月旭液相色谱柱说明书

Welch HPLC Column Care and Use Manual

卓越铸辉煌，蓄势谱缤纷！

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公司简介

月旭科技（上海）股份有限公司成立于2003年8月，总部和研发中心现设于G60科创走廊板块的上海松江启迪漕河泾（中山）科技园，并在浙江金华设有生产和研发基地，江苏南京等地设有子公司。月旭科技是一家集研发、生产、销售和服务为一体，致力为客户提供色谱分离分析技术、产品和整体解决方案的公司，其产品广泛应用于生物医药、食品安全检测、环境监测、精细化工等关系民生并处于快速发展的行业。

月旭科技是“国家高新技术企业”、“浙江省级色谱分离分析研究中心”、“上海市松江区一类重点扶持企业”，同时承担着上海科技创新行动计划、浙江省重点研发项目等多个政府项目课题。

月旭科技始终坚持自主研发和自主品牌战略，保持核心竞争力。公司主要产品包括Ultimate®、Welchrom®、Xtimate®、Topsil®、Boltimate®和Blossmate®等品牌系列色谱柱、制备纯化色谱填料、样品前处理产品、蛋白纯化产品、分析制备及样品处理类仪器产品，以及其它相关实验室小仪器、通用耗材等。

公司现已有研发的4个品牌的19款色谱柱被录入美国药典USP-PQRI数据库，6个品牌96款键合相品种，收载入USP-ChromCol-umns数据库，在2020版《中国药典》中，有14个药物品种，共计23个检查项目明确推荐了月旭科技Ultimate®系列色谱柱。

公司的核心创造力是专业、全面的科研团队。月旭科技的科研团队是一支集硅胶和聚合物色谱基材制备、多孔材料表面处理和修饰、新型色谱分离固定相开发、色谱柱装填工艺优化、色谱应用分析方法以及工业制备规模色谱纯化工艺开发等不同专业方向的多学科研发团队，拥有21项已授权专利。

公司的核心生产力是优异、稳定的产品质量。于2018年再次通过了NSF-ISR的ISO 9001:2015的国际质量管理体系。从严狠抓质检流程及标准，保证生产的每一个产品都合格合规，完美达到实验要求。

公司的核心竞争力是覆盖全国、辐射全球的销售网络。在全国20多个城市设有办事处，服务于国内的制药行业、高校、研究院所和各省市商检、质检、农检、环境监测单位和其它第三方检测机构。并在印度、美国及加拿大设有子公司，与巴西、阿根廷和土耳其等20多个国家的当地经销商建立了长期稳定的合作关系。

公司的核心生命力是快速、高效的技术服务团队。月旭科技技术服务团队以专业、全面、准确、快速的特点，享誉全行业。我们始终以客户为中心，快速精准解决客户问题，为客户提供准确完善的技术服务。

月旭科技长期致力于成为中国领先的色谱填料、色谱耗材和仪器制造商，色谱分析和分离纯化整体解决方案提供商，色谱实验用品一站式供应商。公司始终以让公众的饮食健康更有保障为企业使命；以极限的性能，合理的价格，更好的服务为企业理念；以积极开拓进取，努力创造价值为企业精神；以客户优先，团队至上，学习创新，攻坚克难，诚信尽责，红利共享为核心价值观。我们将依托长三角G60科创走廊在人才、技术、供应链等资源聚集的优势，持续投入研发创新，全面提升品质管理，不断增强客户服务能力，打造世界知名的色谱产品品牌。

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尊敬的用户：

您好！

非常感谢您选择使用我公司生产的高效液相色谱柱。为了让您有更好的使用体验，请仔细阅读该说明书，有任何意见和建议请拨打我公司客服电话400-810-6969。

祝：身体健康！

工作顺利！

附：

为满足公司全球品牌规划需要，Ultimate系列产品在中国大陆以外的国家地区将使用Ultisil 名称进行推广。

色谱柱使用前的准备

说明书常见名词解释：

pH范围：该款色谱柱能耐受的流动相及样品溶液的pH范围。

比表面积：一克硅胶的表面积。

孔径：全多孔硅胶球内部孔的直径，根据目标物的分子量来选择。

载碳量：硅胶球上键合官能团多少的一个量化参数。

USP编号：USP色谱柱数据库中键合相的通用编号。

过渡流动相：是指有机相和水相比例与做样流动相相同，只是过渡流动相不含缓冲盐、酸、碱等添加剂。

过渡程序：为了保证活化程序与做样程序的流动相之间能有更好的互溶性而采用过渡流动相冲洗的程序。

最高耐压：是指色谱柱本身能耐受的压力，建议长期使用压力为30MPa以下，仪器可能在最高耐压下会出现异常现象，故在使用时请注意仪器压力，务必安全使用。

保存溶剂：在储存或者运输过程中用来保持填料活性的溶剂，对人体有一定的伤害，使用时请做好相应的防护措施。

色谱柱的身份确认：

为了保证每一支色谱柱的质量，月旭公司出售的每一支色谱柱都有唯一的身份编码，根据此编码，我公司可以将质量问题确定到个人。为了保障你的利益，收到色谱柱时，请完成以下程序：

1、仔细查看包装盒是否完好，与自己请购的色谱柱是否一致；

2、盒内是否有质量检验报告及检验人员签名；

3、色谱柱表面有无碰撞伤痕，柱两端保护色谱柱的堵头是否完整；

4、色谱柱柱体是否贴有月旭公司色谱柱的身份标牌，并仔细核对包装盒与色谱柱标签上的型号和编号是否一致。

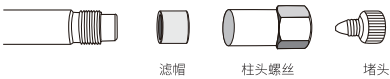
注：

色谱柱内部装填物为细小颗粒，请勿擅自打开，避免内容物吸入人体内，对人体产生影响，如果需要打开，请做好相应的防护措施。

结构和安装

结构：

月旭公司生产的高效液相色谱柱柱管材质均为316L不锈钢，两端结构完全一致，其结构如图一：

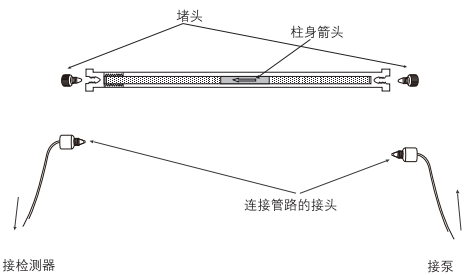


图一 月旭液相色谱柱结构

安装：

为了保证色谱柱使用时有最高柱效，连接管路尽量使用适合的细径管路，色谱柱进出口的连接必须非常适配，连接管端口部分必须平整，不能有毛刺和切口斜面等现象，各种连接管路请使用专业工具切割 修整；

1、取出色谱柱，仔细查看柱身洗脱液流向箭头标识，用手旋下柱两端的堵头，放好色谱柱，使洗脱液流向和柱身所示流向一致，如图二所示：



图二 色谱柱的正确连接

2、用合适的方法将“连接管路的不锈钢或者其它材质的接头”旋入色谱柱两端，管路接头要和色谱柱接口连接紧密，确保零死体积连接，在色谱仪正常运行时没有漏液。

Blossmate®品牌色谱柱说明书

色谱柱归类索引

类型	符号	页码	中文	USP编号	月旭型号
反相柱	C18	5	十八烷基硅烷键合硅胶柱	L1	Blossmate® C18
					Blossmate® Aqs C18
					Blossmate® ST-C18
反相柱	C4	5	丁基硅烷键合硅胶柱	L26	Blossmate® C4
反相柱	Phenyl	5	苯基硅烷键合硅胶柱	L11	Blossmate® Phenyl

Blossmate®反相系列色谱柱

色谱柱参数：

中文名称	名称	pH范围	比表面积(m^2/g)	孔径(Å)	载碳量(%)	USP编号	最高柱温(°C)	最高压力(MPa)
十八烷基硅烷键合硅胶柱	C18	2.0-8.0	300	100	14	L1	60	40
	Aqs C18	2.0-8.0	300	100	10	L1	60	40
	ST-C18	1.0-11.0	300	100	12	L1	60	40
丁基硅烷键合硅胶柱	C4	1.5-10.0	15	450	0.5	L26	60	40
苯基硅烷键合硅胶柱	Phenyl	1.5-10.0	15	450	1.0	L11	60	40

Blossmate®系列色谱柱采用全新高纯全多孔硅胶基质，加之月旭科技独特的键合工艺和双封尾工艺，确保硅胶表面有更高的惰性，进而拥有更加对称的峰形，更高的柱效。

色谱柱高标准的严苛质控条件，保证了每一支色谱柱出厂前都经过严格质量筛选的“优胜劣汰”，色谱柱的重现性更好，峰容量更高。

保存溶剂为甲醇/水

	活化程序	过渡程序	备注
流速	0.5mL/min	1mL/min	流动相中不含盐不需要过渡
流动相	80%甲醇	10%甲醇	
时间	4h	1h	
柱温	30°C	30°C	

保存溶剂为乙腈/水

	活化程序	过渡程序	备注
流速	0.5mL/min	1mL/min	流动相中不含盐不需要过渡
流动相	80%乙腈	10%乙腈	
时间	4h	1h	
柱温	30°C	30°C	

色谱柱的日常冲洗：(建议反冲)

做样流动相	不含酸碱盐	含酸碱盐	含离子对试剂
流速	做样流速		
冲洗流动相	80%甲醇	10%甲醇-80%甲醇	10%甲醇-50%甲醇-80%甲醇
时间	各项40min		
存储	置于最后一步保存溶剂中，放于阴凉干燥处		
备注	流动相中的甲醇，可以更换成乙腈		

色谱柱的异常冲洗：

当色谱柱出现，柱压升高，峰形异常，柱效降低，分离度下降等异常后，先使用过渡流动相冲洗掉色谱柱中的盐，再按照下表方式冲洗；如果流动相使用了离子对试剂，在下表的流动相第一步使用50%的甲醇后，再按照下表冲洗（建议反冲）：

流速	1/4做样流速
流动相	100%甲醇-100%乙腈-100%异丙醇-100%乙腈
时间	柱长≤100mm　各项100min
	柱长＞100mm　各项120min
备注	异丙醇黏度大，压力较高，请注意调整流速在合适范围内

Xtimate® “超限”品牌色谱柱说明书

色谱柱归类索引

类型	符号	页码	中文	USP编号	月旭型号
反相柱	C18	7	十八烷基硅烷键合硅胶	L1	Xtimate® C18
					Xtimate® Polar RP
	C8		辛烷基硅烷键合硅胶	L7	Xtimate® C8
	C4		丁基硅烷键合硅胶	L26	Xtimate® C4
	Phenyl		苯基硅烷键合硅胶	L11	Xtimate® Phenyl-Hexyl
	CN		氰基键合硅胶柱	L10	Xtimate® CN
分子排阻柱	SEC-120	8	球状亲水改性硅胶	L33/L59	Xtimate® SEC-120
	SEC-200		球状亲水改性硅胶	L33/L59	Xtimate® SEC-200
	SEC-300		球状亲水改性硅胶	L33/L59	Xtimate® SEC-300
	SEC-500		球状亲水改性硅胶	L33/L59	Xtimate® SEC-500
	SEC-700		球状亲水改性硅胶	L33/L59	Xtimate® SEC-700
	SEC-1000		球状亲水改性硅胶	L33/L59	Xtimate® SEC-1000
	SEC-2000		球状亲水改性硅胶	L33/L59	Xtimate® SEC-2000
聚合物基质离子交换柱	H^+	10	磺化交联苯乙烯二乙烯基苯共聚氢型强阳离子交换柱	L17	Xtimate® Sugar-H
	Ca^{2+}		磺化交联苯乙烯二乙烯基苯共聚钙型强阳离子交换柱	L19	Xtimate® Sugar-Ca
聚合物基质反相柱	PS/DVB	11	刚性苯乙烯-二乙烯基苯共聚物微球	L21	Xtimate® PS/DVB
乳糖专用	NH_2	12	特殊工艺氨基键合硅胶柱	L8	Xtimate® Lactose-NH_2
盐酸二甲双胍专用柱	SCX	13	磺酸基强阳离子硅胶柱	L9	Xtimate® XB-SCX

Xtimate® “超限”反相系列色谱柱

色谱柱参数：

中文名称	名称	pH范围	比表面积(m^2/g)	孔径(Å)	载碳量(%)	USP编号	最高柱温(℃)	最高压力(MPa)
十八烷基硅烷键合硅胶	C18	1.0-12.5	320	120	14	L1	(流动相pH<6.5) 70℃ (流动相pH>6.5) 40℃	40 (≥5μm) 60 (<5μm)
	Polar RP	1.0-12.5	320	120	16	L1		
辛烷基硅烷键合硅胶	C8	1.0-12.5	320	120	10	L7		
	C8	1.0-12.5	100	300	5	L7		
氰丙基硅烷键合硅胶	CN	1.0-12.5	320	120	7	L10		
苯基己基硅烷键合硅胶	Phenyl-Hexyl	1.0-12.5	320	120	12	L11		
丁基硅烷键合硅胶	C4	1.0-12.5	320	120	8	L26		
			100	300	4			

Xtimate®系列高纯硅胶基质表面键合有机无机杂化层是月旭公司研发团队在硅胶表面修饰技术上持续创新研究和攻关的成果，用一种独特的有机无机杂化键合工艺，使产品既具有硅胶基质的高柱

效和高机械强度，又兼具了聚合物填料的高pH耐受性，是一款臻乎完美、代表目前国际领先水平的高品质HPLC色谱柱产品。

Xtimate®色谱柱专门为液相色谱方法开发而设计，能够在整个pH范围内使用种类多样的流动相体系和很宽的温度范围进行方法开发。即使在最苛刻的条件下，Xtimate®色谱柱亦具有非常稳定的性能和更长的寿命。它采用先进的创新技术生产，而且按严苛的质量标准进行质量控制，是用户针对难度大的色谱分离的首选方案。

新柱活化：（保存溶剂：乙腈/水）

键合相	Xtimate® C18、Xtimate® Polar RP、Xtimate® C8、Xtimate® C4、Xtimate® Phenyl-Hexyl、Xtimate® CN				
	活化程序		过渡程序		备注
	柱内径≤3mm	柱内径＞3mm	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.5mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	80%乙腈		10%乙腈		
时间	4h		1h		
柱温	30°C		30°C		

