HPLC application note & product information
Avantor® offers a full range of materials and consumables for biopharma, healthcare, education, advanced technology and applied materials industries. We combine a broad portfolio of our own quality, trusted brands as well as access to millions of other products.

Brands that belong to Avantor (for HPLC market)

- **J.T.Baker**: High quality and various reference for HPLC Solvent
- **Macron Fine Chemicals**: Consistent and reliable chemicals
- **VWR Chemicals BDH**: Various products and high quality for LCMS Solvent (EU Base)
- **Rankem**: Competitive price for HPLC Solvent
- **VWR Consumables**: High quality, various product list for HPLC Consumable
- **Avantor® ACE® and Avantor® Hichrom**: High quality range of U/HPLC chromatography products

Avantor’s portfolio of manufactured U/HPLC columns offers:

- High quality products
- Competitive prices
- Fast delivery
- Expert technical support
- Excellent after-sales care
HPLC analysis method development service

Avantor provides the well-organized method development and validation platform in accordance with ICH and state-of-the-art technique to be able to help establishment of your quality attribute.

Core Capability

- HPLC analytical method development
- Biochemical analysis method development
- Product stability test by ICH
- Optimization
- Method transfer

Method development Procedure

Service Industry

| Bio/Pharmaceuticals | Amino acids, Peptide, Proteins |
| Clinical           | Hormones, Drug metabolites, Poisons |
| Industrial Chemicals | Petrochemicals, Electronic materials, Synthesized chemicals |
| Food               | Preservatives, Health supplement, Hair dye, Pigments |
| Environment        | Contaminants, Pesticide, Herbicide |
| Cosmetics          | Cosmeceuticals, Preservatives, Hair dye |
WATER SOLUBLE VITAMINS (1)

1. Pyridoxamine
2. Thiamine (Vit B1)
3. L-Ascorbic acid (Vit C)
4. Niacinamide (Vit B3)
5. Nicotinic acid
6. Pyridoxal
7. Pyridoxine
8. P-Aminobenzoic acid
9. Pantothenic acid (Vit B5)
10. Folic acid (Vit B9)
11. Cyanocobalamin (Vit B12)
12. Riboflavin (Vit B2)
13. d-Biotin (Vit B7)
14. Thiocetic acid

WATER SOLUBLE VITAMINS (2)

1. Pyridoxine (Vit B6)
2. p-Aminobenzoic acid
3. Pantothenic acid
4. Folic acid
5. d-Biotin
6. Cyanocobalamin
7. Riboflavin

Column : ACE 5 C8 (4.6*250mm)
Mobile phase : Gradient analysis
A : 50mM KH$_2$PO$_4$ pH 2.5
B : MeOH
Flow rate: 1 mL/min
Temperature: Ambient
Detector: UV, 205 nm

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Column: ACE Ultracore 2.5 SuperPhenylHexyl (2.1*50 mm)
Mobile phase : Gradient analysis
A : 20mM KH$_2$PO$_4$, pH 2.7
B : 20mM KH$_2$PO$_4$, pH 2.7 in MeOH/Water(50:50 v/v)
Flow rate: 0.4 mL/min
Injection vol.: 1 μL
Temperature: 40 °C
Detector: UV, 205 and 254 nm

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SUGARS-MONOSACCHARIDES AND DISACCHARIDES

1. Fructose
2. Glucose
3. Sucrose

MONOSACCHARIDES ANALYSIS

Column: ACE Excel 5 NH₂ (4.6*150mm)
Mobile phase: ACN : Water (75:25 v/v)
Flow rate: 1.0 mL/min
Injection vol.: 10μL
Temperature: 35 °C
Detector: RID, 35

DISACCHARIDES ANALYSIS

Column: ACE Excel 3 NH₂ (4.6*150mm)
Mobile phase: ACN : Water (80:20 v/v)
Flow rate: 1.0 mL/min
Injection vol.: 20μL
Temperature: 35 °C
Detector: RID, 35
SWEETENERS AND PRESERVATIVES IN ENERGY DRINK

1. Pyridoxine (Vit B6)
2. Citric acid
3. Pantothenic acid (Vit B5)
4. Acesulfame K
5. Caffeine
6. Aspartame
7. Sorbate
8. Benzoate

Column: ACE Excel 3 C18-mide (4.6*150mm)
Mobile phase: Gradient Analysis
A: 0.1% Phosphoric Acid in Water
B: 0.1% Phosphoric Acid in ACN
Flow rate: 1.0 mL/min
Injection vol.: 5μL
Temperature: 30 °C
Detector: UV, 214nm

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Test standard

Energy drink
FAST SEPARATION OF ORGANIC ACIDS

1. Sinapic acid
2. Ferulic acid
3. 3,4-Dimethoxycinnamic acid
4. Cinnamic acid
5. 4-Methoxycinnamic acid

Column: ACE Excel 3 C18-mide (2.1*250mm)
Mobile phase: 20mM H₃PO₄ in MeOH/Water (40:60 v/v)
Flow rate: 0.21 mL/min
Injection vol.: 5μL
Temperature: 20 °C
Detector: UV, 210nm

Column: ACE Excel 1.7 C18Amide (3.0*50mm)
Mobile phase: 20mM H₃PO₄ in MeOH/Water (40:60 v/v)
Flow rate: 0.8 mL/min
Injection vol.: 2μL
Temperature: 20 °C
Detector: UV, 210nm
FATTY ACID ANALYSIS

1. Linolenic acid
2. Myristic acid
3. Linoleic acid
4. Palmitic acid
5. Oleic acid
6. Stearic acid

Column : ACE 3 C8 (4.6*150mm)
Mobile phase : ACN/Water (90:10 v/v)
Flow rate: 1.0 mL/min
Injection vol.: 5μL
Temperature: 15 °C
Detector: ELSD, 22
COSMETICS

FAST SEPARATION OF ORGANIC ACIDS

1. p-Phenylenediamine
2. p-Aminophenol
3. Toluene-2,5-diamine
4. m-Aminophenol
5. o-Phenylenediamine
6. 2-Chloro-p-phenylenediamine
7. o-Aminophenol
8. Resorcinol
9. 2-Nitro-p-phenylenediamine
10. Toluene-3,4-diamine
11. 4-Amino-2-hydroxytoluene
12. 2-Methylresorcinol
13. 6-Amino-m-cresol
14. N,N-Diethyltoluene-2,5-diamine
15. 4-Amino-3-nitrophenol

