

Buffer Recommendations for ACE[®] SuperC18[™] UHPLC/HPLC Columns

Buffer Selection

ACE SuperC18 columns have been designed for use with LC-MS compatible mobile phases across an extended pH range (pH 1.5 – pH 11.5). Manufactured using proprietary Encapsulated Bonding Technology (EBT[™]), this technology dramatically increases the ligand coverage of the silica surface and improves stability, inertness and chromatographic performance. The use of LC-MS compatible (volatile) buffers as detailed in Table 1 are recommended to maximise column lifetime. Working at the extremes of pH, temperature and/or pressure will result in shorter column lifetimes.

Table 1: Use of LC-MS Compatible Buffers for Maximum Column Lifetime

Buffer/Additive	pK _a	Buffer Range ¹	LC-MS Compatible	Comments
Trifluoroacetic acid (TFA)	0.2		Yes	Use in 0.02 – 0.2% range. Ion pair additive. May preferentially ionise and suppress MS signal.
Formic acid	3.8		Yes	Use with ammonium formate salt for maximum buffering capacity. Use in 0.05% - 0.5% range.
Ammonium formate	3.8	2.8 – 4.8	Yes	Typically use 10-25mM. Note: both sodium and potassium salts are non-volatile.
Acetic acid	4.8		Yes	Use with ammonium acetate salt for maximum buffering capacity. Use in 0.05% - 0.5% range.
Ammonium acetate	4.8	3.8 – 5.8	Yes	Typically use 10-25mM. Note: both sodium and potassium salts are non-volatile.
Ammonium formate	9.2	8.2 – 10.2	Yes	Typically use 10-25mM.
Ammonium acetate	9.2	8.2 – 10.2	Yes	Typically use 10-25mM.
Ammonia (NH ₃ OH)	9.3	8.3 – 10.3	Yes	Typically use 10-25mM. Adjust pH with ammonium hydroxide or acetic acid.
Ammonium bicarbonate	10.3	9.3 – 11.3	Yes	Use NH ₄ HCO ₃ not (NH ₄) ₂ CO ₃

¹ A buffer is most effective when used within ± 1 pH unit of its pK_a, but may provide adequate buffering ± 2 pH units from the pK_a.

Use of non LC-MS Compatible Buffers:

Whilst the use of the above LC-MS compatible (volatile) buffers are recommended, ACE SuperC18 columns may also be used with a variety of non LC-MS compatible, non-volatile buffers, commonly used within analytical methods. However, under alkaline conditions (>pH 7), such buffers are recognised to accelerate column degradation compared to LC-MS compatible buffers – the use of buffers detailed within Table 1 is consequently recommended to ensure maximum column lifetime at elevated pH. Further details are contained within the FREE ACE booklet 'A Guide to HPLC and LC-MS Buffer Selection' by leading chromatography expert John Dolan. Request your FREE copy via your local distributor or via info@ace-hplc.com.

Buffer Concentration:

Always use the highest quality buffer grade available and appropriately filter buffer solutions before use. In general, a buffer concentration of up to 25mM will be sufficient for most applications. LC-MS methods may use lower buffer concentrations – typically 10 mM. The exact recommended concentration is dependent upon the analysis goals – lower buffer concentrations will generally increase column lifetime. When performing gradient separations, the buffer concentration of each mobile phase should be matched to ensure adequate buffering capacity remains throughout the gradient profile.

Temperature:

ACE SuperC18 columns may be used at temperatures up to 100°C. However, any temperature above ambient will reduce column lifetime. As a general rule, for acidic mobile phases (<pH 7), maintaining a temperature <60°C will help maximise column lifetime, whereas for alkaline mobile phases (>pH 7), maintaining a temperature <40°C is recommended.

Recommendations for Maximising Column Lifetime:

Optimising method conditions for maximum column lifetime can be a compromise with achieving maximum analyte resolution. However, selecting an LC-MS compatible buffer (as detailed within Table 1), using the lowest acceptable buffer concentration (typically ~10mM), reducing temperature, and reducing overall pressures will help prolong the lifetime of ACE SuperC18 UHPLC/HPLC columns.

Further Information – FREE BUFFER GUIDE

Further information on buffer selection is provided in the FREE ACE booklet 'A Guide to HPLC and LC-MS Buffer Selection' by John Dolan. Request your FREE copy via your local distributor or via info@ace-hplc.com. For further guidance on maximising column lifetime, or to assist with developing your evaluation conditions, please contact our Technical Support Department at info@ace-hplc.com.

ACE[®] SuperC18[™]

Ultra-Inert UHPLC and HPLC Columns with Extended pH Stability

Product Availability and Specifications:

Phase	Functional Group	Endcapped	Particle Size (µm)	Pore Size (Å)	Surface Area (m ² /g)	Carbon Load (%)	Maximum pH Range	USP Listing
ACE SuperC18	Octadecyl encapsulated	Yes	2, 3, 5, 10	90	400	14.8	1.5-11.5 ^a	L1

^a ACE SuperC18 columns are designed for use with LC-MS compatible buffers. For further details on the ACE SuperC18 UHPLC/HPLC column range, please contact your distributor or visit www.ace-hplc.com.

To further extend UHPLC and HPLC column lifetimes, ACE pre-column filters are recommended – for further details please contact your distributor or visit www.ace-hplc.com.

