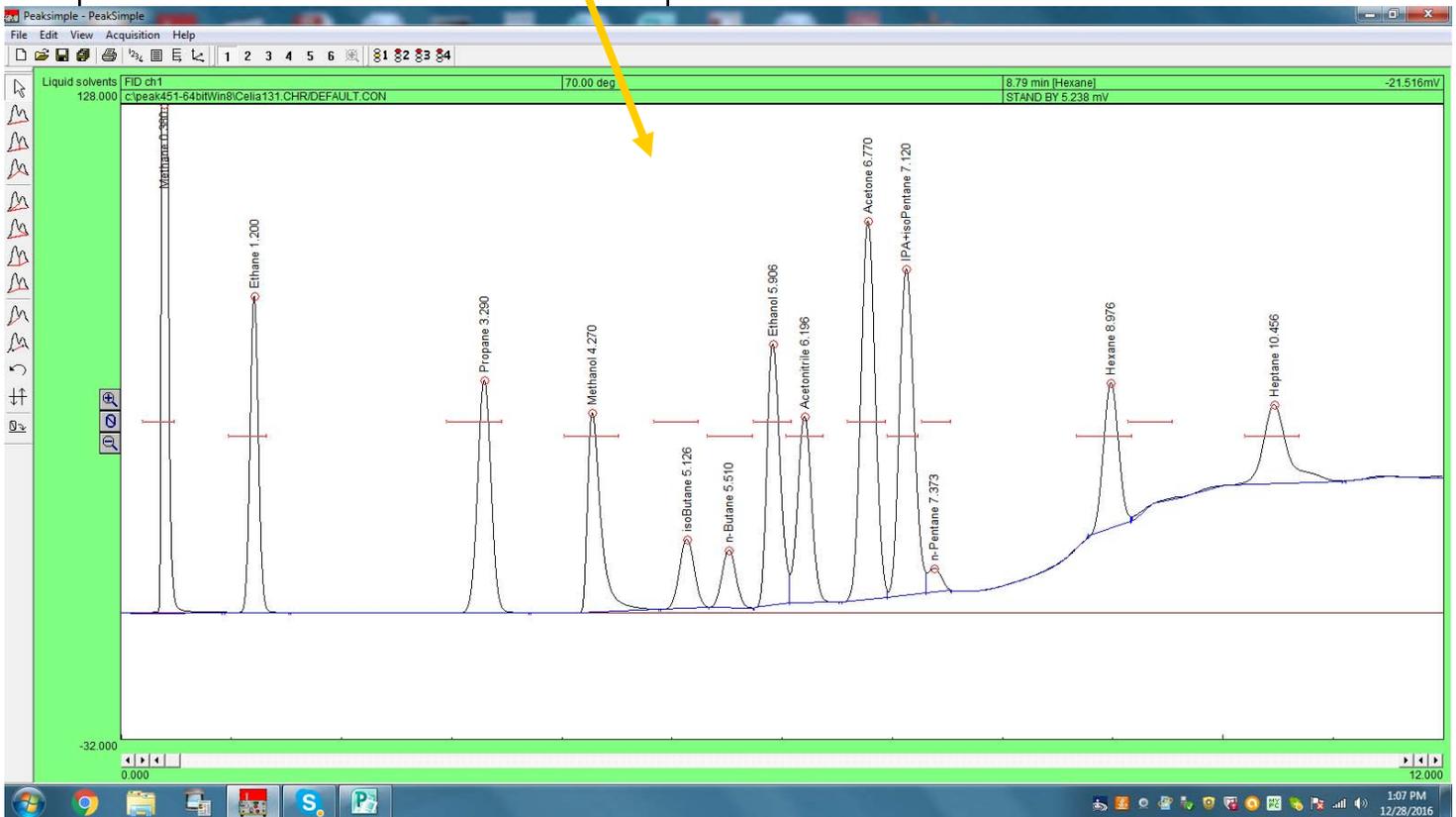
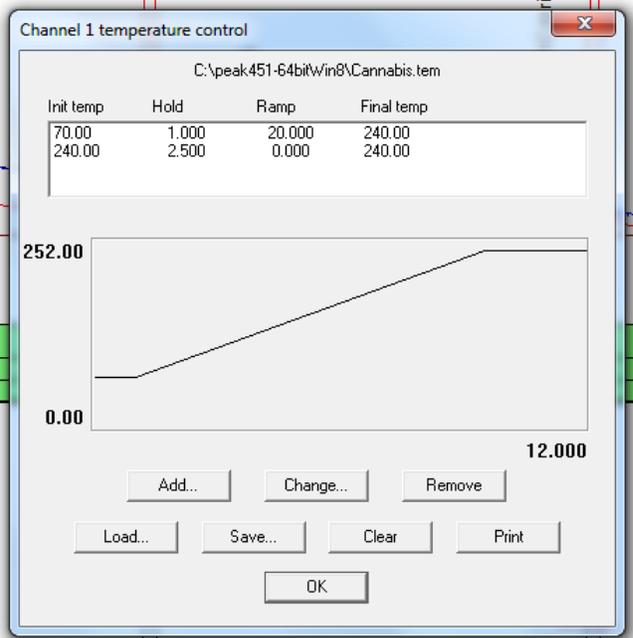