Column: ACE Excel 5 C18-Amide (4.6*250mm)
Mobile phase: A:B=60:40 (v/v) A: 1.8 g disodium phosphate dodecahydrate + 2.8 g potassium dihydrogen phosphate + 1.0 g sodium 1-heptanesulfonate in Water(1L): B: ACN
Flow rate: 1.0 mL/min
Temperature: 25 °C
Detector: UV, 280nm
COSMETICS

PRESERVATIVES

1. Phthalic acid
2. p-Hydroxybenzoic acid
3. Benzoic acid
4. Sorbic acid
5. Methyl paraben
6. Ethyl paraben
7. Propyl paraben

WATER SOLUBLE VITAMINS (2)

1. Phthalic acid
2. p-Hydroxybenzoic acid
3. Sorbic acid
4. Methyl paraben
5. Ethyl paraben
6. Propyl paraben

Column: ACE 5 C18, (4.6*250mm)
Mobile phase: ACN/50mM KH₂PO₄ pH 4.4 in Water (40:60 v/v)
Flow rate: 1.0 mL/min
Temperature: Ambient
Detector: UV, 230nm

Column: ACE Excel 1.7 C18 (3.0*50mm)
Mobile phase: ACN/20mM KH₂PO₄ pH 2.5 in Water (30:70 v/v)
Flow rate: 0.43 mL/min
Temperature: 20 °C
Detector: UV, 230nm
SUN SCREEN AGENTS

1. Benzophenone-3
2. Octocrylene
3. Octyl dimethyl PABA
4. Octyl methoxycinnamate
5. Avobenzone
6. Ethylhexyl salicylate
7. Homosalate
8. Ethylhexyl triazone
9. Tinosorb® M
10. Tinosorb® S

Column: ACE 3 C18, 4.0*150mm, 3 μm
Mobile phase: Gradient analysis
A: MeOH/Water (85:15 v/v)
B: THF
Flow rate: 0.85 mL/min
Temperature: 30 °C
Detector: UV, 310nm

PRODUCT LIST

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<td>1-Heptanesulfonic Acid, Sodium Salt</td>
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**Time (min) | %B**
---|---
0 | 0
7 | 0
10 | 50
14 | 50
16 | 0
PESTICIDE & HERBICIDE ANALYSIS

1. Deisopropylatrazine
2. Desethylatrazine
3. Simazine
4. Cyanazine
5. Atrazine
6. Internal Standard
7. Sebuthylazine
8. Propazine
9. Terbutylazine
10. Prometryn
11. Terbutryn
12. Alachlor
13. Pendimethalin

Column: ACE 3 C18 (2.1*150mm)
Mobile phase: Gradient analysis
A: 0.1M Ammonium Acetate in Water
B: ACN
Flow rate: 0.3 mL/min
Injection vol.: 25μL
Temperature: 40 °C
Detector: UV, 220 nm
(Pendimethalin at 245nm)

1. Phenol
2. o-Cresol
3. 2-Chlorophenol
4. 4-Chlorophenol
5. 2,6-Dichlorophenol
6. 6-CP
7. 2,4-D
8. MCPA
9. PCOC
10. 2,4-Dichlorophenol
11. 2,4-DP
12. CMPP
13. 2,4-DB
14. MCPB

Column: ACE 3 C18-PFP (4.6*150mm)
Mobile phase: Gradient analysis
A: 0.1% Formic Acid in Water
B: MeOH
Flow rate: 1.0 mL/min
Injection vol.: 10μL
Temperature: 35 °C
Detector: UV, 280 nm

Time (mins) | %B
---|--
0 | 10
40 | 80
47 | 90
49 | 10
ENVIRONMENT

PHENOLIC COMPOUNDS IN GROUND WATER AND SOIL

1. Pyrocatechol
2. 2-Resorcinol
3. 3-Phenol
4. 4-m-Cresol
5. 5-o-Cresol
6. 6,2,4-Dimethylphenol
7. 7,3,4-Dimethylphenol
8. 8,3,5-Dimethylphenol
9. 9,1-Naphthol
10. 10,3,4,5-Trimethylphenol
11. 11,2,3,6-Trimethylphenol
12. 12,2,4,6-Trimethylphenol
13. 13,2-Naphthol

Column: ACE Excel 3 C18-Amide (4.6*150mm)
Mobile phase: 0.1% Formic acid in ACN/Water (35:65 v/v)
Flow rate: 1.0 mL/min
Injection vol.: 10μL
Temperature: 30 °C
Detector: UV, 274 nm

EXPLOSIVE ANALYTES

1. 1,3,5-Trinitrobenzene
2. Nitrobenzene
3. 1,3-Dinitrobenzene
4. 2,4-Dinitrotoluene

Column: ACE Excel 5 CN-ES (4.6*150mm)
Mobile phase: MeOH/Water (50:50 v/v)
Flow rate: 1.0 mL/min
Injection vol.: 5μL
Temperature: 20°C
Detector: UV, 254 nm
PAHS BEYOND THE EPA PRIORITY POLLUTANTS

1. Naphthalene
2. Acenaphthylene
3. 1-Methylnaphthalene
4. 2-Methylnaphthalene
5. Acenaphthene
6. Fluorene
7. Phenanthrene
8. Anthracene
9. Fluoranthene
10. Pyrene
11. Benzo[c]phenanthrene
12. Cyclopenta(cd)pyrene
13. Benzo[a]anthracene
14. Chrysene
16. 7,12-Dimethylbenz[a] anthracene
17. Benzo[e]pyrene
18. Benzo[b]fluoranthene
20. Benzo[a]pyrene
21. Dibenz[ah]anthracene
22. Benzo[ghi]perylene
23. Indeno[1,2,3-cd]pyrene

Column: Vydac 218TP54 (4.6*150mm)
Mobile phase: A: Water, B: ACN
Gradient: 50 to 100 %B over 30mins
Flow rate: 1.0 mL/min
Temperature: 30 °C
Detector: UV/Vis, 254 nm

PRODUCT LIST

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GRADIENT SEPARATION OF PEPTIDE AND PROTEINS

Compound information

1. Oxytocin 1007 Da
2. Bradykinin 1060 Da
3. Angiotensin II 1046 Da
4. Angiotensin I 1296 Da
5. Ribonuclease A 13.7 kDa
6. Cytochrome C 12.3 kDa
7. Bovine Insulin 5733 Da
8. Human Insulin 5808 Da
9. Porcine Insulin 5777 Da
10. Lysozyme 14.3 kDa