For HPLC column connections up to 5000psi, PEEK[™] fingertight fittings (p/n# ACE-CC10) are recommended – for further details please contact your distributor or visit www.ace-hplc.com.

For UHPLC column connections up to 25000psi, reusable fittings (p/n# EXL-CC10) are recommended – for further details please contact your distributor or visit www.ace-hplc.com.

ACE Excel 2µm SuperC18 UHPLC/HPLC Columns (UHPLC/HPLC 'Excel' hardware with 1000bar/15000psi pressure limit)

Column Diameter	Column Length							
	20mm	30mm	35mm	50mm	75mm	100mm	125mm	150mm
2.1mm	EXL-1011-0202U	EXL-1011-0302U	EXL-1011-3502U	EXL-1011-0502U	EXL-1011-7502U	EXL-1011-1002U	EXL-1011-1202U	EXL-1011-1502U
3.0mm	EXL-1011-0203U	EXL-1011-0303U	EXL-1011-3503U	EXL-1011-0503U	EXL-1011-7503U	EXL-1011-1003U	EXL-1011-1203U	EXL-1011-1503U
4.6mm	EXL-1011-0246U	EXL-1011-0346U	EXL-1011-3546U	EXL-1011-0546U	EXL-1011-7546U	EXL-1011-1046U	EXL-1011-1246U	EXL-1011-1546U

ACE Excel 3µm SuperC18 UHPLC/HPLC Columns (UHPLC/HPLC 'Excel' hardware with 1000bar/15000psi pressure limit)

Column Diameter	Column Length								
	20mm	30mm	35mm	50mm	75mm	100mm	125mm	150mm	250mm
2.1mm	EXL-1111-0202U	EXL-1111-0302U	EXL-1111-3502U	EXL-1111-0502U	EXL-1111-7502U	EXL-1111-1002U	EXL-1111-1202U	EXL-1111-1502U	EXL-1111-2502U
3.0mm	EXL-1111-0203U	EXL-1111-0303U	EXL-1111-3503U	EXL-1111-0503U	EXL-1111-7503U	EXL-1111-1003U	EXL-1111-1203U	EXL-1111-1503U	EXL-1111-2503U
4.6mm	EXL-1111-0246U	EXL-1111-0346U	EXL-1111-3546U	EXL-1111-0546U	EXL-1111-7546U	EXL-1111-1046U	EXL-1111-1246U	EXL-1111-1546U	EXL-1111-2546U

ACE Excel 5µm SuperC18 UHPLC/HPLC Columns (UHPLC/HPLC 'Excel' hardware with 1000bar/15000psi pressure limit)

Column Diameter	Column Length								
	20mm	30mm	35mm	50mm	75mm	100mm	125mm	150mm	250mm
2.1mm	EXL-1211-0202U	EXL-1211-0302U	EXL-1211-3502U	EXL-1211-0502U	EXL-1211-7502U	EXL-1211-1002U	EXL-1211-1202U	EXL-1211-1502U	EXL-1211-2502U
3.0mm	EXL-1211-0203U	EXL-1211-0303U	EXL-1211-3503U	EXL-1211-0503U	EXL-1211-7503U	EXL-1211-1003U	EXL-1211-1203U	EXL-1211-1503U	EXL-1211-2503U
4.6mm	EXL-1211-0246U	EXL-1211-0346U	EXL-1211-3546U	EXL-1211-0546U	EXL-1211-7546U	EXL-1211-1046U	EXL-1211-1246U	EXL-1211-1546U	EXL-1211-2546U

ACE 5µm SuperC18 Semi-Prep and Preparative HPLC Columns

Column Diameter	Column Length					
	50mm	75mm	100mm	125mm	150mm	250mm
7.75mm	ACE-1211-0508	ACE-1211-7508	ACE-1211-1008	ACE-1211-1208	ACE-1211-1508	ACE-1211-2508
10.0mm	ACE-1211-0510	ACE-1211-7510	ACE-1211-1010	ACE-1211-1210	ACE-1211-1510	ACE-1211-2510
21.2mm	ACE-1211-0520	ACE-1211-7520	ACE-1211-1020	ACE-1211-1220	ACE-1211-1520	ACE-1211-2520

ACE 10µm SuperC18 Analytical, Semi-Prep and Preparative HPLC Columns

Column Diameter	Column Length					
	50mm	75mm	100mm	125mm	150mm	250mm
4.6mm ¹	EXL-1311-0546	EXL-1311-7546	EXL-1311-1046	EXL-1311-1246	EXL-1311-1546	EXL-1311-2546
7.75mm	ACE-1311-0508	ACE-1311-7508	ACE-1311-1008	ACE-1311-1208	ACE-1311-1508	ACE-1311-2508
10.0mm	ACE-1311-0510	ACE-1311-7510	ACE-1311-1010	ACE-1311-1210	ACE-1311-1510	ACE-1311-2510
21.2mm	ACE-1311-0520	ACE-1311-7520	ACE-1311-1020	ACE-1311-1220	ACE-1311-1520	ACE-1311-2520
30.0mm	ACE-1311-0530	ACE-1311-7530	ACE-1311-1030	ACE-1311-1230	ACE-1311-1530	ACE-1311-2530

¹ Supplied in dual compatible UHPLC/HPLC 'Excel' hardware format with 1000bar/15000psi pressure limit

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