FORENSICS

UCT

SELECTRA® DA HPLC COLUMNS FOR THE CLINICAL AND FORENSICS MARKETS

SELECTRA®DA HPLC COLUMNS

SELECTRA®DA HPLC COLUMNS

Product Benefits

- Excellent selectivity for a wide range of therapeutic drugs and drugs of abuse.
- Alternative selectivity from C18 for aromatic compounds.
- Ability to retain compounds that can be difficult on C18.
- Available in 3µm and 5µm spherical particle sizes.
- Significant selectivity changes with choice of acetonitrile or methanol as the organic solvent.

SELECTRA® DA HPLC Column	Part Numbers
50 x 2.1mm 3µm DA	SLDA50ID21-3UM
100 x 2.1mm 3µm DA	SLDA100ID21-3UM
10 x 2.0mm 3µm DA Guard	SLDAGDC21-3UM
50 x 2.1mm 5µm DA	SLDA50ID21-5UM
100 x 2.1mm 5µm DA	SLDA100ID21-5UM
10 x 2.0mm 5µm DA Guard	SLDAGDC21-5UM

HPLC Guard	Part Numbers
HPLC Guard Cartridge Holder	SLGRDHLDR

Chromatogram of Buprenorphine and Norbuprenorphine on SELECTRA® DA Column

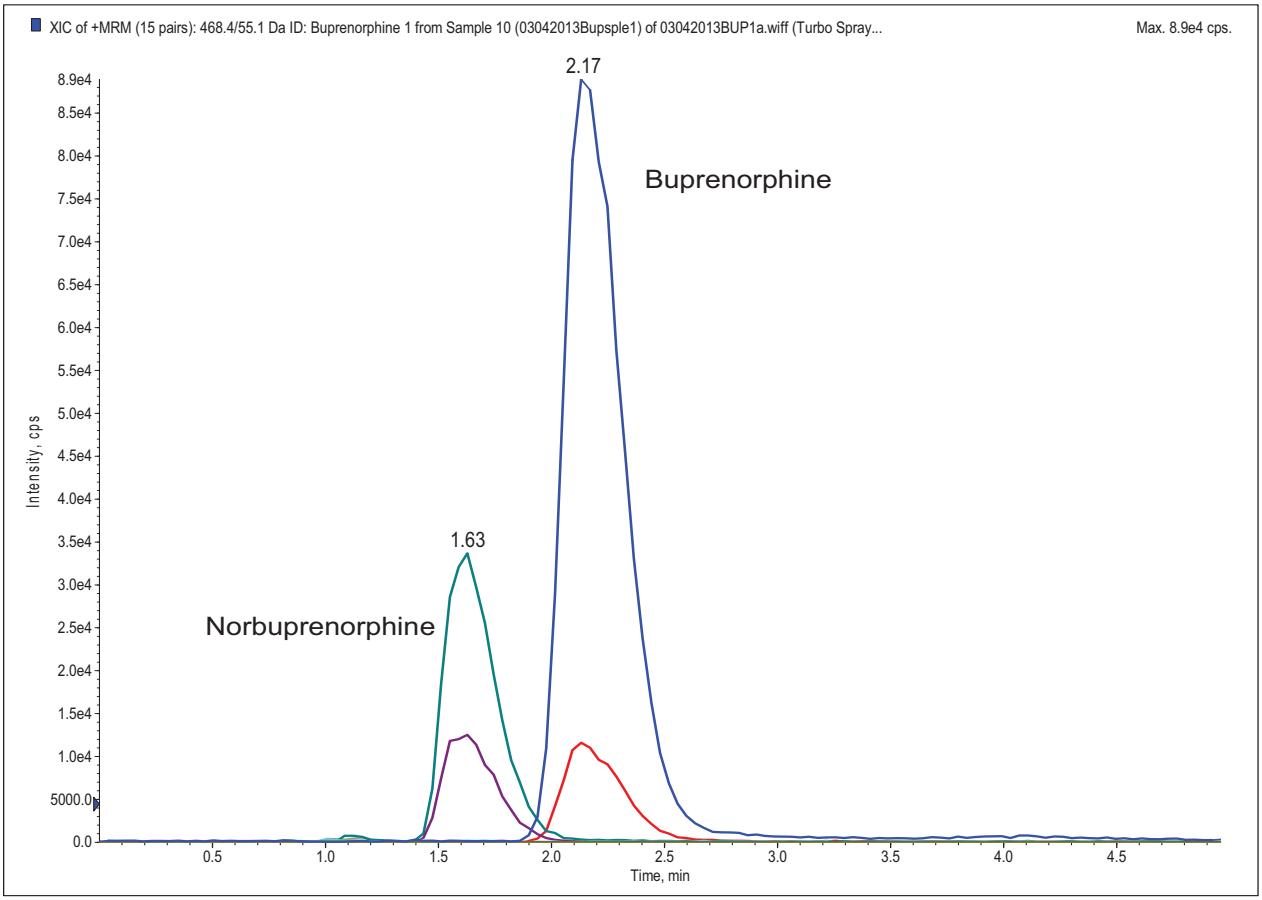
1. **Column:**
   a. UCT Part Number: **SLDA100ID21-5UM**
   b. Dimensions: 100 mm x 2.1 mm
   c. Particle Size: 5 µm
   d. Column Temp = 50 °C

2. **Sample:**
   a. Concentration: 100 ng/ mL
   b. Diluent: 200 µL of mobile phase

3. **Injection Volume:** 10µL

4. **Instrument:** Agilent 1100
   a. Mobile phase: DI Water (0.1% Formic Acid): Methanol (0.1% Formic Acid) (40:60)
   b. Flow rate 0.5 mL/ minute

5. **Detector:** ABSCIEX 4000 Qtrap
   a. Mass Spec info:
      i. Ion Source: ESI
      ii. Ion Mode: Positive
      iii. Ion Spray Voltage: 4500V
      iv. Curtain Gas: 10
      v. Gas 1: 40
      vi. Gas 2: 40
      vii. CAD Gas: Medium
      viii. Source Temp: 650°C
      ix. Mode: Positive
      x. Dwell Time: 150 ms



Mass Spec Table

Compound:	Rt /min	Precursor Ion	Product Ion 1	Product Ion 2
Norbuprenorphine	1.63	414.4	83.1	115.1
Buprenorphine	2.17	468.1	55.1	83.1