The combo column consisting of a 3 foot Haysep-D and a 3 foot Haysep-R connected in series with a stainless steel fitting can be ordered using SRI part#8600-3D3R which has a list price of \$390 as of January 2017

# Residual Solvents in medical cannabis analysis using the SRI 8610C FID GC

For a Washington State analysis, using the SRI combo column, set the column oven temperature as shown starting at 70C and ramping to 240C.

This is what a mixture of the solvents looks like on this column.



# Residual Solvents in medical cannabis analysis using the SRI 8610C FID GC Jan 2017

To prepare a concentrate for residual solvent analysis measure 100 milligrams of the concentrate into a 40 ml septum vial.



Use a heat gun like the kind Home Depot or Harbor Freight sells for paint stripping to melt the concentrate inside the sealed vial.



Try to coat the inside of the vial with the melted concentrate. This releases the residual solvents into the air which is trapped in the vial.



## Residual Solvents in medical cannabis analysis using the SRI 8610C FID GC Jan 2017

Put the vial in the incubator, which is built-in to the SRI GC, so it stays warm. If the vial is cold, higher boiling solvents like hexane and heptane may condense and will not measure correctly.



Make a calibration standard for the solvents you want to measure. If the legal limit is 500ppm residual ethanol, then make the standard so the amount of ethanol in the standard is close to what 500ppm ( .05% ) of ethanol would look like if it were in the concentrate.

If the weight of the concentrate in the 40ml vial is 100 milligrams( mg ), then the weight of 500ppm of ethanol would be 50 micrograms ( ug ) in the 40ml vial.

1 ml of pure ethanol weighs 789mg, so to make a liquid calibration standard with 50ug of ethanol in 1ul of water, ( same as 50mg/ml ) use your 100ul syringe to measure 63.5ul of pure ethanol into 1ml of water.

Weigh out 1ml of water into a smaller ( 1.5ml ) vial. This will weigh 1 gram.  
Then tare the vial so the scale reads 000.



## Residual Solvents in medical cannabis analysis using the SRI 8610C FID GC Jan 2017

Using the 100ul syringe supplied with the SRI GC, measure 64ul of pure ethanol and add it to the 1ml of water.

The scale should now read 50 milligrams. The photo shows 49mg. You can add a microliter more ethanol at a time using the 10ul syringe until the scale reads exactly 50.

The calibration standard now contains 50ug/ul ( same as 50mg/ml ) ethanol in water.

Using the 10ul syringe provided with the SRI GC, deposit 1ul of the liquid calibration standard into a clean 40ml vial