Analysis Condition

- Column: ACE 3 C4-300 (2.1*150mm)
- Mobile phase: Gradient analysis
  - A: 0.1 % TFA in Water
  - B: 0.1 % TFA in ACN : Water (80 : 20 v/v)
- Flow rate: 0.5mL/min
- Injection vol.: 3μL
- Temperature: 60 °C
- Detector: UV, 220nm

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RAPID SEPARATION OF PEPTIDES

Compound information
1. Gly-Tyr (Mw 238.2)
2. Val-Tyr-Val (Mw 379.5)
3. Tyr-Gly-Gly-Phe-Met
   (Met-Enkephalin, Mw 573.7)
4. Asp-Arg-Val-Tyr-Ile-His-Pro-Phe
   (Angiotensin II, Mw 1046.2)
5. Tyr-Gly-Gly-Phe-Leu
   (Leu Enkephalin, Mw 555.5)

Analysis Condition
Column: ACE Excel 1.7 C18, 3.0*50mm, 1.7 μm
Mobile phse: Gradient analysis
A: 0.05% TFA in Water
B: 0.05% TFA in ACN
Flow rate: 0.8mL/min
Injection vol.: 1μL
Temperature: 60°C
Detector: UV, 220nm

Time (mins) %B
0 5
3.0 40
4.0 90
5.5 90
10.5 5
ANALYSIS OF BOVINE, HUMAN, PORCINE INSULIN

1. Bovine Insulin
2. Human Insulin
3. Porcine Insulin

Column: ACE 5 C18, (4.6*250mm)
Mobile phase: Gradient analysis
A: 0.1% TFA in Water/ACN (71:29 v/v)
B: 0.1% TFA in Water/ACN (68:32 v/v)
Flow rate: 1 mL/min
Injection vol.: 10μL
Temperature: Ambient
Detector: UV, 215nm

CATECHOLAMINES AND METANEPHRINES SEPERATION

1. Norepinephrine
2. Epinephrine
3. Normetanephrine
4. Dopamine
5. Metanephrine

Column: ACE Excel 5 CN-ES (4.6*150mm) 5μm
Mobile phase: MeOH/Water (50:50 v/v)
Flow rate: 1.0 mL/min
Injection vol.: 5μL
Temperature: 25 °C
Detector: UV, 260 nm
**PROTEIN/PEPTIDE**

**MILK PROTEINS**

Column: ACE 5 C18-300, (2.1*150mm)

Mobile phase: Gradient analysis

A: 0.1% TFA in Water

B: 0.1% TFA in ACN

Flow rate: 0.2 mL/min

Temperature: 45

Detector: UV, 214nm

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MW ~23-25 kDa  
α caseins

MW ~24 kDa  
β caseins

MW ~18 kDa  
β lactoglobulins

**PRODUCT LIST**

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ANALGESIC SEPARATION

1. 4-Acetamidophenol  
2. 4-Aminobenzoic acid  
3. 4-Hydroxybenzoic acid  
4. Caffeine  
5. 2-Acetamidophenol  
6. 3-Hydroxybenzoic acid  
7. Salicylamide  
8. Acetanilide  
9. Phenol  
10. Acetylsalicylic acid  
11. Benzoic acid  
12. Sorbic acid  
13. Salicylic acid  
14. Phenacetin  
15. Salicylaldehyde

Column: ACE 3 C18-AR (4.6*50mm)  
Mobile phase: Gradient analysis  
A: 0.1% Formic acid in Water  
B: 0.1% Formic acid in ACN  
Flow rate: 1.0 mL/min  
Temperature: 40°C  
Detector: UV, 240nm

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1. Paracetamol  
2. Hydrochlorothiazide  
3. Aspirin  
4. Bendroflumethiazide  
5. Ketoprofen  
6. Flurbiprofen  
7. Ibuprofen

Column: ACE Excel 2 SuperC18, (2.1*50mm)  
Mobile phase: Gradient analysis  
A: 0.1% Formic acid in Water  
B: 0.1% Formic acid in ACN  
Flow rate: 1.2 mL/min  
Injection vol.: 0.5μL  
Temperature: 50 °C  
Detector: UV, 214nm

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ANTIHISTAMINES AND EXPECTORANTS

1. Pseudoephedrine
2. Scopolamine
3. Doxylamine
4. Chlorpheniramine
5. Triprolidine
6. Diphenhydramine
7. Acrivastine
8. Promethazine
9. Fexofenadine
10. Cetirizine
11. Loratadine

Column: ACE UltraCore 2.5 SuperC18 (3.0*100mm)
Mobile phase: Gradient analysis
A: 20mM ammonium formate pH 3.0 in Water
B: 20mM ammonium formate pH 3.0 in MeOH/Water (9:1 v/v)
Flow rate: 1.2 mL/min
Temperature: 25 °C
Detector: UV, 254nm

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1. Maleic acid
2. Norephedrine
3. Salicylamide
4. Guaifenesin
5. Guaiacol
6. Chlorpheniramine maleate
7. Dextromethorphan

Column: ACE 5 C18 4.6*250mm, 5 μm
Mobile phase: MeOH/50mM KH₂PO₄, pH 3.0 in Water (50:50 v/v)
Flow rate: 1.0 mL/min
Temperature: 22 °C
Detector: UV, 220nm
CLINICAL/DRUGS

SEPARATION OF PENICILLINS
1. Penicillin V
2. Piperacillin
3. Ampicillin
4. Amoxicillin

Column: ACE 5 HILIC-B (4.6*150mm)
Mobile phase: 10 mM Ammonium Formate
ph 4.7 in ACN:Water ( 80:20 v/v )
Flow rate: 1.5 mL/min
Temperature: 30 ºC
Detector: UV, 214nm

β-BLOCKERS ANALYSIS
1. Penicillin V
2. Piperacillin
3. Ampicillin
4. Amoxicillin

Column: ACE 5 HILIC-A (4.6*150mm)
Mobile phase: 12 mM Ammonium Formate
ph 4.7 in ACN:Water ( 88:12 v/v )
Flow rate: 1.5 mL/min
Temperature: 25 ºC
Detector: UV, 230nm

NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

Column: ACE Excel 2 SuperC18 (3.0*50mm)
Mobile phase: Gradient analysis
A: 0.1% Formic acid in Water
B: 0.1% Formic acid in ACN
Flow rate: 0.86 mL/min
Injection vol.: 1.4μL
Temperature: 40 ºC
Detector: UV, 254nm