Chromatogram of Gabapentin on SELECTRA® DA Column

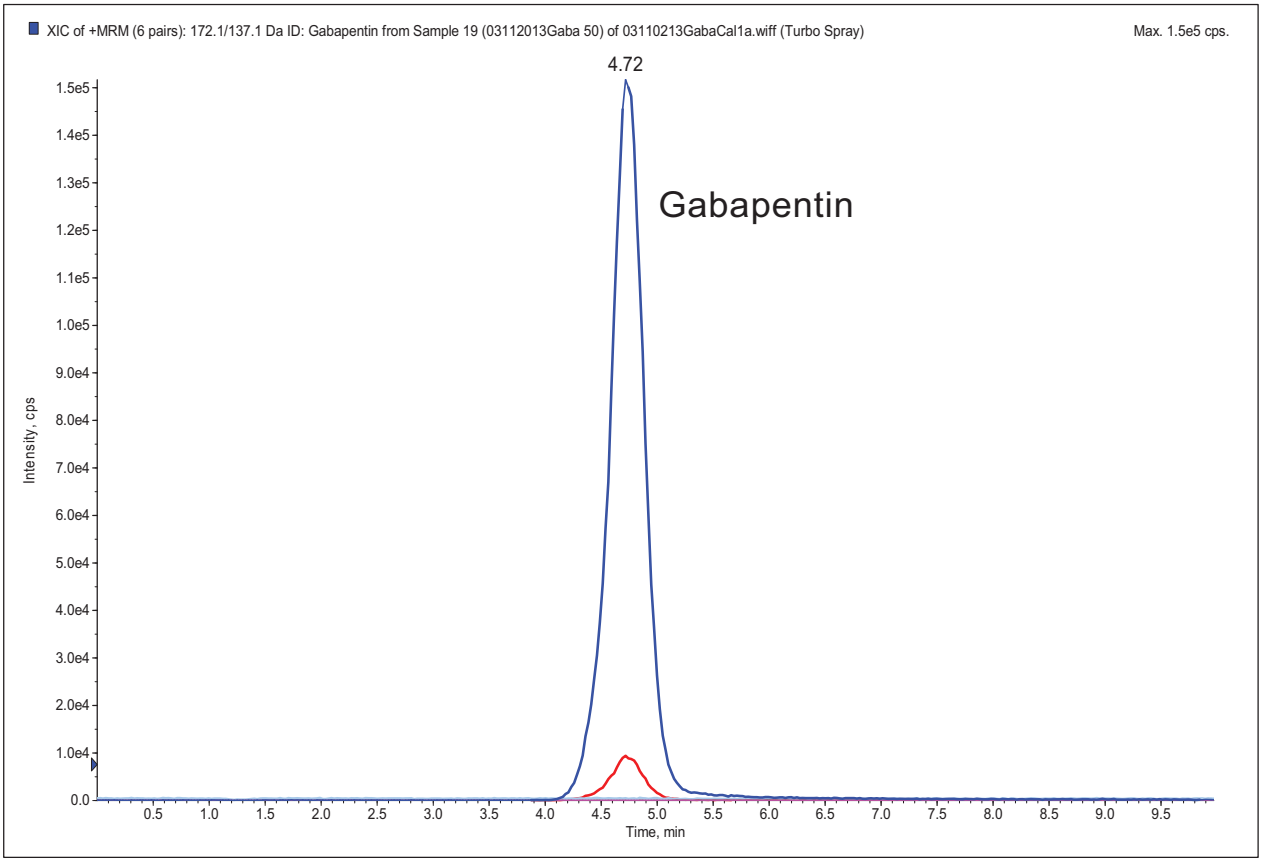
1. **Column:**
   a. UCT Part Number: **SLDA100ID21-5UM**
   b. Dimensions: 100 mm x 2.1 mm
   c. Particle Size: 5 µm
   d. Column Temperature: 50 °C

2. **Sample:**
   a. Concentration: 100 ng/ mL
   b. Diluent: 200 µL of mobile phase

3. **Injection Volume:** 10 µL

4. **HPLC:** Agilent 1100
   a. Mobile phase: DI Water w/ 0.1% Formic Acid: Methanol w/ 0.1% Formic Acid (70:30)
   b. Flow rate 0.5 mL/ minute

5. **Detector:** ABSCIEX 4000 Qtrap
   a. Mass Spec info:
      i. Ion Source: ESI
      ii. Ion Mode: Positive
      iii. Ion Spray Voltage: 4500V
      iv. Curtain Gas: 10
      v. Gas 1: 40
      vi. Gas 2: 40
      vii. CAD Gas: Medium
      viii. Source Temp: 650 °C
      ix. Mode: Positive
      x. Dwell Time: 150 ms



Mass Spec Table

Compound	Rt /min	Precursor Ion	Product Ion 1	Product Ion 2
Gabapentin	4.72	172.1	137.1	67.1

Chromatogram of Salbutamol & Clenbuterol on SELECTRA® DA Column

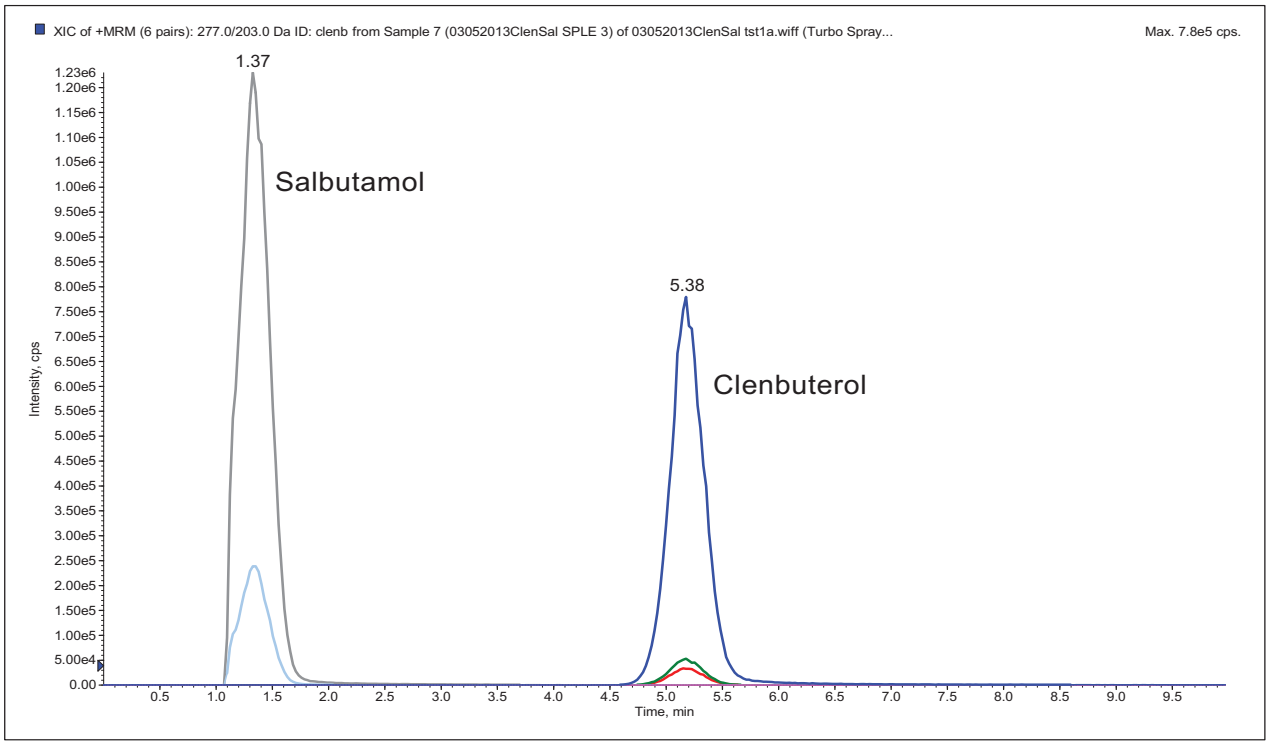
1. **Column:**
   a. UCT Part Number: **SLDA100ID21-5UM**
   b. Dimensions: 100 mm x 2.1 mm
   c. Particle Size: 5 µm
   d. Column Temperature: 50 °C