色谱柱的日常冲洗：（建议反冲）

做样流动相	不含酸碱盐	含酸碱盐	含离子对试剂
流速	做样流速		
冲洗流动相	80%甲醇	10%甲醇-80%甲醇	10%甲醇-50%甲醇-80%甲醇
时间	柱长≤100mm 各项30min		
	柱长＞100mm 各项40min		
保存	置于80%甲醇中，放于阴凉干燥处		
备注	流动相中的甲醇，可以更换成乙腈		

色谱柱的异常冲洗：

当色谱柱出现，柱压升高，峰形异常，柱效降低，分离度下降等异常后，先使用过渡流动相冲洗掉色谱柱中的盐，再按照下表方式冲洗；如果流动相使用了离子对试剂，第一步使用50% 的甲醇后，再按照下表冲洗（建议反冲）：

流速	1/4做样流速
流动相	100%甲醇-100%乙腈-100%异丙醇-100%乙腈
时间	柱长≤100mm 各项100min
	柱长＞100mm 各项120min
备注	异丙醇黏度大，压力较高，请注意调整流速在合适范围内

Xtimate® SEC系列分子排阻柱

Xtimate® SEC色谱柱是硅胶基质的体积排阻色谱柱，其色谱填料为高纯度、具有良好稳定性的硅胶微球表面键合亲水性高分子聚合物。月旭公司采用特殊的表面修饰技术，确保了该填料具有良好的稳定性和批次之间的较好重现性。

Xtimate® SEC填料采用独特的化学键合技术，在硅球表面键合了亲水性聚合物以及亲水性二醇基官能团。双重键合机制使水溶性高分子聚合物、蛋白、生物酶、多肽等生物样品的非特异性吸附极小，广泛应用于水溶性聚合物及生物大分子的分离和测定。

色谱柱参数

中文名称	名称	pH范围	分子量范围		孔径(Å)	USP编号
球状亲水改性硅胶分子排阻柱	Xtimate® SEC-120	2-7.5，短时间可耐受7.5-9.5	蛋白分子量范围500-150,000	水溶性高分子范围500-25,000	120	L33/L59
球状亲水改性硅胶分子排阻柱	Xtimate® SEC-200	2-7.5，短时间可耐受7.5-9.5	蛋白分子量范围5,00–200,000	水溶性高分子范围500-50,000	200	L33/L59
球状亲水改性硅胶分子排阻柱	Xtimate® SEC-300	2-7.5，短时间可耐受7.5-9.5	蛋白分子量范围5,000–1,250,000	水溶性高分子范围1,000-100,000	300	L33/L59
球状亲水改性硅胶分子排阻柱	Xtimate® SEC-500	2-7.5，短时间可耐受7.5-9.5	蛋白分子量范围10,000–3,500,000	水溶性高分子范围2,000-500,000	500	L33/L59
球状亲水改性硅胶分子排阻柱	Xtimate® SEC-700	2-7.5，短时间可耐受7.5-9.5	蛋白分子量范围15,000–5,000,000	水溶性高分子范围2,500-500,000	700	L33/L59
球状亲水改性硅胶分子排阻柱	Xtimate® SEC-1000	2-7.5，短时间可耐受7.5-9.5	蛋白分子量范围50,000–7,500,000	水溶性高分子范围5,000-1,500,000	1000	L33/L59
球状亲水改性硅胶分子排阻柱	Xtimate® SEC-2000	2-7.5，短时间可耐受7.5-9.5	蛋白分子量范围大于10,000,000	水溶性高分子范围50,000-2,500,000	2000	L33/L59

Xtimate® SEC与大多数缓冲液相容，如醋酸铵、磷酸盐、Tris等。在pH7.0，流动相为150mM磷酸盐缓冲液环境下，对Xtimate® SEC柱进样100次或使用1个月，其分离性能几乎没有发生改变。Xtimate® SEC固定相具有中性、亲水的特点，与生物分子特别是蛋白质之间的非特异性相互作用非常小。Xtimate® SEC柱还具有高容量的特点，因此能保证高的分离效率和回收率。

新柱活化（保存溶剂：90%乙腈）

键合相	Xtimate® SEC-120、Xtimate® SEC-200、Xtimate® SEC-300、Xtimate® SEC-500、Xtimate® SEC-700、Xtimate® SEC-1000、Xtimate® SEC-2000		
柱规格	柱内径≤4.6mm	柱内径＞4.6mm	备注
流速	0.2mL/min	0.5mL/min	
流动相	第一步用纯乙腈　第二步用水		
时间	各5h		
柱温	30℃		

色谱柱的日常冲洗：

键合相	Xtimate® SEC-120、Xtimate® SEC-300、Xtimate® SEC-500、Xtimate® SEC-700、Xtimate® SEC-1000、Xtimate® SEC-2000	
做样流动相	不含酸碱盐	含酸碱盐
流速	做样流速	
冲洗流动相	10%乙腈-90%乙腈	5%乙腈水-90%乙腈
时间	柱长≤100mm　各项40min	
	柱长＞100mm　各项60min	
保存	保存在90%乙腈中，放于阴凉干燥处	
备注		

异常冲洗：

多次使用后某些样品可能会吸附到入口筛板或填料上。当积累至一定程度时会出现压力升高并伴随峰形展宽的异常现象，需要进行特殊的冲洗，该冲洗的清洗溶液选择的基本原则：1）低pH的盐溶液有助于移除碱性蛋白；2）有机溶剂有助于移除疏水蛋白；3）助溶剂有助于去除在固定相上强吸附的物质（如通过氢键作用等）。

注意：只有在中性盐溶液或有机溶剂没有明显改善效果的情况下使用助溶剂（如：6-8M 的尿素或 0.2-0.3% 十二烷基硫酸钠）。

键合相	Xtimate® SEC-120、Xtimate® SEC-300、Xtimate® SEC-500、Xtimate® SEC-700、Xtimate® SEC-1000、Xtimate® SEC-2000
流速	1/2做样流速（例如做样流速是0.4mL/min，那异常冲洗就用0.2 mL/min）
流动相	1、具有低pH值的高浓度中性盐溶液（如0.5M硫酸钠溶液，硫酸调整pH3.0） 2、含有机溶剂（如10-20%的甲醇、乙腈、乙醇等）的缓冲溶液（如50mM磷酸盐缓冲液，pH7.0）
时间	柱长≤100mm　各项60min
	柱长＞100mm　各项120min
备注	

Xtimate® “超限”聚合物基质系列离子交换柱：

该系列色谱柱填料为刚性苯乙烯/二乙烯基苯基质的强离子交换树脂，专用于糖类及有机酸类的分离。Xtimate® Sugar-Ca色谱柱在糖类的分离和分析上表现出优秀的性能，是应用于食品、生物化学品、天然产物中糖分析的首选。Xtimate® Sugar-H色谱柱在有机酸分离上有优秀的性能。

色谱柱参数：

名称	pH范围	交联度	抗衡离子	USP编号	耐受压力	耐受温度℃	流速(ml/min)
Xtimate® Sugar-H	1.0-3.0	8%	H^+	L17	14MPa	95	＜2（70℃）
Xtimate® Sugar-Ca	5.0-9.0	8%	Ca^{2+}	L19	14MPa	95	＜2（70℃）

使用步骤：

1、用两通取代色谱柱将仪器连接，用过滤好的超纯水冲洗仪器50mL；

2、再用分析流动相冲洗仪器50mL，将流速降到0mL/min；

3、将Xtimate® Sugar色谱柱连接在HPLC系统上，按照下列方法进行活化和过渡。

使用注意事项：

该系列的色谱柱是以树脂的膨胀形态紧密装填的，如果样品进行了很好的前处理，那大部分产生的问题都和树脂填料有关，由于单向阀的损坏或是突然反压增加，脆弱的树脂填料可能被泵的波动冲到柱子的后筛板处导致色谱柱损坏，因此要经常检查仪器是否工作正常，在线过滤器以及保护柱中是否截留了微粒。溶剂之间极性差异太大，填料温差太大，脉冲太大，都是柱床损坏的诱因，故尽量避免与之相关的误操作：

1、在柱温未到设定值之前，请将流速设置在0.2-0.3mL/min，避免柱压太高；

2、在柱温达到设定值时，流速增至分析流速，流速变化以

0.1mL/min为增量，待柱压稳定后再继续增加流速，避免流速增加导致过大的压力脉冲，损坏色谱柱；同样，降低流速也需要0.1mL/min的流速进行递减；

3、最大流速不应使压力超过14MPa；

4、使用完以后，一定先降柱温至室温以后才能停泵，取下，放置到4℃ 冰箱保存；

5、色谱柱从冰箱取出以后，要恢复到室温以后才能应用到仪器上增加柱温，避免温差太大导致柱床损坏；

6、流动相充分脱气，以保证良好的基线；

新柱的活化：（保存溶剂：水体系）

	活化程序		过渡程序		备注
柱规格	柱内径≤4.6mm	柱内径>4.6mm	柱内径≤4.6mm	柱内径>4.6mm	
流速	0.1mL/min	0.5mL/min	做样流速	做样流速	
流动相	Xtimate® Sugar-Ca 0.5g/L EDTA Ca（CAS：23411-34-9）		水		
	Xtimate® Sugar-H pH=2.5 硫酸水溶液		流动相		
时间	12h		4h		
柱温	80℃		80℃		

日常冲洗

流速	做样流速
流动相	水
时间	柱长≤100mm　30min
	柱长>100mm　50min
保存条件	保存在水，置于4℃冰箱内保存
备注	

再生冲洗：

当使用流动相约5L，或者出现柱压升高，峰形异常，柱效下降，分离度降低时，请按照下表进行再生。

流速	做样流速
流动相	Xtimate® Sugar-Ca：0.5g/L EDTA 二钠钙水溶液 Xtimate® Sugar-H：pH=2.5硫酸水溶液
柱温	85℃
时间	柱长≤100mm　8h
	柱长>100mm　12h
备注	

Xtimate® PS/DVB 色谱柱：

Xtimate® PS/DVB树脂特别为高效分离而设计，为一种新型的反相色谱填料，具有极窄粒径和孔径分布的高交联度聚苯乙烯/二乙烯苯（PS/DVB）颗粒为基质。高交联度的多孔颗粒具有高的化学和物理稳定性，克服了硅胶填料pH值适用范围窄的限制，可以在极端pH（1.0-14.0）条件下使用，更换不同有机溶剂时可以使色谱柱的柱效几乎保持不变。这类色谱填料特别适用于蛋白质、多肽、寡聚核苷酸和抗生素以及小分子药物的分离纯化，可替代市场上同类型产品。

色谱柱参数：

名称	pH范围	比表面积 (m^2/g)	孔径 (Å)	USP 编号	耐受压力 (MPa)	耐受温度°C	有机溶剂比例
Xtimate® PS/DVB	1.0-14.0	450	300	L21	27	75	＞5%

注意事项

1）Xtimate® PS/DVB色谱柱使用pH范围在1.0-14.0，可以进行等度或梯度洗脱，可以使用异丙醇、甲醇、乙醇和乙腈等常规反相体系中的有机溶剂和水，也可以使用TFA等离子对试剂来改善分离效果和峰形。

2）虽然 Xtimate® PS/DVB溶胀很小，但建议在上样、洗脱和清洗过程中，保持流动相至少5%的有机溶剂浓度。不能100%的水溶液中使用。

新柱的活化：（保存溶剂：80%乙腈）

活化程序			过渡程序		备注
柱规格	柱内径 ≤4.6mm	柱内径 ＞4.6mm	柱内径 ≤4.6mm	柱内径 ＞4.6mm	
流速	0.2mL/min	0.5mL/min	0.2mL/min	1mL/min	
流动相	80%乙腈		10%乙腈		
时间	5h		1h		
柱温	30°C		做样柱温		

日常冲洗：

流速	做样流速
冲洗流动相	过渡流动相-80%乙腈水
时间	柱长≤100mm　每项30min
	柱长＞100mm　每项50min
保存条件	保存在80%乙腈水中，置于阴凉干燥处保存
备注	

再生冲洗：

当出现柱压升高，峰形异常，柱效下降，分离度降低时，请按照下表进行再生。

流速	做样流速
流动相	10%甲醇溶液-纯甲醇-纯乙腈-纯异丙醇 -纯乙腈-80%乙腈
柱温	30°C
时间	柱长≤100mm　每项0.5h
	柱长＞100mm　每项1h
备注	

乳糖专用柱：

Xtimate® Lactose-NH_2液相色谱柱，其柱填料采用月旭科技独有的创新性键合工艺，以超高纯全多孔球形硅胶为基质，键合氨丙基官能团，通过严格的工艺过程控制，保证形成均一、致密氨基官能团分子层，最大限度的提高了键合覆盖率，确保柱填料具有优异的稳定性。Xtimate® Lactose-NH_2（4.6×300mm，5μm）具有更高的稳定性和耐受性，能完全满足药典检测乳糖的要求，可以有效的减少人员操作、仪器和试剂等变化因素的影响，提高分析效率。

色谱柱参数：

名称	pH范围	比表面积(m^2/g)	孔径(Å)	USP编号	耐受柱压(MPa)	耐受温度℃
Xtimate® Lactose-NH_2	2.0-8.0	450	120	L8	40	75

注意事项

检测乳糖使用示差折光检测器(RID)，该检测器对温度的变化、流动相比例的变化、流动相中的气泡比较敏感，会产生基线漂移，噪音增大，分离度达不到，柱效不够等异常现象，因此在使用过程中，要注意以下几点：

1）流动相混合在一起，充分手动摇匀，真空抽滤，超声脱气10分钟，使用一个通道运行，不要使用仪器在线混合；

2）仪器配置在线过滤器；

3）进样体积严格按照药典要求，进样10μL，尽可能的将定量环更换成10μL定量环，以减少柱外死体积的影响；

4）要充分保证色谱柱的柱温达到设定值，由于一般的柱温箱都是以加热空气，热空气再作为介质加热色谱柱的，而且还不能将流动相预热到设定值，故色谱柱要达到设定值比较困难，建议将柱温箱用干毛巾或者干的棉花填充，充当传热介质，以便有更好的基线噪音和色谱效果。