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1. Aspirin
2. Phenacetin
3. Sulindac
4. Tolmetin
5. Naproxen
6. Nimesulide
7. Flurbiprofen
8. Diclofenac
9. Phenylbutazone
10. Meclofenamic acid
ANALYSIS OF NICOTINE AND RELATED SUBSTANCES

Column: ACE Excel 2 SuperC18 (2.1*100mm)
Mobile phase: Gradient analysis
A: 10mM Ammonium Acetate, pH 10.0
B: ACN
Flow rate: 0.6 mL/min
Injection vol.: 5μL
Temperature: 30 °C
Detector: UV, 260nm

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1. Nicotine-cis-N-oxide
2. Nicotine-trans-N-oxide
3. Norcotinine
4. Cotinine
5. Nornicotine
6. Anatabine
7. Myosmine
8. MNP
9. Anabasine
10. Nicotine
11. β-nornicotyrine
12. β-nicotyrine
BIOMARKER PROFILING

Column: ACE UltraCore 2.5 SuperC18 (2.1*50mm)
Mobile phase: A:B=90:10
   A: 7% Methanol, 2.1 mM Tetrabutylammonium bisulfate + 84mM KH2PO4, pH 6 with KOH
   B: 7% Methanol, 2.1 mM Tetrabutylammonium bisulfate + 8.4mM KH2PO4, pH 6 with KOH
Flow rate: 0.4 mL/min
Injection vol.: 2μL
Temperature: Ambient
Detector: UV, 260nm

1. Deoxyuridine
2. Deoxyguanosine
3. Deoxythymidine
4. Adenosine
5. Deoxyadenosine
6. 2-Fluoro-2’-fluoroadenine arabinoside
7. 2-Fluorodeoxyadenosine
8. 2-Fluoroadenosine
9. 2-Chlorodeoxyadenosine
10. Clofarabine
11. Methylthioadenosine
Steroids Analysis by UHPLC

Column: ACE Excel 2 CN-ES (2.1*50mm)
Mobile phase: Gradient analysis
A: 0.1% Formic acid in Water
B: 0.1% Formic acid in ACN
Flow rate: 0.4 mL/min
Temperature: 40 °C
Detector: UV, 260nm

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1. Cortisone
2. Corticosterone
3. 11α-hydroxyprogesterone
4. 11-Ketoprogesterone
5. β-Estradiol
6. 17α-Estradiol
7. 17α-Ethinylestradiol
8. Estrone
MYCOTOXINS BY LC-MS/MS

Column: ACE Excel 2 C18-AR, 50 x 2.1 mm
Mobile phase: Gradient analysis
A: 1 mM ammonium acetate + 0.5% Acetic acid in Water
B: 1 mM ammonium acetate + 0.5% Acetic acid in 95% MeOH
Flow rate: 0.6 mL/min
Temperature: 40 °C
Detector: LC-MS/MS

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1. Aflatoxin G2 (m/z 331.1 → 313.1)
2. Aflatoxin G1 (m/z 329.0 → 243.1)
3. Aflatoxin B2 (m/z 315.1 → 287.0)
4. Aflatoxin B1 (m/z 313.1 → 285.0)
5. HT-2-toxin (m/z 442.2 → 263.1)
6. T-2-toxin (m/z 484.2 → 305.1)
7. Ochratoxin A (m/z 404.1 → 239.0)
β-BLOCKERS BY LC-MS/MS

Column: ACE Excel 2 C18 50 x 2.1 mm
Mobile phase: Gradient analysis
   A: 2mM Ammonium acetate + 0.1%
      Formic acid in Water
   B: 2mM Ammonium acetate + 0.1%
      Formic acid in MeOH
Flow rate: 0.4 mL/min
Temperature: 40 °C
Injection volume: 10 μL
Detector: LC-MS/MS

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1. Sotalol (m/z 272.9 → 212.8)  
2. Atenolol (m/z 267.0 → 89.8)  
3. Pindolol (m/z 248.9 → 115.8)  
4. Nadolol diastereomers (m/z 310.0 → 253.9)  
5. Metoprolol (m/z 268.0 → 115.8)  
6. Labetalol (m/z 329.1 → 161.8)  
7. Propranolol (m/z 260.0 → 115.7)  
8. Alprenolol (m/z 250.0 → 115.8)
PERFLUORINATED COMPOUNDS IN WATER BY LC-MS/MS

Column: ACE Excel 1.7 C18 2.1×100mm, 1.7μm EXL-171-1002U
Mobile phase: Gradient analysis
A: 2mM Ammonium acetate, 0.1% Formic acid in Water/MeCN (90:10 v/v)
B: 2mM Ammonium acetate, 0.1% Formic acid in Water/MeCN (10:90 v/v)
Flow rate: 0.5 mL/min
Injection vol.: 10μL
Temperature: 40 °C
Detector: LC-MS/MS

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1. Perfluorohexanoic acid (m/z 313.0 → 268.9)
2. Perfluorobutanesulfonic acid (m/z 299.0 → 79.9)
3. Perfluoroctanoic acid (m/z 413.0 → 368.9)
4. Perfluorohexanesulfonic acid (m/z 399.0 → 80.0)
5. Perfluorononanoic acid (m/z 463.0 → 419.0)
6. Perfluorodecanoic acid (m/z 513.0 → 469.0)
7. Perfluorooctanesulfonic acid (m/z 499.0 → 80.0)
Organophosphorus flame retardants in water by LC-MS/MS

Column: ACE3 C18 2.1*100mm, ACE-111-1002
Mobile phase: Gradient analysis
   A: 0.05mM Ammonium formate, 0.005%
     Formic acid in Water
   B: Water:MeCN = 95:5 (v/v)
Flow rate: 0.25 mL/min
 injected vol.: 80μL
Temperature: 25 °C
Detector: LC-MS/MS

1. Trimethyl phosphate (TMP) (m/z 141 → 109)
2. Triethyl phosphate (TEP) (m/z 183 → 127)
3. Tris(2-chloroethyl) phosphate (TCEP) (m/z 285 → 223)
4. Bis(1,3-dichloro-2-propyl) phosphate (BDCP) (m/z 321 → 99)
5. Triiso-propyl phosphate (TiPP) (m/z 225 → 99)
6. Tri-n-propyl phosphate (TPrP) (m/z 225 → 99)
7. Tris((2R)-1-chloro-2-propyl) phosphate (TCPP) (m/z 327 → 99)
8. Tris(1,3-dichloro-2-propyl) phosphate (TDCPP) (m/z 431 → 99)
9. Triphenyl phosphate (TPP) (m/z 327 → 215)
10. Tri-n-butyl phosphate (TbP) (m/z 267 → 211)
11. Tris(2-butoxyethyl) phosphate (TBEP) (m/z 399 → 299)
12. Bis(2-ethylhexyl) phosphate (BEHP) (m/z 323 → 99)
PRODUCT LIST