2. **Sample:**
   a. Concentration: 100 ng/mL
   b. Diluent: 200 µL of mobile phase

3. **Injection Volume:** 10 µL

4. **HPLC:** Agilent 1100
   a. Mobile phase: DI Water w/ 0.1% Formic Acid: Methanol w/ 0.1% Formic acid (70:30)
   b. Flowrate 0.5 mL/ minute
   c. Column Temperature = 50 °C

5. **Detector:** ABSCIEX 4000 Qtrap
   a. Mass Spec info:
      i. Ion Source: ESI
      ii. Ion Mode: Positive
      iii. Ion Spray Voltage: 4500V
      iv. Curtain Gas: 10
      v. Gas 1: 40
      vi. Gas 2: 40
      vii. CAD Gas: Medium
      viii. Source Temp: 650 °C
      ix. Mode: Positive
      x. Dwell Time: 150 ms



Mass Spec Table

Compound:	Rt /min	Precursor Ion	Product Ion 1	Product Ion 2
Salbutamol	1.37	240.0	148.0	127.0
Clenbuterol	5.38	277.1	203.0	168.0

Chromatogram of JWH-073 & JWH-018 on SELECTRA® DA Column

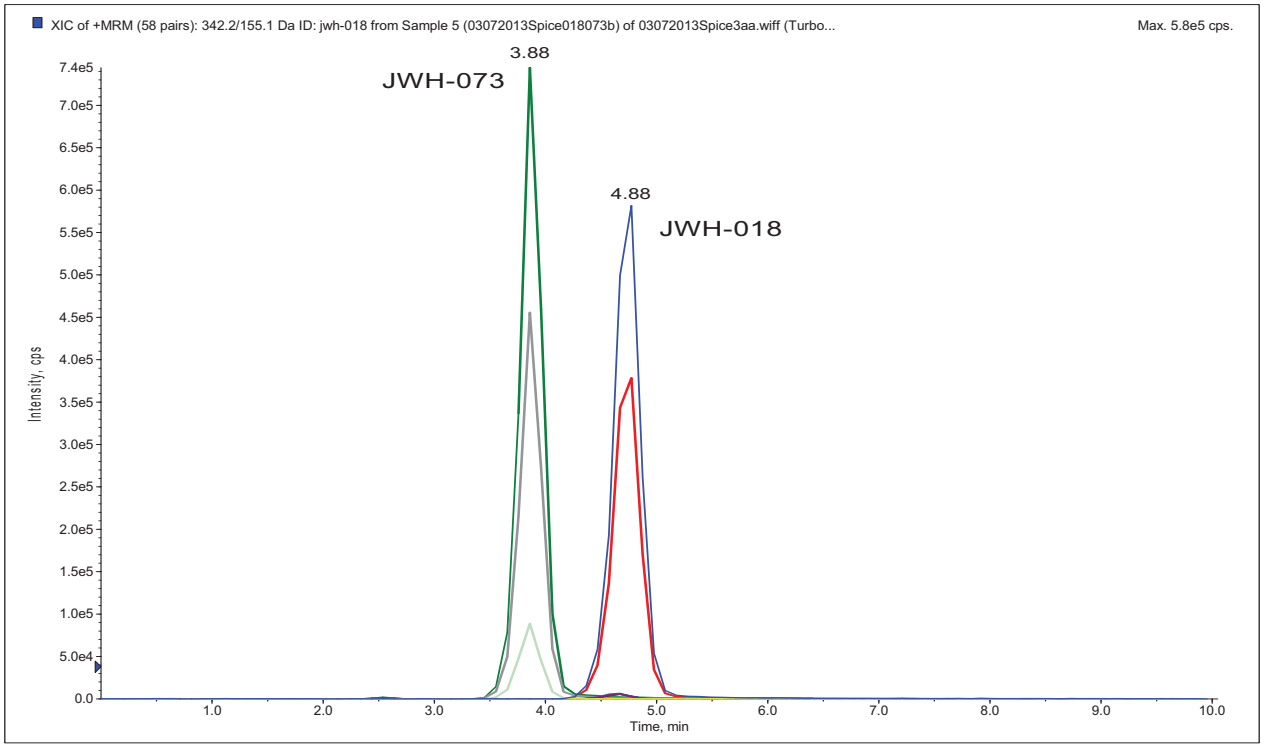
1. **Column:**
   a. UCT Part Number: **SLDA100ID21-5UM**
   b. Dimensions: 100 mm x 2.1mm
   c. Particle Size: 5 µm
   d. Column Temperature: 50 °C

2. **Sample:**
   a. Concentration: 100 ng/ mL
   b. Diluent: 200 µL of mobile phase

3. **Injection Volume:** 10µL

4. **HPLC:** Agilent 1100
   a. Mobile Phase: DI Water w/ 0.1% Formic Acid: Methanol w/ 0.1% Formic Acid (20:80)
   b. Flowrate 0.7 mL/ minute

5. **Detector:** ABSCIEX 4000 Qtrap
   a. Mass Spec info:
      i. Ion Source: ESI
      ii. Ion Mode: Positive
      iii. Ion Spray Voltage: 4500V
      iv. Curtain Gas: 10
      v. Gas 1: 40
      vi. Gas 2: 40
      vii. CAD Gas: Medium
      viii. Source Temp: 650°C
      ix. Mode: Positive
      x. Dwell Time: 150 ms



Mass Spec Table

Compound	Rt/ minutes	Precursor Ion	Product Ion 1	Product Ion 2
JWH-073	3.88	328.2	155.0	127.0
JWH-018	4.88	342.2	155.0	127.0

