Choosing the Correct Inlet Liner for you GC Analysis

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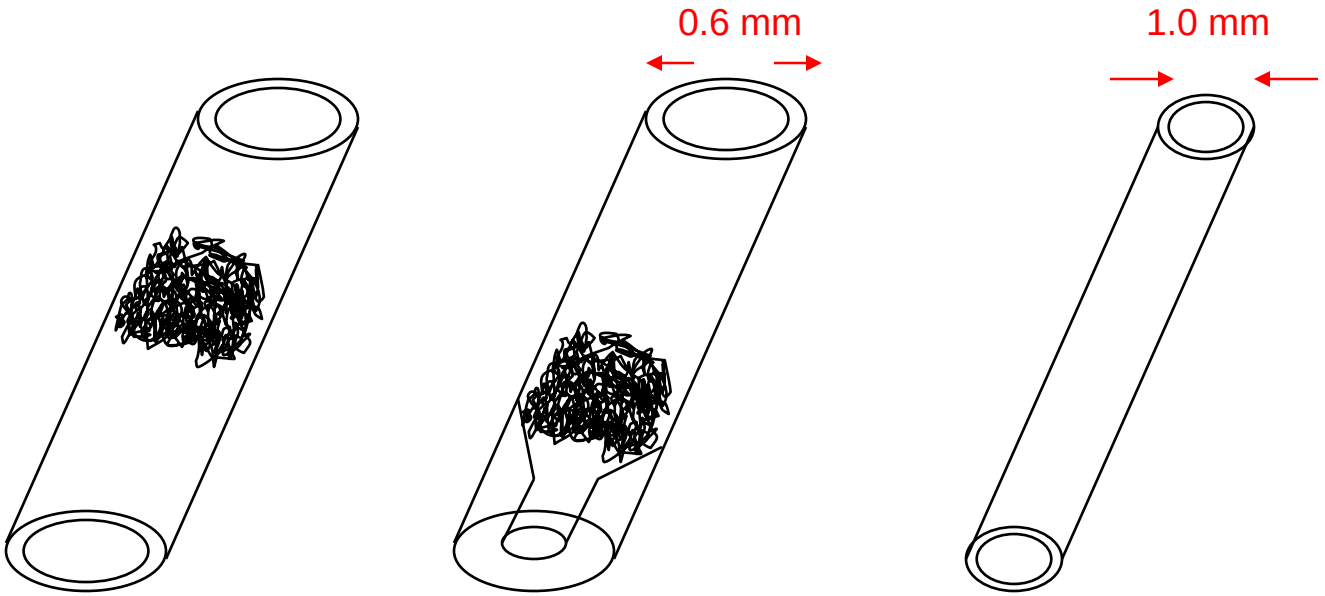
Introduction

Choosing the correct liner for a particular application must take several variables into account. Variables to consider include matching the liner to the injection type, matching the injection volume to the volume of the liner, determine if a vaporization aide is required and if any chemical treatments of the liner are needed.

Outline

- Dimensional characteristics of liners for different injection types
- Matching the injection volume (resulting vapor volume) to the liner volume
- Types of vaporization aids
- Benefits of deactivated liners for active compounds

Liner Dimensions



Split Splitless PTV

Liner Internal Volume

Liner Design	Volume (Range)
Straight Tube	990-100 ul
Tapered	900-800 ul
Cup	800 ul
Special Designs	<700 ul
PTV	100 ul

Different liner designs have different internal volume
May need to check with supplier for liner volume