新柱的活化：（保存溶剂：乙腈）

	活化程序	过渡程序	备注
柱规格	4.6×300mm，5μm		
流速	0.5mL/min	1mL/min	
流动相	纯乙腈	纯乙腈	
时间	5h	1h	
柱温	30℃	做样柱温	

日常冲洗：

流速	做样流速
流动相	纯乙腈
时间	60min
保存条件	保存在纯乙腈中，置于阴凉干燥处保存
备注	

再生冲洗：

当出现柱压升高，峰形异常，柱效下降，分离度降低时，请按照下表进行再生

流速	做样流速
流动相	纯甲醇-纯乙腈-纯异丙醇-纯乙腈
柱温	30℃
时间	每项3h
备注	异丙醇压力较高，应适当减低流速，但冲洗体积要相当

盐酸二甲双胍专用柱：

Xtimate® XB-SCX液相色谱柱，其柱填料采用月旭科技独有的创新性键合工艺，以超高纯全多孔球形硅胶为基质，键合磺酸基官能团。Xtimate® XB-SCX 4.6×250mm，5μm具有更高的稳定性和耐受性，能完全满足药典检测盐酸二甲双胍及其制剂的要求，可以有效的

降低人员操作、仪器和试剂等变化因素的影响，提高分析效率。

色谱柱参数：

名称	pH范围	比表面积 (m^2/g)	孔径 (Å)	USP 编号	耐受柱温 (MPa)	耐受温度 (°C)
Xtimate® XB-SCX	2.0-8.0	350	120	L9	40	60

注意事项：

1、离子交换类的色谱柱平衡时间较久，建议按照下列活化流程活化后，用做样流动相0.2mL/min过夜平衡色谱柱；

2、检测有关物质时，由于供试品浓度较高，样品峰宽较大，杂质分离即可；

3、检测制剂时，由于不同厂家使用的辅料有差异，可能会导致辅料与杂质分离不好的情况；

4、色谱柱从冰箱取出后，须置放室温后，才能应用到仪器上增加柱温。

新柱的活化：（保存溶剂：甲醇）

	活化程序	过渡程序	备注
柱规格	4.6×250mm，5μm		
流速	0.5mL/min	1mL/min	
流动相	90%甲醇	5%甲醇水	
时间	5h	1h	
柱温	30°C	做样柱温	

日常冲洗：

流速	做样流速
流动相	10%甲醇水
时间	60min
保存条件	保存在10%甲醇水中，置于4°C冰箱中保存
备注	

再生冲洗：

当出现柱压升高，峰形异常，柱效下降，分离度降低时，请按照下表进行再生。

流速	做样流速
流动相	水-100mmol/L $NaClO_4$（磷酸调节pH=3）-水-10%甲醇
柱温	30°C
时间	各项80min
备注	

Ultimate® “极限”品牌色谱柱说明书

色谱柱归类索引：

类型	页码	符号	中文	USP编号	月旭型号
反相柱	16	C18	十八烷基硅烷键合硅胶	L1	Ultimate® XB-C18
					Ultimate® LP-C18
					Ultimate® LP-Aq
					Ultimate® AQ-C18
					Ultimate® Plus C18
					Ultimate® Alk C18
					Ultimate® PAH
					Ultimate® Polar RP
					Ultimate® ODS-3
					Ultimate® XS-C18
					Ultimate® Plus-LP
		C8	辛烷基硅烷键合硅胶	L7	Ultimate® XB-C8
					Ultimate® LP-C8
					Ultimate® F-C8
					Ultimate® Plus-C8
		Phenyl	苯基硅烷键合硅胶	L11	Ultimate® XB-phenyl
					Ultimate® Phenyl-Ether
				L11/L43	Ultimate® PFP
				L11	Ultimate® Plus-phenyl
		C4	丁基硅烷键合硅胶	L26	Ultimate® XB-C4
		C3	丙基硅烷键合硅胶	L56	Ultimate® LP-C3
		C30	C30	L62	Ultimate® XB-C30
		C1	三甲基硅烷键合硅胶	L13	Ultimate® XB-C1
		CN	氰基键合硅胶柱	L10	Ultimate® XB-CN
					Ultimate® LP-CN
正相柱	18	CN	氰基键合硅胶柱	L10	Ultimate® XB-CN
		SiO_2	硅胶柱	L3	Ultimate® SiO_2
		NH_2	氨基键合硅胶柱	L8	Ultimate® XB-NH_2
		Diol	二醇基键合硅胶柱 二羟基丙醇键合硅胶柱	L20	Ultimate® Diol
HILIC	19	SiO_2	硅胶官能团HILIC色谱柱	L3	Ultimate® HILIC Silica
		NH_2	氨基官能团HILIC色谱柱	L8	Ultimate® HILIC-NH_2
		Amide	聚丙烯酰胺键合硅胶柱	L68	Ultimate® HILIC Amide
		Amphion	两性离子柱	/	Ultimate® HILIC Amphion II
离子交换柱	20	SCX	磺酸基强阳离子交换柱	L9	Ultimate® XB-SCX
		SAX	季铵基强阴离子交换柱	L14	Ultimate® XB-SAX
混合键合相	21	NH_2/CN	氨基氰基混合键合	L18	Ultimate® NH_2/CN
		C18/SCX	十八烷基磺酸基强阳离子混合键合	/	Ultimate® C18/SCX
		SCX/C18	磺酸基强阳离子十八烷基混合键合	/	Ultimate® SCX/C18
正相手性柱	23		硅胶表面涂覆直链淀粉-三(3,5二甲基)苯基氨基甲酸酯	L51	Ultimate® Amy-D
			硅胶表面涂覆直链淀粉-三[(s)-α-甲基苯基氨基甲酸酯]	/	Ultimate® Amy-S
			硅胶表面涂覆纤维素-三(3,5-二甲基)苯基氨基甲酸酯	L40	Ultimate® Cellu-D
			硅胶表面涂覆纤维素-三(4-甲基苯甲酸酯)	L80	Ultimate® Cellu-J

类型	页码	符号	中文	USP编号	月旭型号
反相手性柱	24		硅胶表面涂覆直链淀粉-三(3,5二甲基)苯基氨基甲酸酯	L51	Ultimate® Amy-DR
			硅胶表面涂覆直链淀粉-三[(s)-α-甲基苯基氨基甲酸酯]	/	Ultimate® Amy-SR
			硅胶表面涂覆纤维素-三(3,5-二甲基)苯基氨基甲酸酯	L40	Ultimate® Cellu-DR
			硅胶表面涂覆纤维素-三(4-甲基苯甲酸酯)	L80	Ultimate® Cellu-JR

Ultimate® “极限”反相系列色谱柱

色谱柱参数：

中文名称	名称	pH范围	比表面积(m^2/g)	孔径(Å)	载碳量(%)	USP编号	最高柱温(℃)	最高压力(MPa)
十八烷基硅烷键合硅胶	LP-C18	0.5-8.0	320	120	10	L1	(流动相 pH≤6.5) 70 (流动相 pH>6.5) 40	40 (≥5μm) 60 (<5μm)
	LP-C18	0.5-8.0	90	300	5	L1		
	LP-Aq	1.0-8.0	320	120	5	L1		
	AQ-C18	1.5-10.0	320	120	12	L1	(流动相 pH≤6.5) 60 (流动相 pH>6.5) 40	40 (≥5μm) 60 (<5μm)
	XB-C18	1.5-10.0	320	120	17	L1		
	XB-C18	1.5-10.0	90	300	8	L1		
	Polar RP	1.5-10.0	320	120	18	L1/L60		
	PAH	1.5-10.0	320	120	22	L1		
	Alk C18	1.5-10.0	320	120	12	L1		
	Plus C18	2.0-8.0	160	130	10	L1		
	ODS-3	2.0-8.0	380	100	15	L1		
	XS-C18	1.5-10.0	320	120	23	L1		
	Plus-LP	0.5-8.0	130	160	9	L1		
辛烷基硅烷键合硅胶	XB-C8	1.5-10.0	320	120	12	L7	(流动相 pH≤6.5) 70 (流动相 pH>6.5) 40	40 (≥5μm) 60 (<5μm)
	XB-C8	1.5-10.0	90	300	4	L7		
	LP-C8	1.0-8.0	90	300	3	L7		
	LP-C8	1.0-8.0	320	120	5.5	L7		
	F-C8	1.5-10.0	320	120	12	L7		
	Plus-C8	1.5-10.0	130	160	7	L7		
苯基硅烷键合硅胶	XB-Phenyl	1.5-10.0	320	120	12	L11	(流动相 pH≤6.5) 60 (流动相 pH>6.5) 40	40 (≥5μm) 60 (<5μm)
	Phenyl-Ether	1.5-10.0	320	120	4	L11		
	PFP	1.5-10.0	320	120	12	L11/L43		
	Plus-phenyl	1.5-10.0	130	160	8	L11		
丁基硅烷键合硅胶	XB-C4	1.5-10.0	320	120	8	L26		
	XB-C4	1.5-10.0	90	300	3	L26		
丙基硅烷键合硅胶	LP-C3	1.0-8.0	320	120	4	L56	(流动相 pH≤6.5) 70 (流动相 pH>6.5) 40	40 (≥5μm) 60 (<5μm)
三甲基硅烷键合硅胶	XB-C30	1.5-10.0	320	120	22	L62	(流动相 pH≤6.5) 60 (流动相 pH>6.5) 40	40 (≥5μm) 60 (<5μm)
	XB-C1	1.5-10.0	320	120	4	L13		
氰基键合硅胶柱	XB-CN	1.5-9.0	320	120	7	L10		
	LP-CN	1.0-8.0	320	120	6	L10		

新柱的活化：

键合相	Ultimate® XB-C18	Ultimate® AQ-C18	Ultimat® LP-AQ
	Ultimate® Alk-C18	Ultimate® Plus-C18	Ultimate® XS-C18
	Ultimate® ODS-3	Ultimate® XB-C8	Ultimate® PAH
	Ultimate® F-C8	Ultimate® LP-C8	Ultimate® Phenyl-Ether
	Ultimate® XB-Phenyl	Ultimate® XB-C4	Ultimate® PFP

键合相	Ultimate® LP-C3	Ultimate® LP-C18	Ultimate® plus-LP
	Ultimate® plus-C8	Ultimate® plus-phenyl	Ultimate® LP-CN

保存溶剂为甲醇/水

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径>3mm	柱内径≤3mm	柱内径>3mm	
流速	0.1mL/min	0.3mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	80%甲醇		10%甲醇		
时间	4h		1h		
柱温	30°C		30°C		

*

键合相	Ultimate® XB-C30、Ultimate® XB-C1、Ultimate® Polar RP

保存溶剂为乙腈/水

键合相	Ultimate® XB-CN

保存溶剂为乙腈

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径>3mm	柱内径≤3mm	柱内径>3mm	
流速	0.1mL/min	0.3mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	80%乙腈		10%乙腈		
时间	4h		1h		
柱温	30°C		30°C		

*

色谱柱的日常冲洗：(建议反冲)

键合相	全部反相色谱柱

做样流动相	不含酸碱盐	含酸碱盐	含离子对试剂
流速	做样流速		
冲洗流动相	80%甲醇	10%甲醇-80%甲醇	10%甲醇-50%甲醇-80%甲醇
时间	柱长≤100mm 各项30min		
	柱长>100mm 各项40min		
存储	Ultimate® Polar RP最后一步冲洗用纯乙腈，放置于2-8°C冷藏保存		
	置于最后一步冲洗溶剂中，放于阴凉干燥处		
备注	流动相中的甲醇，可以更换成乙腈		

色谱柱的异常冲洗：

当色谱柱出现柱压升高、峰形异常、柱效降低、分离度下降等异常后，先使用过渡流动相冲洗掉色谱柱中的盐，再按照下表方式冲洗；如果流动相使用了离子对试剂，第一步使用50%的甲醇后，再按照下表冲洗。

(建议反冲)：

键合相	全部反相色谱柱

流速	1/4做样流速
流动相	100%甲醇-100%乙腈-100%异丙醇-100%乙腈
时间	柱长≤100mm 各项100min
	柱长>100mm 各项120min
备注	异丙醇黏度大，压力较高，请注意调整流速在合适范围内

Ultimate® “极限”正相系列色谱柱：

中文名称	名称	pH范围	比表面积 (m^2/g)	孔径 (Å)	载碳量 (%)	USP 编号	最高柱温 (°C)	最高压力 (MPa)
硅胶	SiO_2	2.0-8.0	320	120	/	L3	(流动相 pH≤6.5) 40	40 (≥5μm) 60 (<5μm)
二羟基丙烷键合硅胶	Diol	2.0-8.0	320	120	2.5	L20	(流动相 pH>6.5) 40	
氨丙基硅烷键合硅胶	XB-NH_2	2.0-8.0	320	120	4	L8		
氰基硅烷键合硅胶	XB-CN	1.5-9.0	320	120	7	L10	(流动相 pH≤6.5) 60 (流动相 pH>6.5) 40	40 (≥5μm) 60 (<5μm)

新柱活化：

保存溶剂是正己烷-异丙醇

反相模式使用：做样流动相含甲醇，乙腈，水等极性溶剂

	活化程序		过渡程序		备注
柱规格	柱内径 ≤3mm	柱内径 >3mm	柱内径 ≤3mm	柱内径 >3mm	
流速	0.1mL/min	0.3mL/min	0.2mL/min	1mL/min	
流动相	100%异丙醇		100%乙腈		
时间	12h		2h		
柱温	30°C		30°C		

正相模式使用：做样流动相含正己烷，异丙醇等弱极性溶剂

	活化程序		过渡程序		备注
柱规格	柱内径 ≤3mm	柱内径 >3mm	柱内径 ≤3mm	柱内径 >3mm	
流速	0.1mL/min	0.2mL/min	0.2mL/min	1mL/min	
流动相	100%异丙醇		做样流动相		
时间	4h		2h		
柱温	30°C		30°C		

备注：该处XB-CN柱特指物料编码00229开头的正相CN柱

日常冲洗：(建议反冲)