Chromatogram of Amphetamine, Acetaminophen, PCP, EDDP, & Methadone on SELECTRA® DA Column

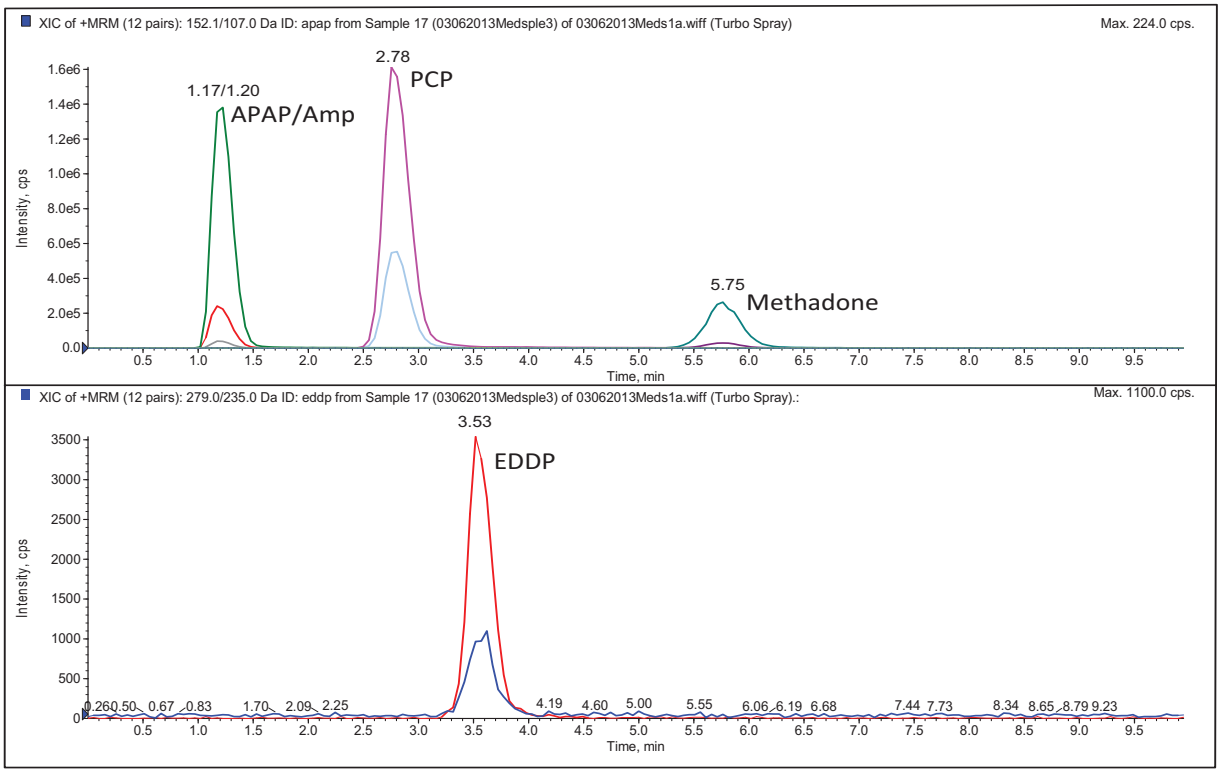
1. **Column:**
   a. UCT Part Number: **SLDA100ID21-5UM**
   b. Dimensions: 100 mm x 2.1 mm
   c. Particle Size: 5 µm
   d. Column Temperature: 50 °C

2. **Sample:**
   a. Concentration: 100 ng/ mL
   b. Diluent: 200 µL of mobile phase

3. **Injection Volume:** 10 µL

4. **HPLC:** Agilent 1100
   a. Mobile Phase: DI Water w/ 0.1% Formic Acid: Methanol w/ 0.1% Formic Acid (45:55)
   b. Flowrate : 0.5 mL/ minute

5. **Detector:** ABSCIEX 4000 Qtrap
   a. Mass Spec info:
      i. Ion Source: ESI
      ii. Ion Mode: Positive
      iii. Ion Spray Voltage: 4500V
      iv. Curtain Gas: 10
      v. Gas 1: 40
      vi. Gas 2: 40
      vii. CAD Gas: Medium
      viii. Source Temp: 650°C
      ix. Dwell Time: 150 ms



Mass Spec Table

Compound	Rt/ minutes	Precursor Ion	Product Ion 1	Product Ion 2
APAP	1.17	152.1	107.1	110.0
Amphetamine	1.20	136.0	90.9	118.1
PCP	2.78	244.1	91.0	86.0
Methadone	5.75	310.0	265.0	105.0
EDDP	3.53	279.0	235.0	250.0

Determination of THC in Marijuana Samples Using Solid Phase Extraction and LC-MS/MS

UCT Part Numbers:
CSTHC206: CLEAN SCREEN® THC, 200mg x 6mL
SLDA100ID21-5UM: SELECTRA® DA (100mm x 2.1mm, 5 µm) LC Column
SLDAGDC21-5UM: SELECTRA® DA (10mm x 2.0mm) Guard Column
SPHPHO7001-5: 0.1M Phosphate Buffer pH 7

Procedure

1. Extraction

a. Add 100 mg of Marijuana sample into a clean glass sample tube
b. Add 5 mL of methanol and cap
c. Sonicate for approximately 60 minutes at room temperature
d. Centrifuge for 10 minutes at 3000 rpm
e. Aliquot 500 µL-1 mL of methanol extract into a clean glass sample tube
f. Add *internal standard and mix.
g. Add 4 mL of 0.1 M phosphate buffer (pH 7) and mix

2. Condition CLEAN SCREEN® Extraction Column

a. 1 x 3 mL CH_3OH
b. 1 x 3 mL D.I. H_2O
c. 1 x 1 mL 0.1 M phosphate buffer (pH 7.0)

NOTE: Aspirate at < 3 inches Hg to prevent sorbent drying.

3. Apply Sample

a. Load at 1 to 2 mL/minute.

4. Wash Column

a. 1 x 3 mL D.I. H_2O
b. 1 x 3 mL 100 0.1 M phosphate buffer (pH 7.0).
c. Dry column (5 minutes at > 10 inches Hg).

5. Elute THC

a. 1 x 3 mL hexane/ethyl acetate/ acetic acid (49:49: 2)
b. Collect eluate at 1 to 2 mL / minute.