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Column: ACE Excel 3 SuperC18 75 x 2.1 mm
Mobile phase: Gradient analysis
A: 5mM Ammonium hydroxide (pH 10.8) in Water
B: 5mM Ammonium hydroxide (pH 10.8) in MeOH/Water (90/10 v/v)
Flow rate: 0.4 mL/min
Temperature: 40 °C
Detector: LC-MS/MS

1. Phenylpropanolamine (m/z 151.6 → 134.0)
2. (l)-Ephedrine (m/z 166.2 → 148.0)
3. (dl)-3,4-MDA (m/z 179.7 → 163.0)
4. (d)-Amphetamine (m/z 135.8 → 90.9)
5. (dl)-3,4-MDMA (m/z 193.7 → 163.0)
6. 4-Methylthioamphetamine (m/z 182.2 → 165.0)
7. (±)-MDEA (m/z 207.7 → 165.0)
## ACE portfolio specifications

### 15 PHASES

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### ACE® Traditional Chemistry

11 STANDARD COLUMN LENGTHS

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### ACE® Novel Chemistry

12 STANDARD COLUMN LENGTHS

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<th>0.075 mm</th>
<th>0.10 mm</th>
<th>0.30 mm</th>
<th>0.50 mm</th>
<th>1.0 mm</th>
<th>2.1 mm</th>
<th>3.0 mm</th>
<th>4.0 mm</th>
<th>4.6 mm</th>
<th>10.0 mm</th>
<th>21.2 mm</th>
<th>30.0 mm</th>
</tr>
</thead>
</table>

### 3 PORE SIZES

- 90A
- 100A
- 300A

### 8 PARTICLE SIZES

- Six fully Porous particles. 1.7 µm | 2 µm | 3 µm | 5 µm | 10 µm | 15 µm
- and two superficially porous particles. 2.5 µm | 5 µm

### 15 PHASES

- C₁₈
- C₁₈-AR
- C₁₈-PFP
- C₁₈-Amide
- CN-ES
- SuperC₁₈
- SuperPhenyHexyl
- ACE® Generix

### 11 STANDARD COLUMN LENGTHS

- C₁₈-HL
- C₁₈
- C₁₈-Amide
- CN-ES

### 3 PORE SIZES

- 90A
- 100A
- 300A

### 8 PARTICLE SIZES

- Six fully Porous particles. 1.7 µm | 2 µm | 3 µm | 5 µm | 10 µm | 15 µm
- and two superficially porous particles. 2.5 µm | 5 µm
J.T.Baker®

LC/MS and HPLC solvents and reagents

- Low backgrounds free of extraneous peaks
- Low UV absorbance in critical ranges assured through UV absorbance
- Testing at a variety of points and through gradient elution testing
- Fluorescence testing for trace impurities, which would cause interference

<table>
<thead>
<tr>
<th>Product name</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetonitrile 4L</td>
<td>9017-88</td>
</tr>
<tr>
<td>Methanol 4L</td>
<td>9093-88</td>
</tr>
<tr>
<td>Water 4L</td>
<td>4218-88</td>
</tr>
<tr>
<td>Hexane(95% N-Hexane) 4L</td>
<td>9304-88</td>
</tr>
<tr>
<td>Acetone 4L</td>
<td>9002-88</td>
</tr>
<tr>
<td>Tetrahydrofuran 4L</td>
<td>9440-88</td>
</tr>
<tr>
<td>2-Propanol 4L</td>
<td>9095-88</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HPLC - conventional</td>
<td>★★★</td>
<td>★</td>
<td></td>
<td>★★★</td>
</tr>
<tr>
<td>HPLC - QC/QA</td>
<td>★★★</td>
<td>★</td>
<td></td>
<td>★★★</td>
</tr>
<tr>
<td>Gas Chromatography(GC)</td>
<td>★★★</td>
<td>★</td>
<td></td>
<td>★★★</td>
</tr>
<tr>
<td>HPLC - Research</td>
<td>★★★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★</td>
</tr>
<tr>
<td>LC/MS - QC/QA</td>
<td>★★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★</td>
</tr>
<tr>
<td>LC/MS - Research</td>
<td>★★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★</td>
</tr>
<tr>
<td>LC/MS - Critical Research</td>
<td>★★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★</td>
</tr>
<tr>
<td>UHPLC - QC/QA</td>
<td>★★★</td>
<td>★★</td>
<td>★★★</td>
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<tr>
<td>UHPLC - General research</td>
<td>★★★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★</td>
</tr>
<tr>
<td>UHPLC - Critical research</td>
<td>★★★</td>
<td>★★</td>
<td>★★★</td>
<td>★★★</td>
</tr>
</tbody>
</table>

- Suitable ★ Preferred ★★ Ideal ★★★
ULTRA RESI-ANALYZED™ SOLVENTS
For Gas Chromatography, Environmental Extraction Applications, and EPA Protocols (Water and Soil)

<table>
<thead>
<tr>
<th>Product</th>
<th>Product Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>9254</td>
</tr>
<tr>
<td>Acetonitrile</td>
<td>9255</td>
</tr>
<tr>
<td>Chloroform</td>
<td>9257</td>
</tr>
<tr>
<td>Cyclohexane</td>
<td>9258</td>
</tr>
<tr>
<td>Ether</td>
<td>9259</td>
</tr>
<tr>
<td>Ethyl Acetate</td>
<td>9260</td>
</tr>
<tr>
<td>n-Heptane</td>
<td>9338</td>
</tr>
<tr>
<td>Hexanes (99% n-hexane)</td>
<td>N/A</td>
</tr>
<tr>
<td>Hexanes (95% n-hexane)</td>
<td>9262</td>
</tr>
<tr>
<td>Methanol</td>
<td>9263</td>
</tr>
<tr>
<td>2-Propanol</td>
<td>9334</td>
</tr>
<tr>
<td>Toluene</td>
<td>9336</td>
</tr>
<tr>
<td>Water</td>
<td>4219</td>
</tr>
<tr>
<td>Methylene Chloride</td>
<td>9264</td>
</tr>
</tbody>
</table>

APPLICATION-OPTIMIZED:
- Dual stabilizer systems provide unmatched product for methylene chloride.
- Optimized distillation processes target removal of reactive impurities, production of higher assays, and narrow solvent fronts.
- Blanketed with inert gas to prevent contamination.