做样流动相	不含酸碱盐乙腈水	含酸碱盐的乙腈水	正己烷，异丙醇等
流速	做样流速		
冲洗流动相	100%乙腈	60%乙腈水-100%乙腈	100%正己烷
时间	柱长≤100mm 各项30min		
	柱长>100mm 各项40min		
存储	置于最后一步冲洗溶剂中，放于阴凉干燥处		
备注			

色谱柱异常冲洗：

当色谱柱出现柱压升高，峰形异常，柱效降低，分离度下降等异常后，先使用过渡流动相冲洗掉色谱柱中的盐，再按照下表方式冲洗(建议反冲)：

做样流动相	甲醇，乙腈，水等	正己烷，异丙醇等
流速	做样流速	
流动相	100%乙腈-100%甲醇-100%异丙醇-100%乙腈	100%异丙醇-100%甲醇-100%异丙醇
时间	柱长≤100mm 各项30min	
	柱长>100mm 各项40min	
备注	异丙醇黏度大，压力较高，请注意调整流速在合适范围内	

正相色谱中，易出现保留时间漂移的情况，是由于固定相的水分含量常常是个影响选择性的关键参数，流动相中的水分含量通常影响保留时间和分离度，大部分溶剂都内含有小部分的溶解水分（正己

烷20°C下水分含量是0.0111% w/w)。正相色谱中出现保留时间波动比较大，可以归因于固定相和流动相中水分的变化，而填料可能还是完好的，建议使用下面的方法：

1、去除固定相上的水分：

用含 2.5% 二甲氧基丙烷（dimethoxypropane）和 2.5% 冰醋酸的正己烷冲洗色谱柱30个柱体积；

2、使用水分含量可控的流动相（比如：用水半饱和）；

半饱和流动相配置方法：将无水的非极性流动相分成两半；其中一半中加入一定量水，并混匀搅拌约一小时，静止分层后，将多余的水相全部除去；将两部分重新混合在一起就配成了“半饱和”流动相。

Ultimate® “极限”HILIC系列色谱柱

键合相	pH范围	比表面积 (m^2/g)	孔径 (Å)	载碳量(%)	USP编号	最高柱温 (°C)	最高压力 (MPa)
HILIC Silica	2.0-8.0	320	120	/	L3	(流动相pH <6.5)60 (流动相pH >6.5)40	40 (≥5μm) 60 (<5μm)
HILIC-NH_2	2.0-8.0	320	120	4	L8		
HILIC Amphion II	2.0-8.0	320	120	6	/		
HILIC Amide	2.0-8.0	320	120	7	L68		

新柱的活化：

键合相	Ultimate® HILIC Silica，Ultimate® HILIC-NH_2， Ultimate® HILIC Amphion II，Ultimate® HILIC Amide

保存溶剂为纯乙腈

	活化程序		过渡程序		备注
柱规格	柱内径 ≤3mm	柱内径 >3mm	柱内径 ≤3mm	柱内径 >3mm	
流速	0.1mL/min	0.3mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	纯乙腈		70%乙腈		
时间	4h		1h		
柱温	30°C		30°C		

色谱柱的日常冲洗：（建议反冲）

	做样流动相不含酸碱盐	做样流动相含酸碱盐
流速	做样流速	
冲洗流动相	纯乙腈	70%乙腈-纯乙腈
时间	柱长≤100mm 各项30min	
	柱长＞100mm 各项40min	
保存	Ultimate® HILIC Silica，Ultimate® HILIC-NH_2，Ultimate® HILIC Amide置于纯乙腈中 Ultimate® HILIC Amphion 最后保存在95%乙腈水中，均放于阴凉干燥处	
备注		

色谱柱的异常冲洗：

当色谱柱出现，柱压升高，峰形异常，柱效降低，分离度下降等异常后，先使用过渡流动相冲洗掉色谱柱中的盐，再按照下表方式冲洗；（建议反冲）：

做样流速	1/4做样流速
流动相	100%甲醇-100%乙腈-100%异丙醇-100%乙腈
时间	柱长≤100mm 各项100min
	柱长＞100mm 各项120min
备注	异丙醇黏度大，压力较高，请注意调整流速在合适范围内

Ultimate® HILIC Amphion II 色谱柱异常时的冲洗

做样流速	做样流速
流动相	50%乙腈-水-0.5M氯化钠-水-95%乙腈
时间	柱长≤100mm　各项100min
	柱长＞100mm　各项120min
备注	

Ultimate® “极限”离子交换系列色谱柱

名称	pH范围	载碳量 (%)	比表面积 (m^2/g)	最高柱温 (°C)	最高压力 (MPa)
XB-SCX	2.0-8.0	12(120Å) 5(300Å)	320(120Å) 90(300Å)	(流动相pH≤6.5) 60 (流动相pH＞6.5) 40	40(≥5μm) 60(＜5μm)
XB-SAX	2.0-8.0	7.5(120Å) 1.5(300Å)	320(120Å) 90(300Å)	(流动相pH≤6.5) 60 (流动相pH＞6.5) 40	40(≥5μm) 60(＜5μm)

Ultimate® XB-SCX 色谱柱的使用特性

1）常用于分离在水溶液中呈阳离子态的化合物；

2）Ultimate® XB-SCX色谱柱能与水和有机溶剂兼容，可用甲醇、乙腈和水（包括缓冲盐溶液）作流动相进行分析；

3）阳离子化合物的保留能力与流动相的pH、离子强度、流动相中有机相的比例以及温度有关。通常离子强度越大保留时间越短，流动相中有机相的比例越大保留时间越短；

4）常用柠檬酸盐和磷酸盐等缓冲盐调整流动相的pH和离子强度以改善分离度。流动相的pH应该维持在pH 2.0~7.5；

5）阳离子柱的平衡时间相对C18而言较长。

Ultimate® XB-SAX 色谱柱的使用特性

1、常用于分离在水溶液中呈阴离子态的化合物；

2、Ultimate® XB-SAX色谱柱能与水和有机溶剂兼容，可用甲醇、乙腈和水（包括缓冲盐溶液）作流动相进行分析；

3、阴离子化合物的保留能力与流动相的pH、离子强度、流动相中有机相的比例以及温度有关。通常离子强度越大保留时间越短，流动相中有机相的比例越大保留时间越长；

4、柠檬酸盐和磷酸盐等缓冲盐通常用于调整流动相的pH和离子强度以改善分离度，但不应超过其pH范围；

5、阴离子柱的平衡时间相对C18而言较长。

新柱活化

键合相	Ultimate® XB-SCX, Ultimate® XB-SAX

保存溶剂为甲醇

	活化程序		过渡程序		备注
柱规格	柱内径 ≤3mm	柱内径 ＞3mm	柱内径 ≤3mm	柱内径 ＞3mm	
流速	0.1mL/min	0.5mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	80%甲醇		过渡流动相		
时间	4h		1h		
柱温	30°C		30°C		

色谱柱的日常冲洗：（建议反冲）

做样流动相	不含酸碱盐	含酸碱盐
流速	做样流速	

冲洗流动相	做样流动相-10%甲醇	过渡流动相-10%甲醇
时间	柱长≤100mm	各项30min
	柱长＞100mm	各项40min
保存	置于10%甲醇中，放于4℃的冰箱	
备注		

离子交换类的填料，较易出现键合相水解脱落，导致保留时间漂移的情况（比如：排除流动相和仪器等外因，今天的保留时间和昨天就差异1分钟以上），可以将保持溶剂改成缓冲盐浓度是做样流动相中缓冲盐浓度1/2（比如做样流动相，乙腈：50mmol/L H_3PO_4=10：90，那保存用的溶剂为乙腈：25mmol/L H_3PO_4=10：90）的流动相保存，能一定程度上阻止键合相的脱落，但是这样处理有盐析出的风险，请慎用。

Ultimate®“极限”混合键合相系列色谱柱：

色谱柱参数：

键合相	名称	pH范围	比表面积(m^2/g)	孔径(Å)	载碳量(%)	USP编号	最高柱温(℃)	最高压力(MPa)
氨基氰基混合键合	NH_2/CN	2.0-8.0	320	120	/	L18	(流动相pH＜6.5)60 (流动相pH＞6.5)40	40 (≥5μm) 60 (＜5μm)
十八烷基磺酸基强阳离子混合键合	C18/SCX	2.0-8.0	320	120	/	/		
磺酸基强阳离子十八烷基混合键合	SCX/C18	2.0-8.0	320	120	/	/		

新柱活化：

键合相	Ultimate® MM NH_2/CN

保存溶剂是正己烷-异丙醇

反相模式使用：做样流动相含甲醇，乙腈，水等极性溶剂

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径＞3mm	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.3mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	100%异丙醇		100%乙腈		
时间	12h		1h		
柱温	30℃		30℃		

正相模式使用：做样流动相含正己烷，异丙醇等弱极性溶剂

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径＞3mm	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.2mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	100%异丙醇		做样流动相		
时间	4h		1h		
柱温	30℃		30℃		

日常冲洗(建议反冲)：

做样流动相	不含酸碱盐的乙腈水	含酸碱盐的乙腈水	正己烷,异丙醇等
流速	做样流速		
冲洗流动相	100%乙腈	60%乙腈-100%乙腈	100%正己烷

做样流动相	不含酸碱盐的乙腈水	含酸碱盐的乙腈水	正己烷,异丙醇等
时间	柱长≤100mm	各项30min	
	柱长＞100mm	各项40min	
保存	置于最后一步保存溶剂中,放于阴凉干燥处		
备注	使用100%正己烷时仪器可能干掉,注意排气泡		

色谱柱异常冲洗:当色谱柱出现,柱压升高,峰形异常,柱效降低,分离度下降等异常后,先使用过渡流动相冲洗掉色谱柱中的盐,再按照下表方式冲洗(建议反冲):

做样流动相	甲醇,乙腈,水等	正己烷,异丙醇等
流速	做样流速	
流动相	100%乙腈-100%甲醇 -100%异丙醇-100%乙腈	100%正己烷 -100%异丙醇
时间	柱长≤100mm 各项30min	
	柱长＞100mm 各项40min	
备注	异丙醇黏度大,压力较高,请注意调整流速在合适范围内	

正相色谱中,固定相的水分含量常常是个影响选择性的关键参数,流动相中的水分含量通常影响保留时间和分离度,大部分溶剂都内含有小部分的溶解水分(正己烷20℃下水分含量是0.0111% w/w)。正相色谱中出现保留时间波动比较大,可以归因于固定相和流动相中水分的变化,而填料可能还是完好的,建议使用下面的方法:

1、去除固定相上的水分:用含2.5%二甲氧基丙烷 (dimethoxypropane)和2.5%冰醋酸的正己烷冲洗色谱柱30个柱体积;

2、使用水分含量可控的流动相(譬用和水半饱和);半饱和流动相配置方法:将无水的非极性流动相分成两半;其中一半中加入一定量水,并混匀搅拌约一小时,静止分层后,将多余的水相全部除去;将两部分重新混合在一起就配成了“半饱和”流动相。

键合相	Ultimate® MM C18/SCX、Ultimate® MM SCX/C18

保存溶剂为甲醇/水

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径＞3mm	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.5mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	80%甲醇		10%甲醇		
时间	4h		1h		
柱温	30℃		30℃		

日常冲洗:(建议反冲)

做样流动相	不含酸碱盐	含酸碱盐	含离子对试剂
流速	做样流速		
冲洗流动相	80%甲醇	10%甲醇-80%甲醇	10%甲醇-50%甲醇-80%甲醇
时间	柱长≤100mm 各项30min		
	柱长＞100mm 各项40min		
保存	置于最后一步保存溶剂中,放于阴凉干燥处		
备注	流动相中的甲醇,可以更换成乙腈		

当色谱柱出现,柱压升高,峰形异常,柱效降低,分离度下降等异常后,先使用过渡流动相冲洗掉色谱柱中的盐,再按照下表方式冲洗;如果流动相使用了离子对试剂,在下表的流动相第一步使用50%的甲醇后,再按照下表冲洗(建议反冲):

流速	1/4做样流速
流动相	100%甲醇-100%乙腈-100%异丙醇-100%乙腈
时间	柱长≤100mm　各项100min
	柱长＞100mm　各项120min
备注	异丙醇黏度大，压力较高，请注意调整流速在合适范围内

Ultimate® “极限”手性系列色谱柱

色谱柱描述：

Ultimate® Amy-D / Amy-DR：硅胶表面涂覆直链淀粉－三(3,5－二甲基苯基氨基甲酸酯)

Ultimate® Amy-S / Amy-SR：硅胶表面涂覆直链淀粉－三[(S)-α-甲基苯基氨基甲酸酯]

Ultimate® Cellu-D / Cellu-DR：硅胶表面涂覆纤维素－三 (3,5－二甲基苯基氨基甲酸酯)

Ultimate® Cellu-J / Cellu-JR：硅胶表面涂覆纤维素－三 (4-甲基苯甲酸酯)

键合相	pH范围	比表面积 (m^2/g)	孔径 (Å)	USP 编号	可承受的柱温范围	最高压力 (MPa)
Amy-D/Amy-DR	2.0-9.0	320	120	L51//	5-40	长期使用＜5，耐压7
Amy-S/Amy-SR	2.0-9.0	320	120	/ /L90		
Cellu-D/ Cellu -DR	2.0-9.0	320	120	L40/L93		
Cellu-J/ Cellu -JR	2.0-9.0	320	120	L80/L107		

Ultimate® “极限”正相手性系列色谱柱：

注意事项：

1) 色谱柱接到色谱仪之前，必须先用合适的流动相冲洗全部管路。有些溶剂(比如丙酮、氯仿、DMF、二甲基亚砜、乙酸乙酯、二氯甲烷、THF)会破坏手性固定相的结构，请不要使用这些溶剂做为流动相的组成部分和作为溶剂来配制样品溶液；

2) 色谱柱只适用于正相模式。

新柱的活化：

键合相	Ultimate® Amy-D、Ultimate® Amy-S、Ultimate® Cellu-D、Ultimate® Cellu-J

活化程序：(保存溶剂：正己烷/异丙醇(90/10 v/v))

活化程序			备注
柱规格	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.5mL/min	
流动相	正己烷/异丙醇=90/10		
时间	4h		
柱温	25°C		