Instrument Conditions

Column: 100 x 2.1 mm (5 µm) SELECTRA® DA
Column Temperature: 40°C
Mobile phase: DI H_2O w/ 0.1% Formic acid: CH_3OH w/ 0.1% Formic acid (25:75)
Flowrate: 0.5 mL/ minute
Detector: API 4000 MS/MS

MS parameters	
Polarity	ESI+
Spray voltage V	4500V
Source Temperature	650° C
Curtain Gas	10
Gas 1	40
Gas 2	40

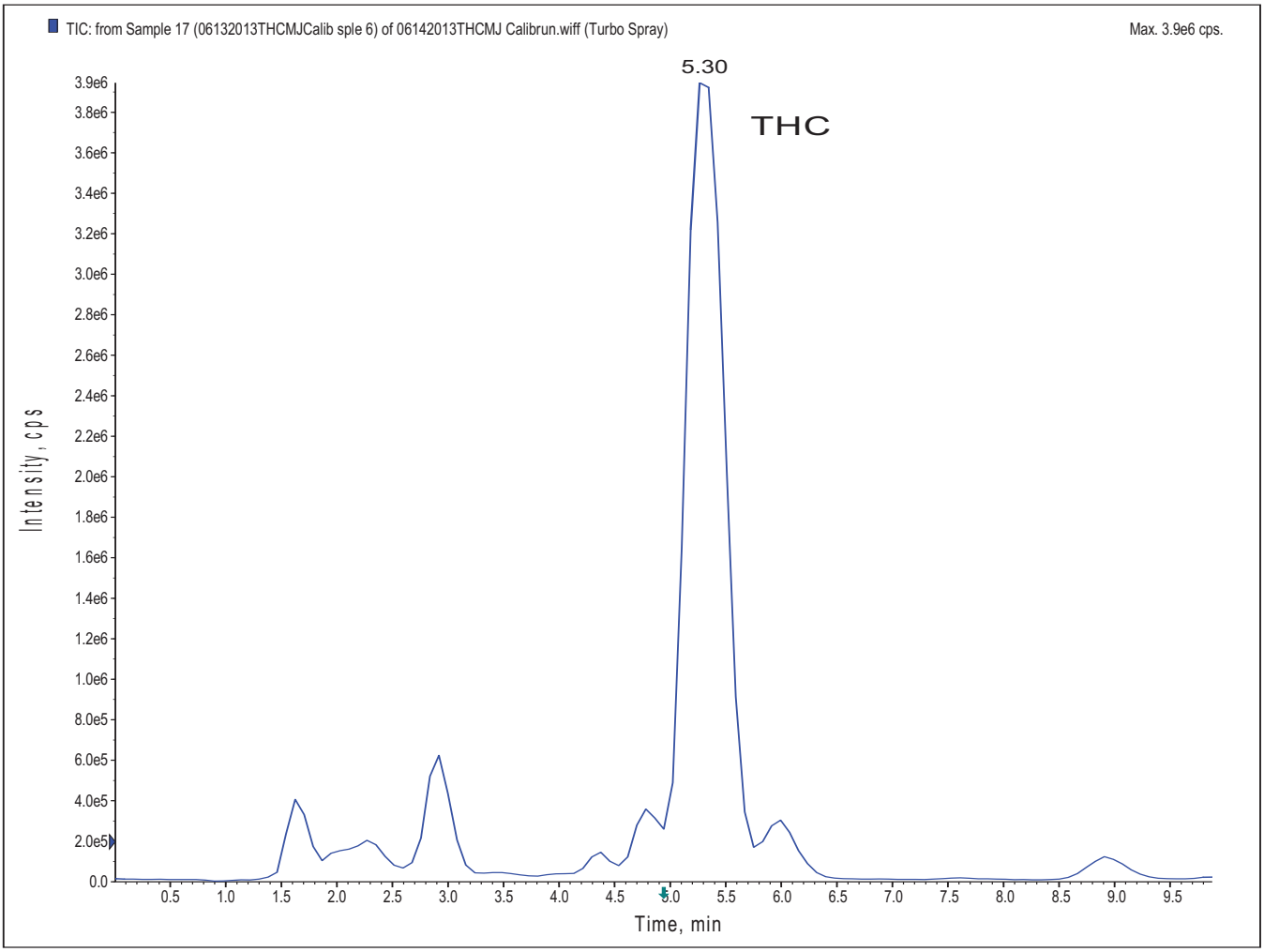
Mass Spec Table

Compound	Q1	Q3	DP/ volts	EP/ volts	CXP/ volts	CE/ volts
THC (1)	315.2	193.2	46	18.8	29	4
THC (2)	315.2	123.1	46	18.8	45	4
*THC-D3 (1)	318.2	196.2	46	18.8	29	4
*THC-D3 (2)	318.2	123.2	46	18.8	43	4

Note: Q1=Precursor Ion; Q3=Product Ion; DP= Declustering Potential; EP= Entrance Potential; CXP= Collision Exit Potential; CE= Collision Energy

*Internal Standard

Chromatogram of THC extracted from Marijuana sample



Determination of Benzodiazepines in Hair Samples Using Solid Phase Extraction and LC-MS/MS

UCT Part Numbers:
CSDAU206: CLEAN SCREEN® DAU 200mg x 6mL
SLDA100ID21-5UM: SELECTRA® DA (100mm x 2.1mm, 5 µm) LC Column
SLDAGDC21-5UM: SELECTRA® DA (10mm x 2.0mm) Guard Column
SPHPHO6001-5: 0.1M Phosphate Buffer pH 6

Procedure

1. Extraction
a. Add 10 -50 mg of decontaminated hair into a clean glass sample tube
b. Add 3 mL of 0.1 M phosphate buffer and mix
c. Sonicate for 12 hours at room temperature
d. Centrifuge for 10 minutes at 3000 rpm
e. Transfer clear liquid to a clean glass sample tube
f. Add internal standards* and mix

2. Condition CLEAN SCREEN® Extraction Column
a. 1 x 3 mL CH_3OH
b. 1 x 3 mL D.I. H_2O
c. 1 x 1 mL 0.1M phosphate buffer (pH 6.0)

NOTE: Aspirate at < 3 inches Hg to prevent sorbent drying

3. Apply Sample
a. Load at 1 to 2 mL/minute.

4. Wash Column
a. 1 x 3 mL D.I. H_2O.
b. 1 x 3 mL 0.1 M phosphate buffer (pH 6.0). containing 5% acetonitrile.
c. Dry column (5 minutes at > 10 inches Hg).

5. Elute Benzodiazapines
a. 1 x 3 mL of ethyl acetate containing 2% ammonium hydroxide
b. Collect eluate at 1 to 2 mL / minute.