FUNCTION-TESTED:
- Extensively characterized by high resolution capillary GC.
- Suitability tests on both ECD and FID detectors.
- Meets EPA requirements for extraction/concentration procedures and AOAC requirements for pesticide residue analysis.
- Performance-tested to purity levels below the Lower Limit of Quantitation (LLQ) for trace analyte detection by standard EPA methods.
- Meets or exceeds ACS specifications
J.T.Baker®
Solid phase extraction products

GENERAL PRODUCT OVERVIEW TABLE

<table>
<thead>
<tr>
<th>Description</th>
<th>Attribute</th>
<th>Silica based SPE products</th>
</tr>
</thead>
<tbody>
<tr>
<td>J.T.Baker® BAKERBOND Speedisk™ 1, 3 and 6 ml columns configured to run 9 times faster than traditional SPE columns, operating with smaller solvent volumes and having higher capacity per milligram sorbent than conventional SPE columns</td>
<td>J.T.Baker® BAKERBOND Speedisk™ Columns</td>
<td>Reverse phase, Normal phase, Ion exchange, Adsorption, Drug of abuse</td>
</tr>
<tr>
<td>50 mm disks that are the correct choice for samples from 200 ml to 2 L. They are neither cartridge nor membrane. A thin bed of J.T.Baker® BAKERBOND™ sorbent micro particles is supported in a laminar structure to maintain speed and capacity and enhance reproducibility of adsorption</td>
<td>J.T.Baker® BAKERBOND Extraction Disks</td>
<td>Extraction disks for manual extraction stations and for automated extractors</td>
</tr>
</tbody>
</table>

J.T.BAKER® BAKERBOND® SPE SILICA-BASED COLUMNS

<table>
<thead>
<tr>
<th>Description</th>
<th>General application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octadeyl (C₁₈)</td>
<td>Non-ionic, non-polar to moderately polar analytes</td>
</tr>
<tr>
<td>PolarPlus Octadeyl (C₁₈)</td>
<td>Non-ionic, non-polar to moderately polar analytes</td>
</tr>
<tr>
<td>Octyl (C₈)</td>
<td>Non-ionic, non-polar to moderately polar analytes</td>
</tr>
<tr>
<td>Phenyl (C₆H₅)</td>
<td>Pore from non-polar/polar solvents using hydrogen bonding like mechanisms</td>
</tr>
<tr>
<td>Cyano (CN)</td>
<td>Non-ionic, non-polar to moderately polar analytes</td>
</tr>
<tr>
<td>Diol (COHCOH)</td>
<td>Non-ionic, polar analytes</td>
</tr>
<tr>
<td>Amine (NH₂)</td>
<td>Ionic, acidic analytes</td>
</tr>
<tr>
<td>Quaternary Amine (N⁺)</td>
<td>Ionic, acidic analytes</td>
</tr>
<tr>
<td>Aromatic Sulfonic Acid (ArSO₂OH)</td>
<td>Ionic, acidic analytes</td>
</tr>
<tr>
<td>Carboxylic Acid (COOH)</td>
<td>Ionic, acidic analytes</td>
</tr>
<tr>
<td>Florisil (Mg₂SiO₃)</td>
<td>Low to moderately polar analytes from nonaqueous solutions</td>
</tr>
<tr>
<td>Silica Gel (SiOH)</td>
<td>Polar analytes from non-polar solvents like hydrocarbons and less polar esters and ethers</td>
</tr>
<tr>
<td>Alumina Neutral</td>
<td>Weakly or moderately polar compounds</td>
</tr>
<tr>
<td>Narc-2 (Cocaine, BEC)</td>
<td>Hydrophobic/basic analytes (Cocaine, Benzoylecgonine)</td>
</tr>
<tr>
<td>Wide Pore Butyl (C₄)</td>
<td>Small peptides, separations where C₁₈ gives excessive retention or poor recovery</td>
</tr>
<tr>
<td>Wide Pore CBX</td>
<td>Weak bases such as purines, pyrimidines, vitamin B₆, cyclic hydroxymamines</td>
</tr>
</tbody>
</table>
VWR Chemicals BDH

Lab reagents for quality control and research

**BDH LC-MS SOLVENT OFFER**
- High purity
- Various product list
- Competitive Price
- Good reference at Europe

**HiPerSolv CHROMANORM® LC-MS and ULTRA LC-MS solvents for LC-MS and ULC-MS applications**

<table>
<thead>
<tr>
<th>Product Part No.</th>
<th>Acetic acid 99%</th>
<th>Acetonitrile ULTRA</th>
<th>Ethyl acetate</th>
<th>Methanol</th>
<th>Methanol ULTRA</th>
<th>2-Propanol</th>
<th>THF</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1L</td>
<td>83640.290</td>
<td>83642.290</td>
<td>85481.320</td>
<td>83638.290</td>
<td>85800.290</td>
<td>84888.290</td>
<td>84882.290</td>
<td>83645.290</td>
</tr>
<tr>
<td>2.5L</td>
<td>83640.320</td>
<td>83642.320</td>
<td>85481.320</td>
<td>83638.290</td>
<td>85800.320</td>
<td>84888.320</td>
<td>84882.320</td>
<td>83645.320</td>
</tr>
</tbody>
</table>

**HiPerSolv CHROMANORM® LC-MS and ULTRA LC-MS solvents for LC-MS and ULC-MS applications**

<table>
<thead>
<tr>
<th>Product Part No.</th>
<th>Acetonitrile with 0,1% acetic acid</th>
<th>Water with 0,1% acetic acid</th>
<th>Acetonitrile with 0,1% formic acid</th>
<th>Water with 0,1% formic acid</th>
<th>Acetonitrile with 0,1% TFA</th>
<th>Methanol with 0,1% TFA</th>
<th>Water with 0,1% TFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1L</td>
<td>84872.290</td>
<td>84873.290</td>
<td>84866.290</td>
<td>84867.290</td>
<td>84869.290</td>
<td>84870.290</td>
<td>84871.290</td>
</tr>
<tr>
<td>2.5L</td>
<td>84872.320</td>
<td>84873.320</td>
<td>84866.320</td>
<td>84867.320</td>
<td>84869.320</td>
<td>84870.320</td>
<td>84871.320</td>
</tr>
</tbody>
</table>