操作条件

柱型	150×4.6mm	250×4.6mm	250×10mm
流动相方向	参照色谱柱标签上的箭头		
典型流速	1.0mL/min 不超过1.5mL/min	1.0mL/min 不超过1.5mL/min	5.0mL/min 不超过7.0mL/min

建议流动相

烷烃/异丙醇	烷烃/乙醇	烷烃/甲醇	甲醇	乙腈
100/0 到0/100	100/0 到0/100	100/0 到0/100	甲醇中可含0到100 的异丙醇或乙醇	乙腈中可含0 到100的异丙醇

1、表格中烷烃为正己烷，异己烷或正戊烷；

2、流动相中醇的洗脱能力一般乙醇>异丙醇，且随着流动相中醇的含量提高，样品峰的保留时间缩短；

3、甲醇在烷烃中的溶解性不好，正己烷中甲醇的最大含量是5%。如果要在烷烃中使用甲醇，最好同时加入一定量的乙醇；

4、色谱柱能使用 100% 的甲醇或乙腈，如果要将正己烷换成甲醇或乙腈，或者换成不同的极性溶剂，强烈建议使用100%的异丙醇作为过渡溶剂，过渡流速小一些（异丙醇粘度较大）；

5、如果待分析样品为酸性化合物， 往往要在流动相中使用酸性添加剂，三氟乙酸，乙酸，甲酸等。对于碱性化合物建议在流动相中加入碱性添加剂，如二乙胺，丁胺，乙醇胺等；如有机酸或有机碱的加入量一般为 0.1- 0.3%，最大不超过 0.5%。

色谱柱的维护：

1、建议在对杂质较多的样品进行分析时使用保护柱；

2、样品尽可能溶解在流动相中，并用0.45μm滤膜过滤；

3、如果要保存色谱柱超过一周，将色谱柱里的溶剂置换成保存溶剂正己烷/异丙醇（90/10），短于一周使用过渡流动相为保存溶剂；

4、如果用过酸性或碱性添加剂，须用无添加剂的流动相或正己烷/异丙醇（90/10）彻底冲洗色谱柱，并保存在其中。

Ultimate® “极限”反相手性系列色谱柱

使用注意事项：

1、色谱柱使用时柱压不能超过10MPa，超过该压力会造成色谱柱的损坏；

2、色谱柱可承受的柱温范围为5°C-40°C；使用pH范围为2.0-9.0；

3、色谱柱仅适用于反相条件；

4、色谱柱使用后请用100%甲醇彻底冲洗并保存。

新柱的活化：

键合相	Ultimate® Amy-DR、Ultimate® Amy-SR、 Ultimate® Cellu-DR、Ultimate® Cellu-JR

反相手性柱（保存溶剂：纯甲醇）

活化程序			备注
柱规格	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.2mL/min	
流动相	100%甲醇		
时间	4h		
柱温	25°C		
粒径	5μm		

柱型	150×4.6mm	250×4.6mm	250×10mm
流动相方向	参照色谱柱标签上的箭头		
典型流速	1.0mL/min 不超过1.5mL/min	1.0mL/min 不超过1.5mL/min	5.0mL/min 不超过7.0mL/min

建议流动相

(A)

	酸性	中性	碱性
水相	磷酸盐缓冲液 六氟磷酸钾溶液	水	硼酸盐缓冲液 磷酸盐缓溶液
有机相	乙腈、甲醇、乙醇、异丙醇		

(B)

水相/有机相比例	缓冲盐溶液/有机相比例
90/10~0/100	90/10~15/85

绝对禁用的溶剂：**四氢呋喃、丙酮、二氯甲烷、三氯甲烷、乙酸乙酯、二甲基亚砜（DMSO）、二甲基甲酰胺（DMF）、甲基叔丁基醚（MTBE）、二甲基乙酰胺（DMAC）**等，无法判定时请咨询厂家。

日常冲洗和保存：

如果使用了缓冲盐，请先使用过渡流动相冲洗30倍柱体积，再使用100%甲醇冲洗30倍柱体积后保存。

如果出现柱压升高、分离度下降等异常情况，请按照下列方式冲洗：

1、用10%甲醇水低流速（参考活化程序的流速规定）冲洗20-30倍柱体积；

2、逐步增加甲醇的比例，使用线性递增的方式增加至100%甲醇，冲洗 20-30 倍柱体积；

3、再线性递增方式增加水的比例，直至90%水，冲洗20-30倍柱体积；

4、如果无效的话，在水中加入0.1%的TFA，重复上述步骤。

Topsil®“拓谱”品牌色谱柱说明书

色谱柱分类索引

类型	页码	符号	中文	USP编号	月旭型号
反相柱	26	C18	十八烷基硅烷键合硅胶	L1	Topsil® C18
		C8	辛烷基硅烷键合硅胶	L7	Topsil® C8
		Phenyl	苯基硅烷键合硅胶	L11	Topsil® Phenyl-Hexyl
		CN	氰基键合硅胶柱	L10	Topsil® CN
正相柱	27	SiliCa	硅胶柱	L3	Topsil® Silica
		NH_2	氨基键合硅胶柱	L8	Topsil® NH_2

Topsil®“拓谱”品牌色谱柱参数

键合相名称	名称(Topsil®)	pH范围	比表面积(m^2/g)	孔径(Å)	载碳量(%)	USP编号	最高柱温(°C)	最高压力(MPa)
十八烷基硅烷键合硅胶	C18	2.0-9.5	260	150	12	L1	(流动相pH≤6.5) 60 (流动相pH>6.5) 40	40
辛烷基硅烷键合硅胶	C8	2.0-9.5	260	150	10	L7		
苯基硅烷键合硅胶	Phenyl-Hexyl	2.0-9.5	260	150	12	L11		
氰基键合硅胶柱	CN	2.0-8.0	260	150	6	L10		
硅胶柱	Silica	2.0-8.0	260	150	/	L3		
氨基键合硅胶柱	NH_2	2.0-8.0	260	150	3	L8		

Topsil®“拓谱”反相系列色谱柱

键合相	Topsil® C18、Topsil® C8、Topsil® Phenyl-Hexyl、Topsil® CN

新柱的活化：保存溶剂为甲醇/水

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径>3mm	柱内径≤3mm	柱内径>3mm	
流速	0.1mL/min	0.5mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	80%甲醇		10%甲醇		
时间	4h		1h		
柱温	30°C		30°C		

色谱柱的日常冲洗：（建议反冲）

做样流动相	不含酸碱盐	含酸碱盐	含离子对试剂
流速	做样流速		
流动相	80%甲醇	10%甲醇-80%甲醇	10%甲醇-50%甲醇-80%甲醇
时间	柱长≤100mm　各项30min		
	柱长>100mm　各项40min		
存储	置于最后一步冲洗溶剂中，放于阴凉干燥处		
备注	流动相中的甲醇，可以更换成乙腈		

色谱柱的异常冲洗：

当色谱柱出现，柱压升高，峰形异常，柱效降低，分离度下降等异常后，先使用过渡流动相冲洗掉色谱柱中的盐，再按照下表方式冲洗；如果流动相使用了离子对试剂，第一步使用50%的甲醇后，再按照下表冲洗（建议反冲）：

流速	1/4做样流速
流动相	100%甲醇-100%乙腈-100%异丙醇-100%乙腈
时间	柱长≤100mm　各项100分钟
	柱长＞100mm　各项120分钟
存储	异丙醇黏度大，压力较高，请注意调整流速在合适范围内
备注	

Topsil® “拓谱”正相系列色谱柱：

键合相：	Topsil® Silica、Topsil® NH_2

新柱的活化：

保存溶剂是正己烷-异丙醇

反相模式使用：做样流动相含甲醇，乙腈，水等极性溶剂

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径＞3mm	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.3mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	100%异丙醇		100%乙腈		
时间	12h		1h		
柱温	30℃		30℃		

正相模式使用：做样流动相含正己烷，异丙醇等弱极性溶剂

	活化程序		过渡程序		备注
柱规格	柱内径≤3mm	柱内径＞3mm	柱内径≤3mm	柱内径＞3mm	
流速	0.1mL/min	0.2mL/min	0.2mL/min	1mL/min	流动相中不含有盐不需要过渡
流动相	100%异丙醇		做样流动相		
时间	4h		2h		
柱温	30℃		30℃		

日常冲洗(建议反冲)：

做样流动相	不含酸碱盐的乙腈水	含酸碱盐的乙腈水	正己烷，异丙醇等
流速	做样流速		
流动相	100%乙腈	60%乙腈-100%乙腈	100%正己烷
时间	柱长≤100mm　各项30min		
	柱长＞100mm　各项40min		
存储	置于最后一步冲洗溶剂中，放于阴凉干燥处		
备注			

色谱柱异常冲洗：

当色谱柱出现，柱压升高，峰形异常，柱效降低，分离度下降等异常后，先使用过渡流动相冲洗掉色谱柱中的盐，再按照下表方式冲洗（建议反冲）：

做样流动相	甲醇，乙腈，水等	正己烷，异丙醇等
流速	做样流速	

做样流动相	甲醇，乙腈，水等	正己烷，异丙醇等
流动相	100%乙腈-100%甲醇-100%异丙醇-100%乙腈	100%正己烷–100%异丙醇
时间	柱长≤100mm　　各项30min	
存储	柱长＞100mm　　各项40min	
	异丙醇黏度大，压力较高，请注意调整流速在合适范围内	
备注		

正相色谱中易出现保留时间漂移的情况，是因为固定相的水分含量常常是个影响选择性的关键参数，流动相中的水分含量通常影响保留时间和分离度，大部分溶剂都内含有小部分的溶解水分（正己烷20°C下水分含量是0.0111%　w/w）。正相色谱中出现保留时间波动比较大，可以归因于固定相和流动相中水分的变化，而填料可能还是完好的，建议使用下面的方法：

1、去除固定相上的水分：用含2.5%二甲氧基丙烷(dimethoxypropane)和2.5%冰醋酸的正己烷冲洗色谱柱30个柱体积；

2、使用水分含量可控的流动相（比如：用水半饱和）；半饱和流动相配置方法：将无水的非极性流动相分成两半；其中一半中加入一定量水，并混匀搅拌约一小时，静止分层后，将多余的水相全部除去；将两部分重新混合在一起就配成了“半饱和”流动相。

Company Introduction

Welch Materials develops and manufactures chromatography consumables including HPLC column, Solid Phase Extraction (SPE) column, GC column, Prep column, Flash column and packing materials.

Our core strength is our extensive experience in particle surface modification science and techniques. We are experts in bonding chemistry and innovative packing materials for chromatography applications. By fully utilizing our resources, we have developed many innovative LC and GC consumable products, and in particular, our most popular HPLC column series: Xtimate®, Ultisil® and Topsil® Series.

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Ultisil® Series 41

Topsil® Series 52

The “Ultimate” series columns and “Ultisil” series columns are the same product with different names to meet our global marketing strategy.

Get Ready for Use

Glossary of Terms

pH Range: the pH range of mobile phase and sample solution, which is within the tolerance of the column.
Specific Surface Area: the surface area of 1g silica.
Pore Size: diameter of pores inside silica spheres (choose pore size according to target molecule weight).
Carbon Load: a parameter shows the quantity of bonded functional groups on silica sphere.
USP Code: general code for bonding phases in United States Pharmacopeial Convention.
Transition Mobile Phase: with same or lower ratio of organic phase and water as mobile phase, but without additives like buffer salt, acid and alkali etc.
Transition: a flushing procedure using transition mobile phase, to ensure better compatibility between mobile phases for equilibration and operation.
Activation: a flushing procedure using proper solvents, to recover the bonding phase activity that lost due to solvents evaporation during column storage and transportation.
Maximum Pressure: the pressure that column can stand. Recommended operating pressure is under 30MPa. Operation at maximum pressure may cause abnormal conditions on instruments. Please operate under maximum pressure and use cautions.
Storage Solvent: solvents used to keep column activity during storage and transportation. Potentially harmful to human body, please use protection.
Analysis Flow Rate: Flow rate when analyze samples.
Analysis Mobile Phase: Mobile phase when analyze samples.

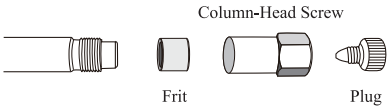
Column Identification:

Each Welch column has a unique serial number, by which, the column can be traced back to each production procedure if any problem occurs. So when customer receives the column, please check:
1. If the package is intact and the label shows the same column required.
2. If inside the box there is a CofA with a signature of quality inspector.
3. If the column has any apparent defects on surface and two end caps are complete.
4. If the column has an ID label with Welch logo and the column specification on the label is consistent with the one on the box.
5. Small particulate matter is packed inside column, please DO NOT open the column in case of inhalation. If have to, please use protection.

Structure and Installation

Structure:

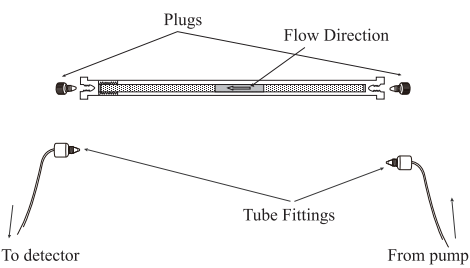
All Welch columns use 316L stainless steel as column tube, with completely consistent both ends.



Installation:

To ensure highest column efficiency, use connection tubes with matched diameter. The connection of both ends must be highly fitted. The tube ends must be smooth, without any burrs or slants. Use professional tools to cut the tubes.

1. Find an arrow on the column identification label which indicates the correct direction of solvent flow. Unscrew the caps of each ends and place it in the right direction.



2. Switch the column using matched connectors (stainless steel or other materials). Make sure the column is tightly connected, without any dead volume or leaking when operating.