6. Dry Eluate
a. Evaporate to dryness under nitrogen < 40°C
b. Reconstitute in 100 µL of mobile phase

Instrument Conditions

Column: 100 x 2.1 mm (5 µm) SELECTRA® DA
Column Temperature: 40°C
Mobile phase: DI H_2O w/ 0.1% Formic acid: CH_3OH w/0.1% Formic acid (30:70)
Flowrate: 0.4 mL/ minute
Injection Volume: 10 µL
Detector: API 4000 MS/MS

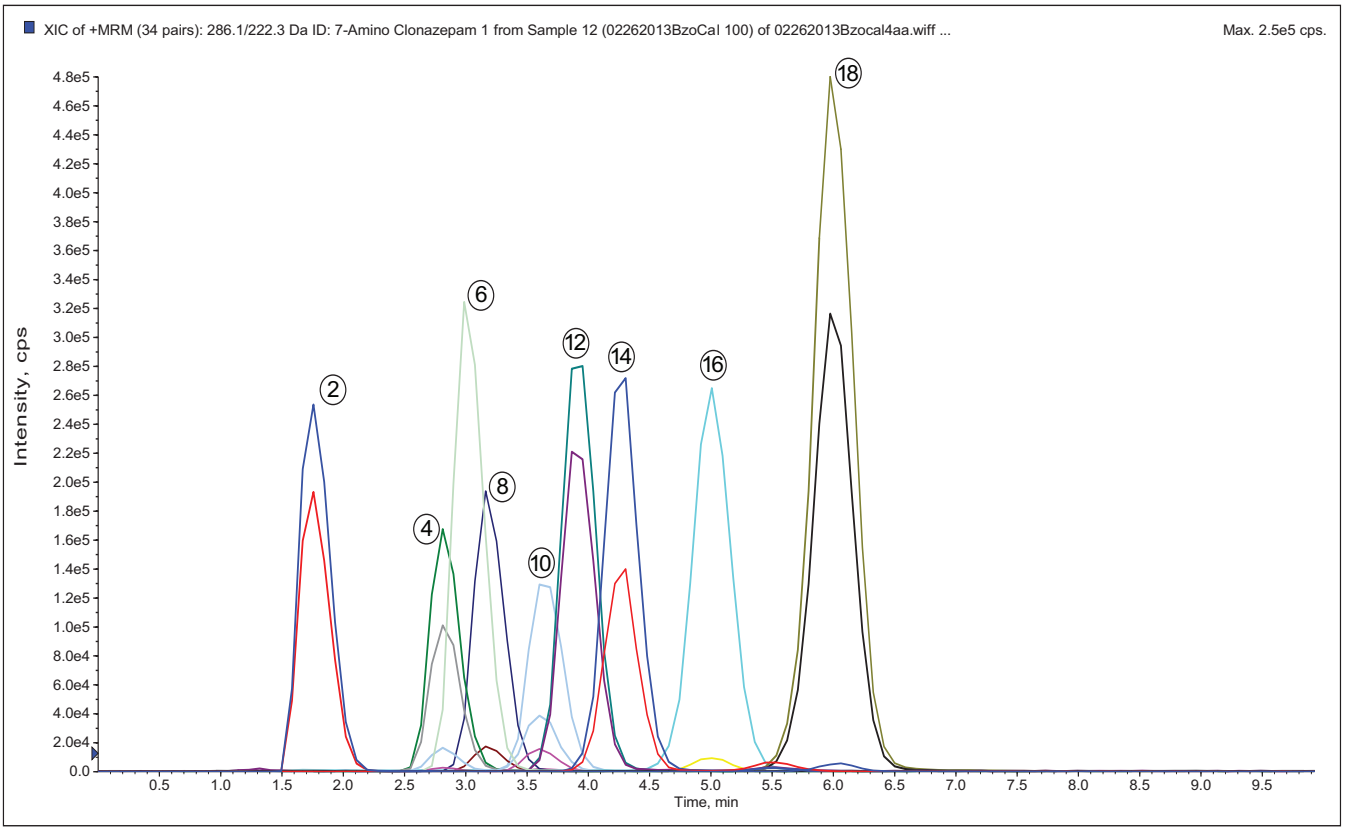
MS parameters	
Polarity	ESI+
Spray voltage V	4500V
Source Temperature	650° C
Curtain Gas	10
Gas 1	40
Gas 2	40
CAD Gas	Medium
Dwell Time	150ms

Mass Spec Table

Compound	Peak Number	RT	Precursor Ion	Product Ion 1	CE1	Product Ion 2	CE 2	DP	EP	CXP
*7-aminoclonazepam-D4	1	1.73	290.12	93.98	30	121.02	30	56	9	4
7-aminoclonazepam	2	1.75	286.09	222.3	31	250.2	27	56	9	4
*Lorazepam-D5	3	2.79	325.11	279.2	37	307	35	51	5.5	4
Lorazepam	4	2.82	321.06	275	29	303.3	21	46	6.5	4
*Oxazepam-D5	5	2.95	292.12	246.2	29	274.3	19	41	4.5	4
Oxazepam	6	3.01	287.09	241.3	31	104.1	21	46	4.5	4
*Clonazepam-D4	7	3.14	320.1	270.4	37	244.2	37	56	8	4
Clonazepam	8	3.17	316.13	270.2	39	241.2	37	56	8	4
*Alpha-hydroxyalprazolam-D5	9	3.62	330.18	302.2	33	284.2	53	56	10	4
Alpha-hydroxyalprazolam	10	3.64	325.18	297.1	33	216.3	33	56	9	4
*Nordiazepam-D5	11	3.86	276.08	213.4	29	165.1	51	41	8	4
Nordiazepam	12	3.91	271.09	140.1	35	165.2	37	56	9	4
*Temazepam-D5	13	4.23	306.17	260.8	27	288.8	19	41	3.5	4
Temazepam	14	4.27	301.12	255.2	50	177.2	50	60	4.5	4
*Alprazolam-D5	15	5.00	314.15	286..5	43	279.3	33	56	7	4
Alprazolam	16	5.04	309.16	281.2	33	205.3	33	66	8	4
*Diazepam-D5	17	5.95	290.16	198.3	29	227.3	21	36	7	4
Diazepam	18	5.99	285.11	193.1	43	154.1	37	56	10	4

Note: DP= Declustering Potential; EP= Entrance Potential; CEP= Collision Entrance Potential; CE= Collision Energy; CXP= Collision Exit Potential

Chromatogram of Benzodiazepines Extracted from Decontaminated Hair



Note: Chromatogram includes only the benzodiazepines, deuterated internal standards are not shown

Column Care & Usage

Each UCT, LLC high performance liquid chromatography (HPLC) column is individually packed and tested to ensure superior performance. A HPLC CoA is included with each column. It contains a chromatogram, the column serial number, and the lot number of the packing material. Retain this information for as long as you have the column; it may be useful if troubleshooting is ever required.

Guard Columns & Filters

In-line filters and/or guard cartridges can extend the life of an analytical column. They are connected in-line prior to the analytical column.