**BDH HAS EVERY ITEMS FOR QC**
- ICP/ICP_MS Standard
- Karlfish
- GC solvent /
- Media for environmental monitoring
- Karl fisher
- Kjeldahl catalysts
- ETC
HPLC TECHNIQUES GIVE BEST RESULTS FOR IMPURITIES PROFILE AND PURITY VERIFICATION

- Controlled acidity and alkalinity
- Low in moisture for better performance in normal phase chromatography
- Ensure high reproducibility and accuracy in results
- Minimum baseline noise in gradient analysis
- Filtered through 0.2 Micron filters to enhance longevity of the column
- Accurate peak quantification
- High resolution and detection of trace impurities
- Processed with rigorous quality checks to ensure batch to batch consistency
- Available in small and replaceable large packs
- Free from UV absorbing impurities to ensure there are no interfering peaks

RANKEM HPLC SOLVENTS ARE IDEALLY SUITABLE FOR

- Sample preparation
- Method development
- Preparation chromatography
- Analytical application

<table>
<thead>
<tr>
<th>Code</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acet</td>
<td>Acetonitrile preparative HPLC-2.5L</td>
</tr>
<tr>
<td>Meth</td>
<td>Methanol LR-2.5 L</td>
</tr>
<tr>
<td>Propanol</td>
<td>Propanol-2-OE (iso-propyl alcohol) LR</td>
</tr>
<tr>
<td>Acet</td>
<td>Acetone LR-2.5 L</td>
</tr>
<tr>
<td>HCl</td>
<td>Hydrochloric acid LR-2.5 LIT</td>
</tr>
<tr>
<td>Water</td>
<td>Water HPLC 1L</td>
</tr>
<tr>
<td>Sulph</td>
<td>Sulphuric acid LR-2.5 LIT</td>
</tr>
<tr>
<td>Nitric</td>
<td>Nitric acid LR-2.5 LIT</td>
</tr>
<tr>
<td>Meth</td>
<td>Methanol HPLC-1 L</td>
</tr>
</tbody>
</table>

**Condition**

<table>
<thead>
<tr>
<th>Detector</th>
<th>PDA</th>
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</thead>
<tbody>
<tr>
<td>HPLC Column</td>
<td>C-18, 5 micron, 250mm x 4mm</td>
</tr>
<tr>
<td>Mode</td>
<td>Gradient</td>
</tr>
<tr>
<td>Mobile phase</td>
<td>Water HPLC/Acetonitrile HPLC</td>
</tr>
<tr>
<td>Method</td>
<td>0-100% ACN over 24min (V/V)</td>
</tr>
<tr>
<td>Wavelength</td>
<td>205nm and 254nm</td>
</tr>
<tr>
<td>Flow Rate</td>
<td>1.8ml/min</td>
</tr>
</tbody>
</table>
SYRINGE FILTERS

- Available with either PP, PTFE or nylon membrane. Membranes are available in either 0.2 or 0.45 μm pore size with the choice often made on analytical column packing size. If the column packing size is larger than 3 μm then use 0.45 μm and if 3 μm or smaller then use 0.2 μm.
- Suitable for HPLC: Low levels of UV-detectable extractables

<table>
<thead>
<tr>
<th>Pore size (μm)</th>
<th>Ø (mm)</th>
<th>Sterile</th>
<th>Pk</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose acetate membrane</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2 **</td>
<td>25</td>
<td>+</td>
<td>50</td>
<td>VWR1514-0061</td>
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<tr>
<td>0.2 **</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0060</td>
</tr>
<tr>
<td>0.45</td>
<td>25</td>
<td>+</td>
<td>50</td>
<td>VWR1514-0063</td>
</tr>
<tr>
<td>0.45</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0062</td>
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<tr>
<td>PES membrane</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2</td>
<td>25</td>
<td>+</td>
<td>50</td>
<td>VWR1514-0073</td>
</tr>
<tr>
<td>0.45</td>
<td>25</td>
<td>+</td>
<td>50</td>
<td>VWR1514-0075</td>
</tr>
<tr>
<td>0.45</td>
<td>13</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0074</td>
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<tr>
<td>PP membrane</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0064</td>
</tr>
<tr>
<td>0.45</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0065</td>
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<tr>
<td>PTFE membrane</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>0.2</td>
<td>13</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0068</td>
</tr>
<tr>
<td>0.45</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0069</td>
</tr>
<tr>
<td>0.45</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0071</td>
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<tr>
<td>Nylon membrane</td>
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<td>0.2</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0066</td>
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<tr>
<td>0.45</td>
<td>25</td>
<td>-</td>
<td>100</td>
<td>VWR1514-0065</td>
</tr>
</tbody>
</table>
### VWR Consumable

**VWR ALL PP SYRINGES**

- Luer tip type
- Luer lock type

**SINGLE-USE SYRINGES**

Disposable, two-piece, without needle, PP barrel and PE piston, latex- and silicone oil-free. Syringes are also available with especially designed oral tip, which prevents accidental Luer or hypodermic connection, in volumes of 5 or 10 ml. Incompatible with injection needles. Please enquire for details.

- Defined position of the plunger at volume "0" to feel when plunger is completely inserted
- No dead space for 1 ml insulin and tuberculin syringe
- Extended graduation for wider range of applications
- Positive safety stop to prevent accidental spills