Blossmate® Series HPLC Column

Column Classification

Type	Phase	Page	Description	USP	Welch Column
Reversed -Phase	C18	32	Octadecyl silane	L1	Blossmate® C18
					Blossmate® Aqs C18
					Blossmate® ST-C18
Reversed -Phase	C4	32	Butyl silane	L26	Blossmate® C4
Reversed -Phase	Phenyl	32	Phenyl groups based silica	L11	Blossmate® Phenyl

Blossmate® Reversed-Phase Series

Specification

Columns	pH Range	Surface Area(m^2/g)	Pore Size(Å)	Carbon Load (%)	USP	Max. Temp.	Max. Pressure
Blossmate® C18	2.0-8.0	300	100	14	L1	60℃	40MPa
Blossmate® Aqs C18	2.0-8.0	300	100	10	L1	60℃	40MPa
Blossmate® ST-C18	1.0-11.0	300	100	12	L1	60℃	40MPa
Blossmate® C4	1.5-10.0	15	450	0.5	L26	60℃	40MPa
Blossmate® Phenyl	1.5-10.0	15	450	1.0	L11	60℃	40MPa

Blossmate® series HPLC columns use a new high-purity fully porous silica gel, combined with the unique bonding and double-endcapping technology of Welch, to ensure that the surface of the silica gel has higher inertness, and thus has a more symmetrical peak shape and higher column efficiency.

The stringent quality control conditions of the high standards of the chromatographic column ensure that each column has undergone strict quality screening before leaving the factory. The "survival of the fittest" column has better reproducibility and higher peak capacity.

(Storage solvent: methanol/water)

	Activation	Transition
Flow Rate	0.5ml/min	1ml/min
Mobile Phase	80% methanol	10% methanol
Time	4h	1h
Temperature	30℃	30℃
Note	No transition required for analysis mobile phases without buffer	

(Storage solvent: acetonitrile/water)

	Activation	Transition
Flow Rate	0.5ml/min	1ml/min
Mobile Phase	80% acetonitrile	10% acetonitrile
Time	4h	1h
Temperature	30℃	30℃
Note	No transition required for analysis mobile phases without buffer	

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction)

Analysis Mobile Phase	Without acid, alkali or salts	Containing acid, alkali or salts	Containing ion-pair reagents
Flow Rate	Analysis flow rate		
Flushing Mobile Phase	80% methanol	10% methanol -80% methanol	10% methanol -50% methanol-80% methanol
Time	40 min each step		
Storage	Store in the last flushing solvents, kept in cool dry place.		
Note	The methanol in mobile phase can be changed into acetonitrile		

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following; If mobile phase contains ion-pair reagents, use 50% methanol in first step and flush as following:（back flushing recommended)

Flow Rate	1/4 analysis flow rate
Mobile Phase	100% methanol – 100% acetonitrile – 100% isopropanol – 100% acetonitrile
Temperature	Column length≤100mm, 100min each step
	Column length>100mm, 120min each step
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.

Xtimate® Series HPLC Column

Column Classification

Type	Page	Phases	Description	USP	Welch Column
Reversed -Phase	34	C18	Octadecyl silane	L1	Xtimate® C18
					Xtimate® Polar RP
		C8	Octylsilane	L7	Xtimate® C8
		C4	Butyl silane	L26	Xtimate® C4
		Phenyl	Phenyl groups based silica	L11	Xtimate® Phenyl-Hexyl
		CN	Nitrile groups bonded silica	L10	Xtimate® CN
Size-Exclusion	35	SEC-120	Hydrophilic spherical protein silica	L33/ L59	Xtimate® SEC-120
		SEC-200			Xtimate® SEC-200
		SEC-300			Xtimate® SEC-300
		SEC-500			Xtimate® SEC-500
		SEC-700			Xtimate® SEC-700
		SEC-1000			Xtimate® SEC-1000
		SEC-2000			Xtimate® SEC-2000
Polymer Based Ion-Exchange	37	H^+	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in hydrogen form	L17	Xtimate® Sugar-H
		Ca^{2+}	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in Calcium form	L19	Xtimate® Sugar-Ca
Polymer-based Reversed -Phase	38	PS/DVB	A rigid, spherical styrene-divinylbenzene copolymer	L21	Xtimate® PS/DVB
Dedicated column for Lactose	39	NH_2	Aminopropylsilane	L8	Xtimate® Lactose-NH_2
Dedicated column for Metformin HCL	40	SCX	Sulfonic strongly cation-exchange silica	L9	Xtimate® XB-SCX

Xtimate® Reversed-Phase Series

Specification

Columns	pH Range	Surface Area(m^2/g)	Pore Size(Å)	Carbon Load (%)	USP	Max. Temp.	Max. Pressure
Xtimate® C18	1.0-12.5	320	120	14	L1	70 C (mobile phase pH＜6.5) 40 C (mobile phase pH＞6.5)	40MPa (≥5μm) 60MPa (＜5μm)
Xtimate® Polar RP	1.0-12.5	320	120	16	L1		
Xtimate® C8	1.0-12.5	320	120	10	L7		
Xtimate® C8	1.0-12.5	100	300	5	L7		
Xtimate® CN	1.0-12.5	320	120	7	L10		
Xtimate® Phenyl -Hexyl	1.0-12.5	320	120	12	L11		
Xtimate® C4	1.0-12.5	320	120	8	L26		
		100	300	4			

With unique organic/inorganic hybrid bonding technique, Xtimate® series column provides not only high efficiency and mechanical strength of silica, but also high pH tolerance of polymer packing material.

Specially designed for method development in wide pH and temperature range using different mobile phases, Xtimate® series ensures stable performance and long lifetime, even in harshest conditions. It is the best choice for chromatographic separations with great difficulties.

Activation of New Column

Phases	Xtimate® C18	Xtimate® Polar RP	Xtimate® C8
	Xtimate® C4	Xtimate® Phenyl-Hexyl	Xtimate® CN

(Storage solvent: acetonitrile/water)

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.5ml/min	0.2ml/min	1ml/min
Mobile Phase	80% acetonitrile		10% acetonitrile	
Time	4h		1h	
Temperature	30℃		30℃	
Note	No transition required for analysis mobile phases without buffer			

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction)

Analysis Mobile Phase	Without acid, alkali or salts	Containing acid, alkali or salts	Containing ion-pair reagents
Flow Rate	Analysis flow rate		
Flushing Mobile Phase	80% methanol	10% methanol -80% methanol	10% methanol -50% methanol-80% methanol
Time	Column length≤100mm, 30min each step		
	Column length>100mm, 40min each step		
Storage	Store in 80% methanol, kept in cool dry places		
Note	The methanol in mobile phase can be changed into acetonitrile		

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency and low resolution etc., first flush off the buffer salts in column using transition mobile phase, then flush as follows; If mobile phase contains ion-pair reagents, first flush off buffer salts as above, then flush with 50% methanol, and flush as follows(back flushing recommended):

Flow Rate	1/4 analysis flow rate
Mobile Phase	100% methanol-100% acetonitrile-100% isopropanol-100% acetonitrile
Time	Column length≤100mm, 100min each step Column length>100mm, 120min each step
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.

Xtimate® SEC Series

Xtimate® SEC series size-exclusion column uses high-purity silica as base material, bonded with hydrophilic polymer and hydrophilic diol functional groups, ensuring high stability and reproducibility. The double-bonding brings extremely low nonspecific adsorption for biological samples like water-soluble polymer, proteins, bio-enzymes and polypeptides etc. It is suitable for the detection and determination of water-soluble polymer and bio-macromolecules.

Specification

Column	pH Range	Mol. Wt. Range		Pore Size(Å)	USP
		Protein Molecule	Water-soluble Macromolecule		
Xtimate®SEC-120	2-7.5 (7.5-9.5 tolerable in a short period)	500-150,000	500-25,000	120	L33/L59
Xtimate®SEC-200		500-200,00	500-50,000	200	L33/L59
Xtimate®SEC-300		5,000-1,250,000	1,000-100,000	300	L33/L59
Xtimate®SEC-500		10,000-3,500,000	2,000-500,000	500	L33/L59
Xtimate®SEC-700		15,000-5,000,000	2,500-500,000	700	L33/L59
Xtimate®SEC-1000		50,000-7,500,000	5,000-1,500,000	1,000	L33/L59
Xtimate®SEC-2000		>10,000,000	50,000-2,500,000	2,000	L33/L59

Xtimate® SEC series is compatible with most buffer solutions, like ammonium acetate, phosphate and Tris etc. Its neutral and hydrophilic stationary phase has extremely low nonspecific interactions with bio-molecules, especially proteins. The high capacity also ensures high resolution and recovery rate. In the 100-injection test and 1-month operation test (pH 7.0, mobile phase: 150mM phosphate buffer solution), the performance of Xtimate® SEC column keeps consistent and stable.

Activation of New Column

Phases	Xtimate® SEC-120	Xtimate® SEC-200	Xtimate® SEC-300	Xtimate® SEC-500
	Xtimate® SEC-700	Xtimate® SEC-1000	Xtimate® SEC-2000	

(Storage solvent: 90% acetonitrile)

Column ID	≤4.6mm	＞4.6 mm
Flow Rate	0.2ml/min	0.5ml/min
Mobile Phase	100% acetonitrile - water	
Time	5h each step	
Temperature	30℃	

Column Daily Flushing

Analysis Mobile Phase	Without acid, alkali or salts	Containing acid, alkali or salts
Flow Rate	Analysis flow rate	
Flushing Mobile Phase	10% acetonitrile-90% acetonitrile	5% acetonitrile – 90% acetonitrile
Time	Column length≤100mm, 40min each step	
	Column length＞100mm, 60min each step	
Storage	Store in 90% acetonitrile, kept in cool dry places	

Abnormal Column Flushing

Some samples may be absorbed on frit or packing materials after repeated injections. The accumulation of these samples or impurities would cause abnormal performance like pressure increasing and peak widening etc. Basic principles of the flushing for these abnormal circumstances: 1) Low-pH salt solutions help remove alkalic protein; 2) Organic solvents help remove hydrophobic protein; 3) Co-solvents help remove substances with strong adsorption on stationary phase (e.g. through hydrogen-bond interaction).

Note: Co-solvents (e.g. 6-8M Urea or 0.2-0.3% Sodium Dodecyl Sulphate.) shall be used ONLY when neutral salt solutions or organic solvents do not work on these circumstances.

Flow Rate	1/2 analysis flow rate(e.g. analysis flow rate is 0.4ml/min, then abnormal flushing flow rate is 0.2ml/min)
Mobile Phase	1. low-pH neutral salt solutions in high concentration (e.g. 0.5M sodium sulphate solution, adjust pH to 3.0 using sulfuric acid); 2. Buffer solutions (e.g. 50mM phosphate buffer, pH 7.0) containing organic solvents (e.g. 10-20% methanol, acetonitrile and ethanol etc.)
Time	Column length≤100mm, 60min each step
	Column length＞100mm, 120min each step

Xtimate® Polymer Based Ion-Exchange Series

Packed with rigid styrene-divinylbenzene based strong ion-exchange resin, this series is dedicated to the separation of saccharides and

organic acids.
Xtimate® Sugar-Ca is the best choice for analysis of sugar in food, bio-chemicals and natural products, providing superior performance in the separation and determination of saccharides. Xtimate® Sugar-H provides excellent performance in the separation of organic acids.

Specification:

Column	pH Range	Cross-link	Counter Ion	USP	Max. Pressure	Max. Temp.	Flow Rate (ml/min)
Xtimate® Sugar-H	1.0-3.0	8%	H^+	L17	14MPa	95℃	<2 (70℃)
Xtimate® Sugar-Ca	5.0-9.0	8%	Ca^{2+}	L19	14MPa	95℃	<2 (70℃)

Procedure

1. First attach a union in place of the column and flush the system with 50ml filtrated ultra-pure water.
2. Flush the system with 50ml analysis mobile phase, then slow the flow rate to 0ml/min.
3. Switch Xtimate® Sugar column to the system, then activate and transit as following procedure.

Notes:

This series column is tightly packed with swelling resin. If samples were well pre-treated, problems occurred shall be related to the resin material. The fragile resin may be flushed onto the back frit due to broken one-way valve or sudden increasing of back pressure, causing the column damaged. So routine system check is suggested, including system function, in-line filter and guard column etc. The column bed damage may be caused by the too big polarity difference between solvents, too big temperature difference in packing materials or too strong pulse etc.
1. Set flow rate at 0.2-0.3ml/min until the column temperature reaches the set value, to avoid high column pressure.
2. When temperature reaches set value, increase flow rate to analysis rate with an increment of 0.1ml/min. Continue to increase only when the column pressure becomes stable, to avoid too strong pressure pulse. The decrement shall be 0.1ml/min as well.
3. The pressure of maximum flow rate shall be under 14MPa.
4. After analysis, cool the column to ambient temperature before stopping the pump. Store the column in 4℃ refrigerator.
5. Before switching column to system, restore its temperature to ambient temperature first to avoid column bed damage due to temperature difference.
6. Mobile phase shall be fully degassed to ensure better baseline.

Activation of New Column

(Storage solvent: water)

	Activation		Transition	
Column ID	≤4.6mm	>4.6mm	≤4.6mm	>4.6mm
Flow Rate	0.1ml/min	0.5ml/min	Analysis flow rate	Analysis flow rate
Mobile Phase	Xtimate® Sugar-Ca: 0.5g/L EDTA Ca (CAS: 23411-34-9)		Water	
	Xtimate® Sugar-H: sulphuric acid solution, pH2.5		Analysis mobile phase	
Time	12h		4h	
Temperature	80℃		80℃	

Column Daily Flushing

Flow Rate	Analysis flow rate
Mobile Phase	Water
Time	Column length ≤ 100mm, 30min
	Column length＞100mm, 50min
Storage	Store in water, kept in 4℃ refrigerator

Regeneration Flushing

For circumstances like using 5L of mobile phase, high column pressure, abnormal peak shape, low column efficiency and low resolution etc.

Flow Rate	Analysis flow rate
Mobile Phase	Xtimate® sugar-Ca: 0.5g/L EDTA Ca solution Xtimate® sugar-H: sulphuric acid solution, pH 2.5
Temperature	85℃
Time	Column length ≤ 100mm, 8h
	Column length＞100mm, 12h

Xtimate® PS/DVB Column

Xtimate® PS/DVB resin is a new-type reversed-phase packing material for high-efficiency separation. The highly cross-linked PS/DVB particles provide high chemical and physical stability, ensuring good performance under extreme pH (1-14) and stable efficiency using different organic solvents. It is the best choice for the separation and purification of proteins, polypeptides, oligonucleotides, antibiotics and small molecule drugs.