• Pressure Recommendation

UCT, LLC HPLC columns are silica based. To ensure optimal column life, operating pressures of 3000psi or lower are recommended. Column pressures may increase as the column ages as particulates from the system accumulate on the column. Sudden increases in pressure are usually a result of a blocked frit. Pressure will vary with different mobile phases. For example Water/Methanol mixtures will generally give higher back pressure than Water/Acetonitrile mobile phases. (see Table I)

• Guard Cartridges

Guard cartridges are used to capture impurities that may otherwise lodge on the HPLC column. Guard cartridges are especially useful with samples from biological sources as these may contain lipids and proteins that pass through frits can quickly block columns. Guard cartridges should have the same phase as the column they are protecting. Guard cartridges should be replaced when the chromatography begins to deteriorate or when the guard cartridge contributes excessive back pressure to the HPLC system.

Mobile Phase

When shipped, the column contains the storage solvent listed on its HPLC CoA. Before use the first time, ensure that your initial planned mobile phase is compatible with this solvent (see Table II). If it is not, you must flush the column with an intermediate solvent that is compatible with both the storage solvent and your planned mobile phase. Be especially cognizant if you are using buffers; the storage solvent for most columns contains greater than 50% organic solvent, and contact with a buffer could cause a salting out effect. The resulting precipitate can plug the column.

Flow Direction & Flow Rate

The arrows on the column label indicate the recommended flow direction.

Begin by connecting the inlet end of the column to the injector or autosampler and allow mobile phase to flow from the outlet end of the column into a beaker for 10–15 minutes. Gradually increase the flow rate. For recommended flow rates refer to Table III. Then, stop the mobile phase flow and connect the column to your detector. Because every LC system is unique, especially when used in gradient mode, your results may slightly differ from those obtained in our laboratory. UCT, LLC Technical Service can assist you in optimizing your separations. Be sure to record the operating pressure before calling.

Increasing Column Lifetime

Silica based UCT, LLC HPLC column packing materials have a pH operating range of 2-8. Extended use of any column at extreme pH can shorten column lifetime.

The upper temperature limit for silica based HPLC columns is 80 °C. Elevated temperatures can improve efficiency by lowering solvent viscosity, but column lifetime may be compromised.

Use of HPLC-Grade solvents is strongly recommended. Residue and chemical contaminants in non-HPLC grade solvents can alter a column's selectivity and, potentially plug the inlet frit leading to an increased system pressure. Mobile phase filtering and degassing (either off-line or in-line) is highly recommended.

Column lifetime is also governed by stationary phase type. Hydrocarbon phases, such as C18, are relatively chemically inert. Polar phases, such as cyano or amino, require somewhat more care as they can be chemically active.

Column Maintenance

Columns should not be subjected to mechanical or pressure shock. This can cause irreversible damage to the column.

Columns should be run in the flow direction as marked on the column. The one exception is for column cleaning. The flow can be reversed to back-flush frits if blockages occur.

Do not store the column in an aqueous buffer, this will promote microbiological contamination. First flush the column with water and then with 50/50 organic solvent/water prior to storage.

Washing Procedure for Reverse-Phase Columns

Washing the column successively with non-polar eluents will usually remove accumulated impurities. Follow the washing sequence below, using 30ml of each solvent, to thoroughly clean the column.

1. Distilled water 90%, 10% Methanol
2. 0.5M H3P04 90%, 10% Methanol (Optional)*
3. Distilled water 90%, 10% Methanol (Optional)*
4. Methanol
5. Methanol/Chloroform (1:1) (Optional)
6. Methanol or Acetonitrile (Optional)
7. Distilled water 90%, 10% Methanol
8. Eluent to recondition column

*NOTE: Whenever step 2 is used, it must be followed by step 3.

It is recommended that columns be dedicated for the specific method when ion pairing reagents are used. This is because it is difficult to remove all of the ion pairing reagent.

- Protein Contamination

Proteins can adsorb onto columns causing loss of performance. In this situation rinse the column overnight with 20% 0.1M nitric acid/80% isopropanol at a flow rate of 1/5th the usual flow rate (i.e. at 0.2 ml/min for 4.6mm ID columns). Ensure that the rinse solution is directed directly to solvent waste and not through the detector.

- Lipid Contamination

If lipids or other highly hydrophobic compounds have contaminated the column use the full washing procedure except replace step 5 with 100% chloroform or dichloromethane.