**Packaging:** Sterile versions are packed in individual blister strips. Non sterile versions are bulk packed.

<table>
<thead>
<tr>
<th>Description</th>
<th>Capacity</th>
<th>Pk</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-use syringe, Luer tip type</td>
<td>1ml</td>
<td>100</td>
<td>VWR613-2001</td>
</tr>
<tr>
<td>Single-use syringe, Luer tip type</td>
<td>2ml</td>
<td>100</td>
<td>VWR613-2003</td>
</tr>
<tr>
<td>Single-use syringe, Luer tip type</td>
<td>5ml</td>
<td>100</td>
<td>VWR613-2005</td>
</tr>
<tr>
<td>Single-use syringe, Luer tip type</td>
<td>10ml</td>
<td>100</td>
<td>VWR613-2007</td>
</tr>
<tr>
<td>Single-use syringe, Luer tip type</td>
<td>20ml</td>
<td>100</td>
<td>VWR613-2009</td>
</tr>
<tr>
<td>Single-use syringe, Luer tip type</td>
<td>30ml</td>
<td>50</td>
<td>VWR613-2033</td>
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<tr>
<td>Single-use syringe, Luer tip type</td>
<td>50ml</td>
<td>30</td>
<td>VWR613-2036</td>
</tr>
<tr>
<td>Single-use syringe, Luer lock type</td>
<td>2ml</td>
<td>100</td>
<td>VWR613-2004</td>
</tr>
<tr>
<td>Single-use syringe, Luer lock type</td>
<td>5ml</td>
<td>100</td>
<td>VWR613-2006</td>
</tr>
<tr>
<td>Single-use syringe, Luer lock type</td>
<td>10ml</td>
<td>100</td>
<td>VWR613-2008</td>
</tr>
<tr>
<td>Single-use syringe, Luer lock type</td>
<td>20ml</td>
<td>100</td>
<td>VWR613-2010</td>
</tr>
<tr>
<td>Single-use syringe, Luer lock type</td>
<td>30ml</td>
<td>50</td>
<td>VWR613-2035</td>
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<tr>
<td>Single-use syringe, Luer lock type</td>
<td>50ml</td>
<td>30</td>
<td>VWR613-2038</td>
</tr>
</tbody>
</table>
VWR Consumable

VWR disposable gloves

**LATEX, NON STERILE, POWDER-FREE, TEXTURED FINGERTIPS**

Single-use, ambidextrous gloves made from natural latex. Suitable for food handling, laboratory and industrial applications with complex risks and for medical applications.

**THIN NITRILE, NON STERILE, POWDER-FREE, TEXTURED FINGERS**

Thin ambidextrous gloves are suitable for use in medical applications, food processing and for general applications in non hazardous areas. **Very thin**: Provide excellent elasticity for good wearing comfort.

**NITRILE, NON STERILE, POWDER-FREE, TEXTURED FINISH**

For laboratory use in pharmaceutical, industrial and medical applications and in the food industry. Highly resistant to chemical solvents and fats.

<table>
<thead>
<tr>
<th>Description</th>
<th>Size</th>
<th>pk</th>
<th>Cat.No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latex powder-free gloves</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GLOVE TEXTURED POLYMER COATED PF LATEX</td>
<td>XS</td>
<td>100</td>
<td>VWRA112-5397</td>
</tr>
<tr>
<td>GLOVE TEXTURED POLYMER COATED PF LATEX</td>
<td>S</td>
<td>100</td>
<td>VWRA112-5398</td>
</tr>
<tr>
<td>GLOVE TEXTURED POLYMER COATED PF LATEX</td>
<td>M</td>
<td>100</td>
<td>VWRA112-5399</td>
</tr>
<tr>
<td>GLOVE TEXTURED POLYMER COATED PF LATEX</td>
<td>L</td>
<td>100</td>
<td>VWRA112-5440</td>
</tr>
<tr>
<td>GLOVE TEXTURED POLYMER COATED PF LATEX</td>
<td>XL</td>
<td>90</td>
<td>VWRA112-5441</td>
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<tr>
<td>Thin nitrile powder-free gloves</td>
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<tr>
<td>Nitrile gloves, NITRILE EXTRA LIGHT</td>
<td>XS</td>
<td>200</td>
<td>VWR1112-4193</td>
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<tr>
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<td>S</td>
<td>200</td>
<td>VWR1112-4194</td>
</tr>
<tr>
<td>Nitrile gloves, NITRILE EXTRA LIGHT</td>
<td>M</td>
<td>200</td>
<td>VWR1112-4195</td>
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<tr>
<td>Nitrile gloves, NITRILE EXTRA LIGHT</td>
<td>L</td>
<td>200</td>
<td>VWR1112-4196</td>
</tr>
<tr>
<td>Nitrile gloves, NITRILE EXTRA LIGHT</td>
<td>XL</td>
<td>180</td>
<td>VWR1112-4197</td>
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<td>Strong chemical resistant nitrile powder-free gloves</td>
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<tr>
<td>GLOVE NITRILE AMBI POWDER-FREE</td>
<td>S</td>
<td>100</td>
<td>VWR1112-2371</td>
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<tr>
<td>GLOVE NITRILE AMBI POWDER-FREE</td>
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<td>VWR1112-2372</td>
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<td>VWR1112-3101</td>
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</table>
VWR Equipment

**BOTTLE-TOP DISPENSER**
**VARIABLE VOLUME, AUTOCLAVABLE.**

Fine adjustment for exact, reproducible dispensing. All wetted parts are chemically resistant and autoclavable at +121 °C. Easily removable PTFE piston for smooth action and easy cleaning. Borosilicate glass barrel protected with a transparent PP sleeve can be easily removed and cleaned. Easy priming and minimum waste with no leakage back into the reservoir.

<table>
<thead>
<tr>
<th>Description</th>
<th>Range</th>
<th>Accuracy</th>
<th>Cat.No.</th>
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<tbody>
<tr>
<td>VWR BOTTLE TOP DISPENSER 1-10ML ZIPPETTE</td>
<td>1-10ml</td>
<td>±0.3%</td>
<td>VWR612-4178</td>
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<tr>
<td>VWR BOTTLE TOP DISPENSER 3-30ML ZIPPETTE</td>
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<td>±0.3%</td>
<td>VWR612-4179</td>
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<tr>
<td>VWR BOTTLE TOP DISPENSER 5-50ML ZIPPETTE</td>
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<td>±0.3%</td>
<td>VWR612-4180</td>
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<tr>
<td>VWR BURETTE DIGITAL 50ML DIGITRATE PRO</td>
<td>0-50ml</td>
<td>±0.2%</td>
<td>VWR613-5287</td>
</tr>
</tbody>
</table>

We can handle a lot of equipment and instruments

**INSTRUMENTS AND EQUIPMENT’S**

The VWR Collection offers an extensive selection of laboratory Instruments & Equipment’s ranging from bench top to higher end instruments.

**PORTFOLIO OVERVIEW**

- Refrigerators, freezers & ULT’s
- Ovens
- Incubators and heating blocks
- Glassware washers
- Benchtop and micro centrifuges
- Vortex mixers
- Ultrasonic cleaners
- Shakers
- Microscopes
- Ph meters conductivity meters & electrodes
- Balances and moisture balances
- Air samplers
- Hotplates and stirrers
- Spector photometers
- Bath chillers circulators and thermostats pumps
- Homogenizers
- Autoclaves
Your contact person

HPLC application note & product information