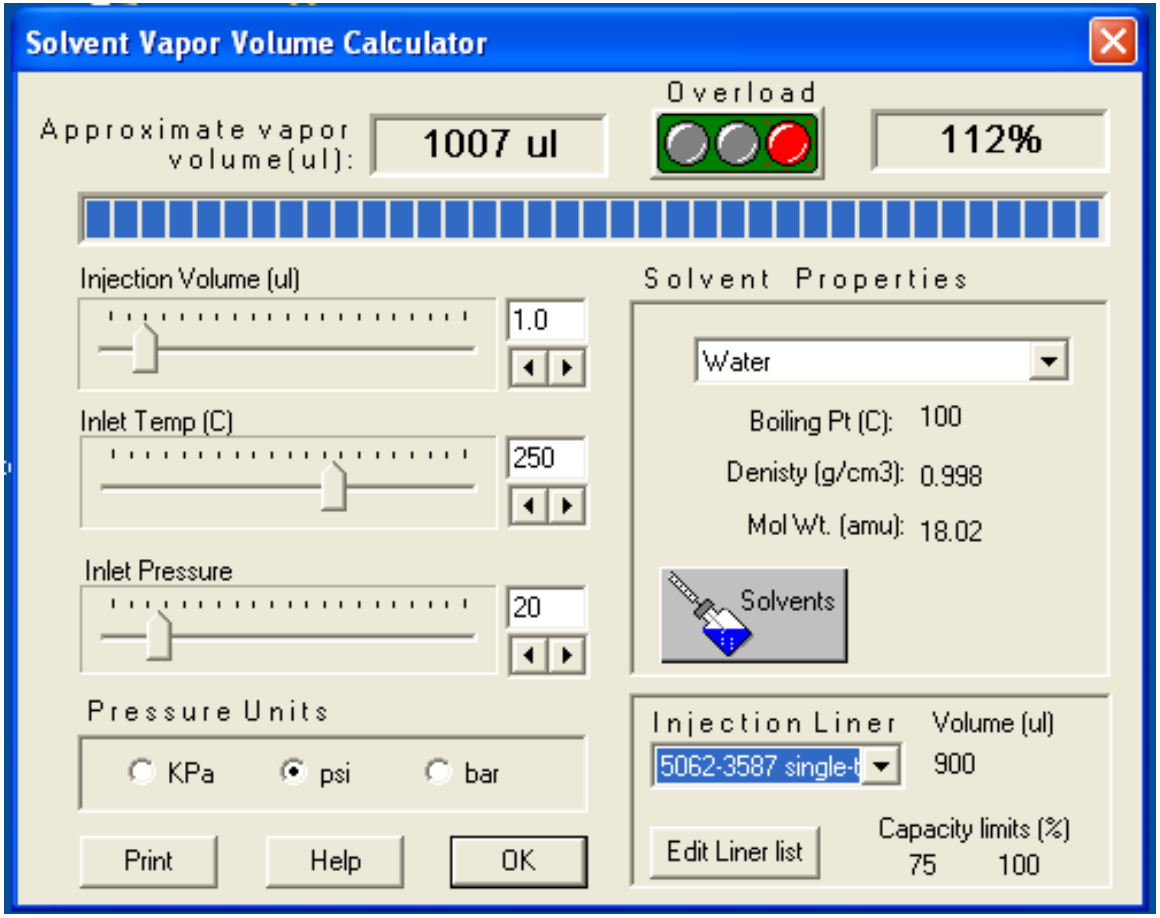
Calculated Vapor Volume of Selected Solvents
1 ul at 250° C

Solvent	20 psi	5 psi
Iso-Octane	110 ul	194 ul
Hexane	139 ul	245 ul
Ethyl Acetate	186 ul	327 ul
Dichloromethane	284 ul	500 ul
Methanol	449 ul	792 ul
Water	1007 ul	1774 ul

Vapor Volume Considerations

- Vapor volume should be a maximum of 75% of liner volume
- Polar solvents have higher vapor volume
- Higher carrier gas pressure gives lower vapor volume
- Increasing injection volume does not result in corresponding increase in peak area
- Over time, excess vapor can condense in split trap

Vapor Volume Calculator



http://www.chem.agilent.com/en-US/Support/Downloads/Utilities/Pages/GcPressureFlow.aspx

Sample Vaporization Aides

- Glass Wool (Most Popular)
  - Deactivated, pesticide grade
- Cups
- Frits
- Tapers

Increase surface area-improved vaporization
Increase activity-decrease response for active compounds

Injection Volume Reproducibility (%RSD)