Specification

Column	pH Range	Surface Area(m^2/g)	Pore Size(Å)	USP	Max. Pressure (MPa)	Max. Temp. (℃)	Organic solvents ratio
Xtimate® PS/DVB	1-14	450	300	L21	27	75	＞5%

Notes

1. This column can be used in isocratic or gradient elution, with water and common organic solvents like isopropanol, methanol, ethanol or acetonitrile etc. Use ion-pair reagents like TFA to improve resolution and peak shape.
2. At least 5% of organic solvents in mobile phase is suggested during sampling, elution and flushing, despite of its low swelling. 100% water solution shall not be used.

Activation of New Column

(Storage solvent: 80% acetontrile)

	Activation		Transition	
Column ID	≤4.6mm	＞4.6mm	≤4.6mm	＞4.6mm
Flow Rate	0.2ml/min	0.5ml/min	0.2ml/min	1ml/min
Mobile Phase	80% acetonitrile		10% acetonitrile	
Time	5h		1h	
Temperature	30℃		Analysis temperature	

Column Daily Flushing

Flow Rate	Analysis flow rate
Flushing Mobile phase	Transition mobile phase – 80% acetonitrile
Time	Column length ≤ 100mm, 30min each step
	Column length＞100mm, 50min each step
Storage	Store in 80% acrtonitrile, kept in cool dry places

Regeneration Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or resolution etc., regenerate column as follows:

Flow Rate	Analysis flow rate
Flushing Mobile phase	10% methanol –100% methanol – 100% acetonitrile – 100% isopropanol– 100% acetonitrile – 80% acetonitrile
Temperature	30℃
Time	Column length≤100mm, 30min each step
	Column length＞100mm, 60min each step

Xtimate® Lactose Column

Xtimate® Lactose-NH_2 is an aminopropyl-bonded silica column, with uniform and compact aminopropyl functional group molecular layer, ensuring high bonding coverage and excellent stability. It is the best choice to improve the efficiency of lactose analysis.

Specification

Column	pH Range	Surface Area(m^2/g)	Pore Size(Å)	USP	Max. Pressure (MPa)	Max. Temp. (℃)
Xtimate® Lactose-NH_2	2-8	450	120	L8	40	75

Notes:

The refractive index detector (RID) used for lactose detection is sensitive to the change of temperature, mobile phase ratio and the airbubbles in mobile phase, which may result in baseline shifts, increasing noise, low resolution and efficiency etc.

1. Mixed mobile phases shall be well shaked and mixed, vacuum filtrated and ultrasonic degassed for 10min. Running the mobile phase in one channel. DO NOT use the in-line mixing of system.
2. The instrument shall be equipped with in-line filter.
3. Injection volume shall be exactly same as method required. Specific sample loop is suggested to ensure accurate injection and to minimize the dead volume.
4. Ensure the column at its set temperature before analyzing. Normal column oven heats the column through hot-air and cannot heat the mobile phase to set value meanwhile. To ensure the column temperature, dry towel or cotton is recommended to fill the oven as heat-transfer media, which shall bring better baseline noise and column performance.

Activation of New Column

(Storage solvent: acetonitrile)

	Activation	Transition
Column	4.6×300mm, 5μm	
Flow Rate	0.5ml/min	1ml/min
Mobile Phase	100% acetonitrile	100% acetonitrile
Time	5h	1h
Temperature	30℃	Analysis temperature

Column Daily Flushing

Flow Rate	Analysis flow rate
Mobile Phase	100% acetonitrile
Time	60min
Storage	Store in pure acetonitrile, kept in cool dry places

Regeneration Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., regenerate column as following:

Flow Rate	Analysis flow rate
Mobile Phase	100% methanol – 100% acetonitrile – 100% isopropanol – 100% acetonitrile
Temperature	30℃
Time	3h each step
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.

Xtimate® Metformin HCL Column

Xtimate® XB-SCX column uses sulfonic group bonded silica, with better stability and tolerance. It applies to the detection of metformin HCL and its preparations and helps improve efficiency and performance.

Specification

Column	pH Range	Surface Area(m^2/g)	Pore Size(Å)	USP	Max. Pressure (MPa)	Max. Temp. (℃)
Xtimate® XB-SCX	2-8	350	120	L9	40	60

Notes

1. Ion-exchange column requires long equilibrium time. Overnight column equilibrium is suggested after activation, using analysis mobile phase, flow rate 0.2ml/min.
2. In detection of related compounds, impurities shall be separated despite of the wide peaks due to high-concentration sample solutions.
3. Poor separation of excipients and impurities may occur when detecting preparations due to different excipients used.
4. Let the column at ambient temperature before switching to instrument.

Activation of New Column

(Storage solvent: methanol)

	Activation	Transition
Column	4.6×250mm, 5μm	
Flow Rate	0.5ml/min	1ml/min
Mobile Phase	90% methanol	5% methanol
Time	5h	1h
Temperature	30℃	Analysis temperature

Column Daily Flushing

Flow Rate	Analysis flow rate
Mobile Phase	10% methanol
Time	60min
Storage	Store in 10% methanol , kept in 4℃ refrigerator

Regeneration Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., regenerate column as following:

Flow Rate	Analysis flow rate
Mobile Phase	Water - 100mmol/L $NaClO_4$ (adjust pH to 3 with phosphate) – water – 10% methanol
Temperature	30℃
Time	80min each step

Ultisil® Series HPLC Column

Column Classification

Type	Page	Phases	Description	USP	Welch Column
Reversed-Phase	42	C18	Octadecyl silane	L1	Ultisil® XB-C18
					Ultisil® LP-C18
					Ultisil® LP-Aq
					Ultisil® AQ-C18
					Ultisil® Plus C18
					Ultisil® Alk C18
					Ultisil® PAH
					Ultisil® Polar RP
					Ultisil® ODS-3
					Ultisil® XS-C18
					Ultisil® Plus-LP
		C8	Octylsilane	L7	Ultisil® XB-C8
					Ultisil® LP-C8
					Ultisil® F-C8
					Ultisil® Plus-C8
		Phenyl	Phenyl groups bonded silica	L11	Ultisil® XB-phenyl
					Ultisil® Phenyl-Ether
				L11/L43	Ultisil® PFP
				L11	Ultisil® Plus-phenyl
		C4	Butyl silane	L26	Ultisil® XB-C4
		C3	Propyl silane	L56	Ultisil® LP-C3
		C30	C30 silane	L62	Ultisil® XB-C30
		C1	Trimethylsilane	L13	Ultisil® XB-C1
		CN	Nitrile groups bonded silica	L10	Ultisil® XB-CN
					Ultisil® LP-CN
Normal-Phase	43	CN	Nitrile groups bonded silica	L10	Ultisil® XB-CN
		SiO_2	Porous silica	L3	Ultisil® SiO_2
		NH_2	Aminopropylsilane	L8	Ultisil® XB-NH_2
		Diol	Dihydroxypropane groups bonded silica	L20	Ultisil® Diol
HILIC	45	SiO_2	Silica HILIC column	L3	Ultisil® HILIC Silica
		NH_2	Amino HILIC column	L8	Ultisil® HILIC-NH_2
		Amide	Polyacrylamide bonded silica	L68	Ultisil® HILIC Amide
		Amphion	Amphion bonded silica	L114	Ultisil® HILIC Amphion II
Ion-Exchange	46	SCX	Sulfonic strongly cation-exchange silica	L9	Ultisil® XB-SCX
		SAX	Quaternary ammonium strongly anion-exchange silica	L14	Ultisil® XB-SAX
mixed mode	47	NH_2/CN	NH_2/CN mixed bond	L18	Ultisil® MM NH_2/CN
		C18/SCX	C18/SCX mixed bond	/	Ultisil® MM C18/SCX
		SCX/C18	SCX/C18 mixed bond	/	Ultisil® MM SCX/C18
Normal-Phase Chiral	49		Amylose tris (3,5-dimethylphenylcarbamate) coated silica	L51	Ultisil® Amy-D
			Amylose tris [(S)-α-methylphenyl carbamate] coated Silica	L90	Ultisil® Amy-S
			Cellulose tris (3,5-dimethylphenylcarbamate) coated silica	L40	Ultisil® Cellu-D
			Cellulose tris (4-methyl benzoate) coated silica	L80	Ultisil® Cellu-J

Type	Page	Phases	Description	USP	Welch Column
Reversed-Phase Chiral	50		Amylose tris (3,5-dimethylphenylcarbamate) coated silica	L51	Ultisil® Amy-DR
			Amylose tris [(S)-α-methylphenyl carbamate] coated Silica	L90	Ultisil® Amy-SR
			Cellulose tris (3,5-dimethylphenylcarbamate) coated silica	L93	Ultisil® Cellu-DR
			Cellulose tris (4-methyl benzoate) coated silica	L107	Ultisil® Cellu-JR

Ultisil® Reversed-Phase Series

Specification

Columns	pH Range	Surface Area(m^2/g)	Pore Size(Å)	Carbon Load(%)	USP	Max. Temp.	Max. Pressure
LP-C18	0.5-8.0	320	120	10	L1	70℃ (mobile phase pH≤6.5) 40℃ (mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
LP-C18	0.5-8.0	90	300	5	L1		
LP-Aq	1.0-8.0	320	120	5	L1		
AQ-C18	1.5-10.0	320	120	12	L1	60℃ (mobile phase pH≤6.5) 40℃ (mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
XB-C18	1.5-10.0	320	120	17	L1		
XB-C18	1.5-10.0	90	300	8	L1		
Polar RP	1.5-10.0	320	120	18	L1/L60		
PAH	1.5-10.0	320	120	22	L1		
Alk C18	1.5-10.0	320	120	12	L1		
Plus C18	2.0-8.0	160	130	10	L1		
ODS-3	2.0-8.0	380	100	15	L1		
XS-C18	1.5-10.0	320	120	23	L1		
Plus-LP	0.5-8.0	130	160	9	L1		
XB-C8	1.5-10.0	320	120	12	L7		
XB-C8	1.5-10.0	90	300	4	L7		
LP-C8	1.0-8.0	90	300	3	L7	70℃ (mobile phase pH≤6.5) 40℃ (mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
LP-C8	1.0-8.0	320	120	5.5	L7		
F-C8	1.5-10.0	320	120	12	L7	60℃ (mobile phase pH≤6.5) 40℃ (mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
Plus-C8	1.5-10.0	130	160	7	L7		
XB-Phenyl	1.5-10.0	320	120	12	L11		
Phenyl-Ether	1.5-10.0	90	300	4	L11		
PFP	1.5-10.0	320	120	12	L11/L43		
Plus-phenyl	1.5-10.0	130	160	8	L11		
XB-C4	1.5-10.0	320	120	8	L26		
XB-C4	1.5-10.0	90	300	3	L26		
LP-C3	1.0-8.0	320	120	4	L56	70℃ (mobile phase pH≤6.5) 40℃ (mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
XB-C30	1.5-10.0	320	120	22	L62	60℃ (mobile phase pH≤6.5) 40℃ (mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
XB-C1	1.5-10.0	320	120	4	L13		
XB-CN	1.5-9.0	320	120	7	L10		
LP-CN	1.0-8.0	320	120	6	L10		

Activation of New Column

Phases	Ultisil® XB-C18	Ultisil® AQ-C18	Ultisil® LP-AQ
	Ultisil® Alk-C18	Ultisil® Plus-C18	Ultisil® XS-C18
	Ultisil® ODS-3	Ultisil® XB-C8	Ultisil® PAH
	Ultisil® F-C8	Ultisil® LP-C8	Ultisil® Phenyl-Ether
	Ultisil® XB-Phenyl	Ultisil® XB-C4	Ultisil® PFP
	Ultisil® LP-C3	Ultisil® LP-C18	Ultisil® plus-LP
	Ultisil® plus-C8	Ultisil® plus-phenyl	Ultisil® LP-CN

(Storage solvent: methanol/water)

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.3ml/min	0.2ml/min	1ml/min
Mobile Phase	80%methanol		10%methanol	
Time	4h		1h	
Temperature	30℃		30℃	
Note	No transition required for analysis mobile phases without buffer.			

Phases	Ultisil® XB-C30、Ultisil® XB-C1、Ultisil® Polar RP

(Storage solvent: acetonitrile/water)

Phases	Ultisil® XB-CN

(Storage solvent: acetonitrile)

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.3ml/min	0.2ml/min	1ml/min
Mobile Phase	80%methanol		10%methanol	
Time	4h		1h	
Temperature	30℃		30℃	
Note	No transition required for analysis mobile phases without buffer.			

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction)

Phases	All reversed-phase columns

Analysis Mobile Phase	Without acid, alkali or salts	Containing acid, alkali or salts	Containing ion-pair reagents
Flow Rate	Analysis flow rate		
Flushing Mobile Phase	80% methanol	10% methanol – 80% methanol	10% methanol – 50% methanol – 80% methanol
Time	Column length≤100mm, 30min each step		
	Column length>100mm, 40min each step		
Storage	The final step is to flush Ultisil® Polar RP with pure acetonitrile and refrigerate at 2-8℃		
	Store in the last flushing solvents, kept in cool dry places		
Note	The methanol in mobile phase can be changed into acetonitrile.		

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following; If mobile phase contains ion-pair reagents, use 50% methanol in first step and flush as following:

Back flushing recommended (reverse to the normal flow direction).

Phases	All reversed-phase columns

Flow Rate	1/4 analysis flow rate
Mobile Phase	100% methanol – 100% acetonitrile – 100% isopropanol – 100% acetonitrile
Temperature	Column length≤100mm, 100min each step
	Column length>100mm, 120min each step
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.

Ultisil® Normal-Phase Series

Columns	pH Range	Surface Area(m^2/g)	Pore Size(Å)	Carbon Load(%)	USP	Max. Temp.	Max. Pressure
Ultisil® SiO_2	2.0-8.0	320	120	/	L3	70℃(mobile phase pH≤6.5) 40℃(mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
Ultisil® Diol	2.0-8.0	320	120	2.5	L20		
Ultisil® XB-NH_2	2.0-8.0	320	120	4	L8		
Ultisil® XB-CN (P/N start from 00229)	1.5-9.0	320	120	7	L10	60℃(mobile phase pH≤6.5) 40℃(mobile phase pH>6.5)	

Activation of New Column

(Storage solvent: n-hexane/isopropanol)

For reversed-phase mode: analysis mobile phase contains polar solvents like methanol, acetonitrile and water etc.