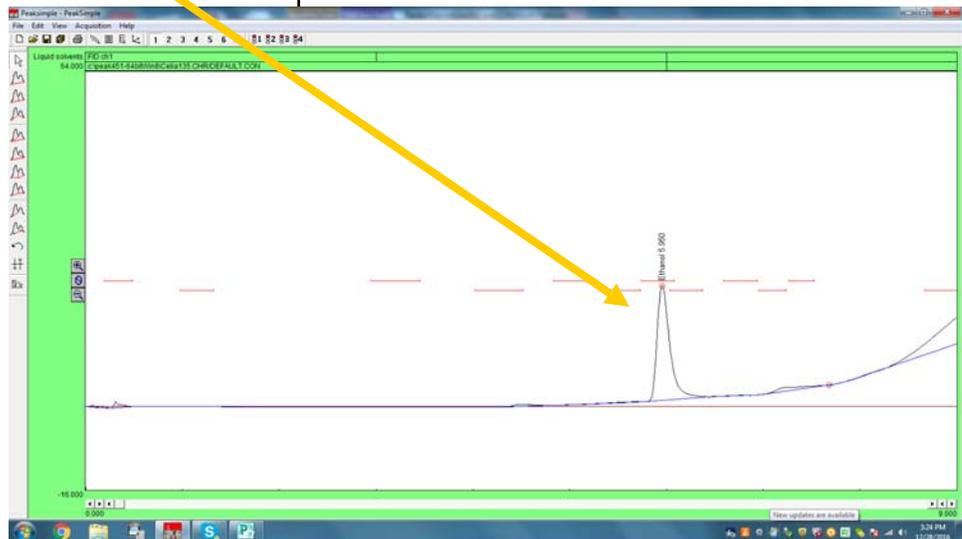


# Residual Solvents in medical cannabis analysis using the SRI 8610C FID GC Jan 2017

Place the 40ml vial into the incubator for a few minutes to make sure the 1ul liquid calibration standard is completely evaporated in the 40ml vial.

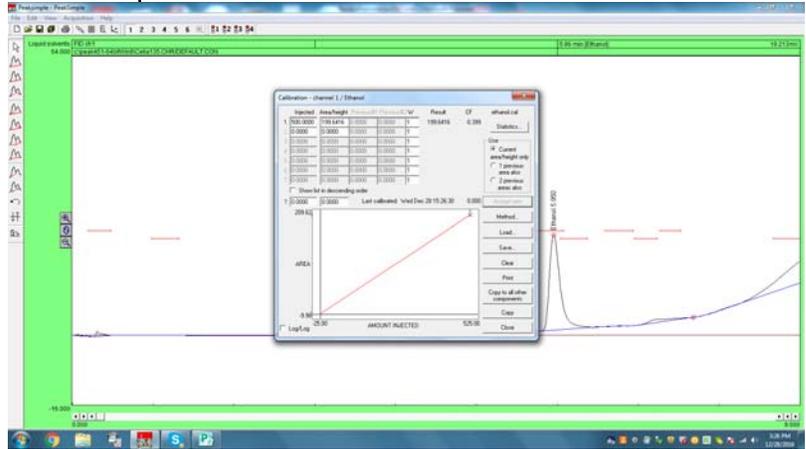
Then using the 1ml plastic medical syringe and 27 gage needle provided with the GC withdraw 1ml of the gas in the 40ml vial and inject into the GC.

You will see the ethanol peak.



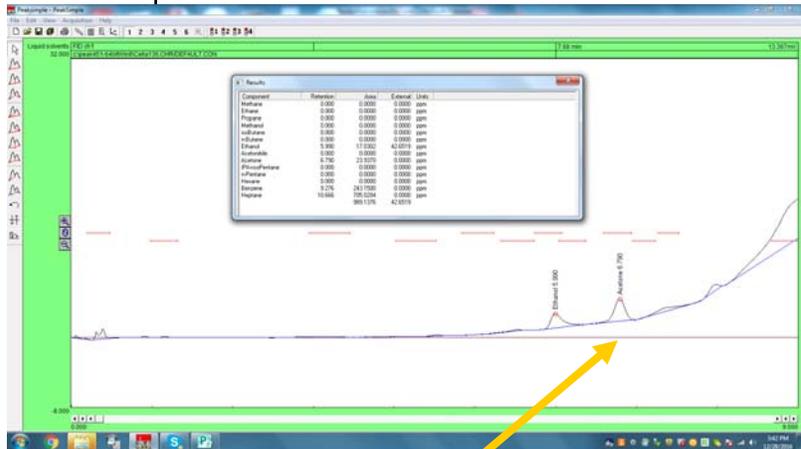
# Residual Solvents in medical cannabis analysis using the SRI 8610C FID GC Jan 2017

Calibrate the ethanol peak as 500ppm.



Inject 1ml of the concentrate sample you previously prepared.

This particular sample calculated out to be 42.6ppm ethanol and also had some acetone for which we were not calibrated.



Acetone