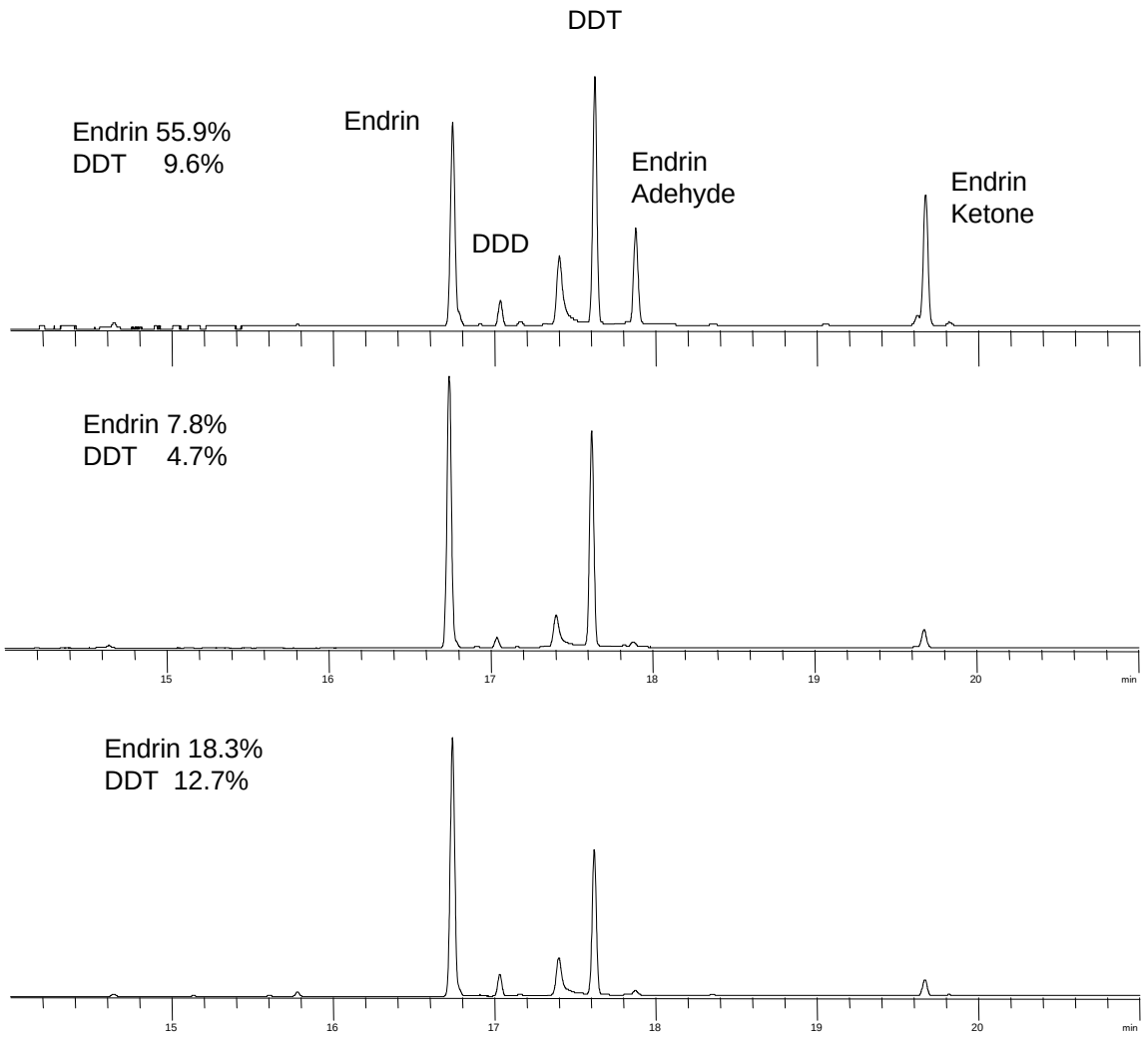
Split Ratio	200x	100x	50x
Standard Liner, No Glass Wool			
C10	3.7	3.3	3.3
C44	9.9	5.4	5.2
Standard Liner, Glass Wool			
C10	2.0	1.1	1.0
C44	2.4	0.9	1.0

Liner Deactivation

- Proprietary
- Hydrophobic
- Can have limited stability
- None present

Deactivated liner good for general use
Stability determined by sample type, cleanliness
Liner activity strongly influenced by glass wool

Liner Activity with/without Glass Wool



Standard Single taper liner w/o GW
No deactivation

Standard Single taper liner w/o GW
Deactivated

Standard Single taper liner with GW
Deactivated

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Conclusions

- Choose the proper liner for the type of injection
- Match the injection size to the internal volume of the liner
  - Check injection volume with Volume Calculator
- Determine what if any vaporization aid is needed
  - Glass wool preferred for most split injections
- Use a deactivated liner (and glass wool) for most applications