Table I: Mobile Phase Viscosity Comparison

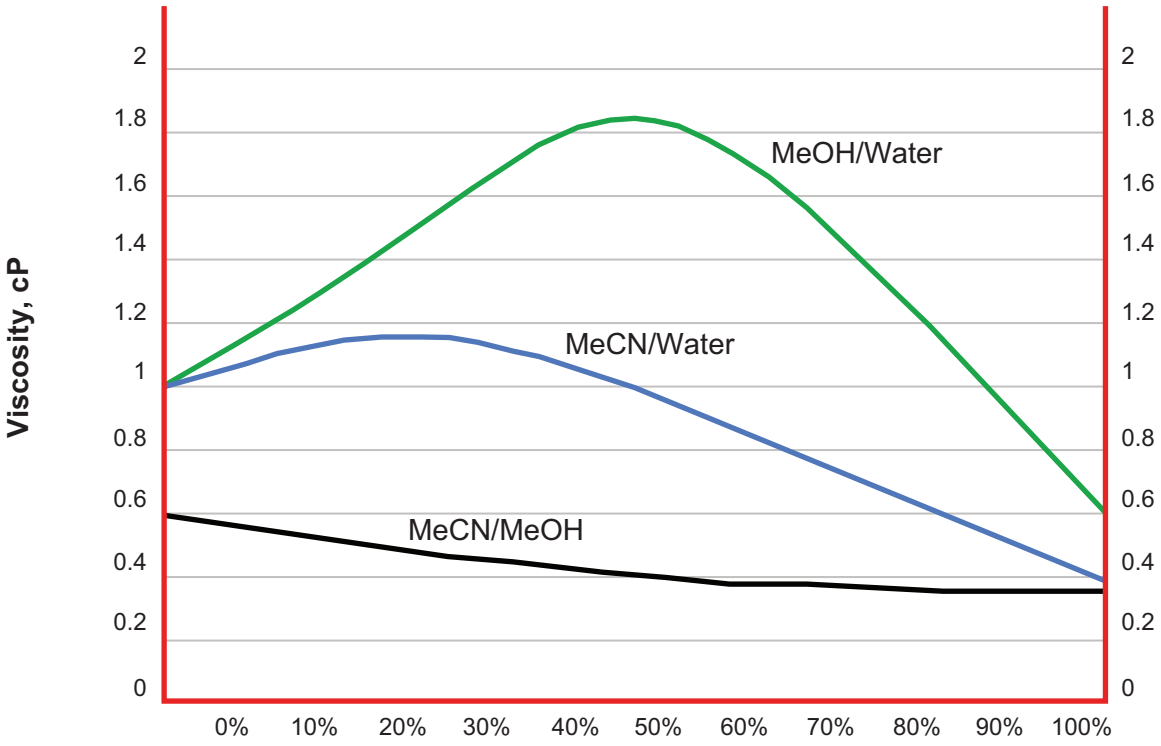


Table II: Solvent Miscibility Chart

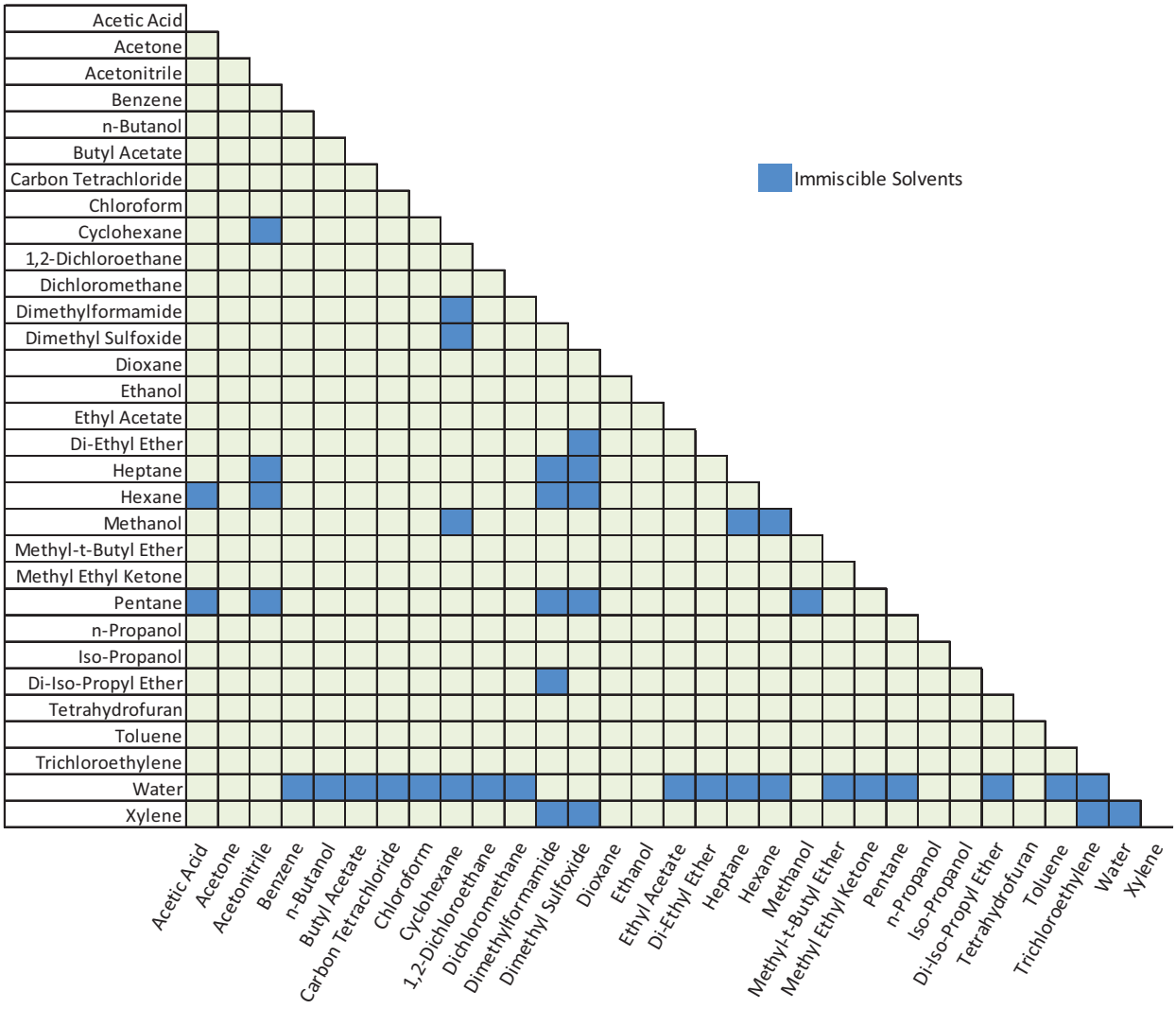


Table III: Optimal Flow Rates Based on Particle Diameter and Column ID

Optimal Flow Rate (mL/min)

I.D. (mm)	Packing Particle Size (µm)	
	3	5
2.1	0.10-0.15mL/min	0.18-0.27mL/min

PRICES AND TERMS

Our prices are subject to change without notice. The price in effect when we receive your order will apply. All prices are in US Dollars and are F.O.B. Lewistown, PA 17044. Terms of payment are net 30 days.

MINIMUM ORDERS

We welcome all orders, therefore, we do not have a minimum order requirement. When ordering, please include your purchase order number, complete "Ship To" and "Bill To" address, catalog number, quantity, and description of product(s). Also include your name and a phone number where you can be reached should we have any questions concerning your order.

SHIPMENTS

Normal processing is within 24 hours after receipt of an order. Unless special shipping requests have been made, our trained staff will send all orders by UPS Ground service. The appropriate shipping charges (freight & insurance costs) will be added to the invoice, unless otherwise instructed by the customer.

SPECIAL PRICING

We offer special pricing for volume purchases and standing orders. Please call a sales representative for more information on special pricing qualifications.

RETURN POLICY

Our Quality Manager will handle all returns. Before returning merchandise, please call to obtain a return authorization number from the quality manager. We will need to know the reason for the return, date of purchase, purchase order number and invoice number in order to issue a return authorization number. Return merchandise must be received before a credit can be issued. Returns will not be accepted after 90 days. A restocking fee of 25% of the price paid, or a minimum of $25.00 (whichever is greater) will be charged on all returns.

WARRANTY

All products manufactured by UCT are guaranteed against defects in materials and workmanship for a period of 90 days after shipment. UCT will replace any items that prove to be defective during this time period.

The exclusive remedy requires the end user to first advise UCT of the defective product by phone or in writing. Secondly, the defective product must be returned within 30 days after proper approval from our Quality Manager. All returns must indicate the purchase order number, the lot number and the shipping date. UCT's total liability is limited to the replacement cost of UCT products.

This warranty does not apply to damage resulting from misuse.

Contact Us

Phone: 215.781.9255
800.385.3153
Fax: 215.785.1226

UCT, Inc.
2731 Bartram Rd.
Bristol, PA 19007

Email: info@unitedchem.com
Web: www.unitedchem.com

MADE IN USA

UCT

FORENSICS