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.3ml/min	0.2ml/min	1ml/min
Mobile Phase	100% isopropanol		100% acetonitrile	
Time	12h		2h	
Temperature	30℃		30℃	

For normal-phase mode: analysis mobile phase contains weak-polar solvents like n-hexane and isopropanol etc.

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.2ml/min	0.2ml/min	1ml/min
Mobile Phase	100% isopropanol		Analysis mobile phase	
Time	4h		2h	
Temperature	30℃		30℃	

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction).

Analysis Mobile Phase	Acetonitrile solution without acid, alkali or salts	Acetonitrile solution containing acid, alkali or salts	N-hexane and isopropanol etc.
Flow Rate	Analysis flow rate		
Flushing Mobile Phase	100% acetonitrile	60% acetonitrile–100% acetonitrile	100% n-hexane
Time	Column length≤100mm, 30min each step		
	Column length>100mm, 40min each step		
Storage	Store in the last flushing solvents, kept in cool dry places		

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following:

Back flushing recommended (reverse to the normal flow direction).

Analysis Mobile phase	Methanol, acetonitrile and water etc.	N-hexane and isopropanol etc.
Flow Rate	Analysis flow rate	
Mobile Phase	100% acetonitrile – 100% methanol – 100% isopropanol – 100% acetonitrile	100% isopropanol – 100% methanol– 100% isopropanol
Temperature	Column length≤100mm, 30min each step	
	Column length>100mm, 40min each step	
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.	

In normal-phase mode, shifts of retention time may occur easily due to the change of water content in stationary phase, mobile phase and other solvents used, while the packing material remains undamaged. Water content in stationary phase affects selectivity and water content in mobile phase affects retention time and resolution. Most solvents contain a certain amount of dissolved water (e.g. 20℃ n-hexane has 0.0111% w/w water content).

Suggestions:

1. Remove the water in stationary phase

Flush the column with 30 column volumes of n-hexane contain 2.5% dimethoxypropane and 2.5% glacial acetic acid.

2. Use mobile phase with controllable water content Half-saturation

mobile phase method: divide the anhydrous non-polar mobile phase in half. Add proper amount of water into one half. Stir for 1h to mix and remove all the water phase after stratification. Then mix the two half together to get half-saturation mobile phase.

Ultisil® HILIC Column

Columns	pH Range	Surface Area(m^2/g)	Pore Size(Å)	Carbon Load(%)	USP	Max. Temp.	Max. Pressure
Ultisil® HILIC-Silica	2.0-8.0	320	120	/	L3	60℃(mobile phase pH≤6.5) 40℃(mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
Ultisil® HILIC-NH_2	2.0-8.0	320	120	4	L8		
Ultisil® HILIC Amphion II	2.0-8.0	320	120	6	L114		
Ultisil® HILIC Amide	2.0-8.0	320	120	7	L68		

Activation of New Column

Phases	Ultisil® HILIC-Silica	Ultisil® HILIC-NH_2
	Ultisil® HILIC Amphion II	Ultisil® HILIC Amide

(Storage solvent: acetonitrile)

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.3ml/min	0.2ml/min	1ml/min
Mobile Phase	100% acetonitrile		70% acetonitrile	
Time	4h		1h	
Temperature	30℃		30℃	
Note	No transition required for analysis mobile phases without buffer			

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction)

Analysis Mobile Phase	Without acid, alkali or salts	Containing acid, alkali or salts
Flow Rate	Analysis flow rate	
Flushing Mobile Phase	100% acetonitrile	70% acetonitrile – 100% acetonitrile
Time	Column length≤100mm, 30min each step	
	Column length>100mm, 40min each step	
Storage	Ultisil® HILIC Silica, Ultisil® HILIC-NH_2 and Ultisil® HILIC Amide column stored in pure acetonitrile; Ultisil® HILIC Amphion column stored in 95% acetonitrile solution; ALL kept in cool dry places	

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following:
Back flushing recommended (reverse to the normal flow direction)

Phases	Ultisil® HILIC-Silica	Ultisil® HILIC-NH_2
	Ultisil® HILIC Amide	

Flow Rate	1/4 analysis flow rate
Mobile Phase	100% methanol – 100% acetonitrile – 100% isopropanol – 100% acetonitrile
Time	Column length≤100mm, 100min each step
	Column length>100mm, 120min each step
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.

Phases	Ultisil® HILIC Amphion II

Flow Rate	Analysis flow rate
Mobile Phase	50% acetonitrile – water – 0.5M NaCl – water – 95% acetonitrile
Time	Column length≤100mm, 100min each step
	Column length>100mm, 120min each step

Ultisil® Ion-exchange Series

Name	pH Range	Carbon Load(%)	Surface Area(m^2/g)	Max. Temp.	Max. Pressure
Ultisil® XB-SCX	2.0-8.0	12(120Å)	320(120Å)	60 C (pH≤6.5)	40Mpa(≥5μm)
		5(300Å)	90(300Å)	40 C (pH>6.5)	60Mpa(>5μm)
Ultisil® XB-SAX	2.0-8.0	7.5(120Å)	320(120Å)	60 C (pH≤6.5)	40Mpa(≥5μm)
		1.5(300Å)	90((300Å)	40 C (pH>6.5)	60Mpa(>5μm)

Features of Ultisil® XB-SCX

1. Mainly used in the separation of compounds that stated in cationic condition in water solution.
2. Ultisil® XB-SCX can be used with water and organic solvents. Methanol, acetonitrile and water (including buffer salt solution) can be used as mobile phase.
3. The retention of cationic compounds is related with pH, ion strength, ratio of organic phase and temperature. Normally higher ion strength or ratio of organic phase brings shorter retention time.
4. To improve resolution, use buffer salts like citric acid and phosphate to adjust pH and ion strength. The pH range of mobile phase shall be controlled between 2.0-7.5.
5. Cationic column has longer equilibration time than C18.

Features of Ultisil® XB-SAX

1. Mainly used in the separation of compounds that stated in anionic condition in water solution.
2. Ultisil® XB-SAX can be used with water and organic solvents. Methanol, acetonitrile and water (including buffer salt solution) can be used as mobile phase.
3. The retention of anionic compounds is related with pH, ion strength, ratio of organic phase and temperature. Normally higher ion strength or lower ratio of organic phase brings shorter retention time.
4. To improve resolution, use buffer salts like citric acid and phosphate to adjust pH and ion strength. The pH range of mobile phase shall be controlled between 2.0-7.5.
5. Anionic column has longer equilibration time than C18.

Activation of New Column

Phases	Ultisil® XB-SCX	Ultisil® XB-SAX

(Storage solvent:methanol)

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.5ml/min	0.2ml/min	1ml/min
Mobile Phase	80% methanol		Transition mobile phase	
Time	4h		1h	
Temperature	30 C		30 C	
Note	No transition required for mobile phase without buffer.			

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction)

Analysis Mobile Phase	Without acid, alkali or salts	Containing acid, alkali or salts
Flow Rate	Analysis Flow Rate	
Flushing Mobile Phase	Analysis mobile phase – 10% methanol	Transition mobile phase – 10% methanol
Time	Column length≤100mm, 30min each step	
	Column length>100mm, 40min each step	
Storage	Store in 10% methanol, kept in 4℃ refrigerator	

Loss of bonded phase due to hydrolysis may occur easily for ion-exchange packing materials, causing shifts of retention time. (e.g. there may be 1min difference between two days' retention time, excluding external causes like mobile phase and instruments.) To prevent that, change the storage solvent into analysis mobile phase with half the content of buffer salts (e.g. if the analysis mobile phase is acetonitrile:50mmol/L H_3PO_4=10:90, the storage solvent shall be acetonitrile:25mmol/L H_3PO_4=10:90). This way may cause salting out. Please use caution.

Ultisil® Mixed Mode Series

Specification

Columns	pH Range	Surface Area(m^2/g)	Pore Size(Å)	Carbon Load(%)	USP	Max. Temp.	Max. Pressure
Ultisil® MM NH_2/CN	2.0-8.0	320	120	/	L18	60℃(mobile phase pH≤6.5) 40℃(mobile phase pH>6.5)	40MPa (≥5μm) 60MPa (<5μm)
Ultisil® MM C18/SCX	2.0-8.0	320	120	/	/		
Ultisil® MM SCX/C18	2.0-8.0	320	120	/	/		

Phases	Ultisil® MM NH_2/CN

Activation of New Column

(Storage solvent:n-hexane/isopropanol)

For reversed-phase mode: analysis mobile phase contains polar solvents like methanol, acetonitrile and water etc.

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.5ml/min	0.2ml/min	1ml/min
Mobile Phase	100% isopropanol		100% acetonitrile	
Time	12h		1h	
Temperature	30℃		30℃	
Note	No transition required for mobile phase without buffer.			

For normal-phase mode: analysis mobile phase contains weak-polar solvents like n-hexane and isopropanol etc.

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.2ml/min	0.2ml/min	1ml/min
Mobile Phase	100% isopropanol		Analysis mobile phase	
Time	4h		1h	
Temperature	30℃		30℃	

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction).

Analysis Mobile Phase	Acetonitrile solution without acid, alkali or salts	Acetonitrile solution containing acid, alkali or salts	N-hexane and isopropanol etc.
Flow Rate	Analysis flow rate		

Flushing Mobile Phase	100% acetonitrile	60% acetonitrile–100% acetonitrile	100% n-hexane
Time	Column length≤100mm, 30min each step		
	Column length>100mm, 40min each step		
Storage	Store in the last flushing solvents, kept in cool dry places		
Note	When using 100% n-hexance, the system may dry out, pay attention to air bubbles		

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following:
Back flushing recommended (reverse to the normal flow direction).

Analysis Mobile phase	Methanol, acetonitrile and water etc.	N-hexane and isopropanol etc.
Flow Rate	Analysis flow rate	
Mobile Phase	100% acetonitrile – 100% methanol – 100% isopropanol – 100% acetonitrile	100% n-hexane – 100% isopropanol
Temperature	Column length≤100mm, 30min each step	
	Column length>100mm, 40min each step	
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.	

In normal-phase mode, shifts of retention time may occur easily due to the change of water content in stationary phase, mobile phase and other solvents used, while the packing material remains undamaged. Water content in stationary phase affects selectivity and water content in mobile phase affects retention time and resolution. Most solvents contain a certain amount of dissolved water (e.g. 20℃ n-hexane has 0.0111% w/w water content).
Suggestions:
1. Remove the water in stationary phase
Flush the column with 30 column volumes of n-hexane contain 2.5% dimethoxypropane and 2.5% glacial acetic acid
2. Use mobile phase with controllable water content
Half-saturation mobile phase method: divide the anhydrous non-polar mobile phase in half. Add proper amount of water into one half. Stir for 1h to mix and remove all the water phase after stratification. Then mix the two half together to get half-saturation mobile phase.

Phases	Ultisil® MM C18/SCX Ultisil® MM SCX/C18

(Storage solvent:methanol/water)

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.5ml/min	0.2ml/min	1ml/min
Mobile Phase	80% methanol		10% methanol	
Time	4h		1h	
Temperature	30℃		30℃	
Note	No transition required for analysis mobile phases without buffer.			

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction)

Analysis Mobile Phase	Acetonitrile solution without acid, alkali or salts	Acetonitrile solution containing acid, alkali or salts	N-hexane and isopropanol etc.
Flow Rate	Analysis flow rate		
Flushing Mobile Phase	80% methanol	10% methanol–80% methanol	10% methanol – 50% methanol – 80% methanol

Time	Column length≤100mm, 30min each step
	Column length>100mm, 40min each step
Note	The methanol in mobile phase can be changed into acetonitrile.

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following; If mobile phase contains ion-pair reagents, use 50% methanol in first step and flush as following:

Back flushing recommended (reverse to the normal flow direction).

Flow Rate	1/4 analysis flow rate
Mobile Phase	100% methanol – 100% acetonitrile – 100% isopropanol – 100% acetonitrile
Temperature	Column length≤100mm, 100min each step Column length>100mm, 120min each step
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.

Ultisil® Chiral Series

Columns:

Ultisil® Amy-D / Amy-DR:

Amylose tris (3,5-dimethylphenylcarbamate) coated silica

Ultisil® Amy-S / Amy-SR:

Amylose tris [(S)-α-methylphenyl carbamate] coated Silica

Ultisil® Cellu-D / Cellu-DR:

Cellulose tris (3,5-dimethylphenylcarbamate) coated silica

Ultisil® Cellu-J / Cellu-JR:

Cellulose tris (4-methyl benzoate) coated silica

Columns	pH Range	Surface Area(m^2/g)	Pore Size(Å)	USP	Temp.	Max. Pressure
Ultisil® Amy-D/Amy-DR	2.0-9.0	320	120	L51	5-40 ℃	Long term usage <5 Mpa, maximum pressure: 7 MPa
Ultisil® Amy-S/Amy-SR	2.0-9.0	320	120	L90		
Ultisil® Cellu-D/ Cellu -DR	2.0-9.0	320	120	L40 /L93		
Ultisil® Cellu-J/ Cellu -JR	2.0-9.0	320	120	L80 /L107		

Ultisil® Normal-Phase Chiral Column

Phases	Ultisil® Amy-D	Ultisil® Amy-S
	Ultisil® Cellu-D	Ultisil® Cellu-J

Notes:

1. Before switching to the system, flush all the pipeline first with proper mobile phase. Some solvents (e.g. acetone, chloroform, DMF, DMSO, acetic acid, ethyl acetate, dichloromethane and THF) can damage the structure of chiral stationary phase. Please DO NOT use those solvents for preparing mobile phase or sample solution.
2. This series column applies only to normal phase mode.

Activation of New Column

Column ID	≤3mm	>3mm
Flow Rate	0.1ml/min	0.5ml/min
Mobile Phase	N-hexane/isopropanol = 90/10	
Time	4h	
Temperature	25 ℃	

Operating Conditions

Dimension	150×4.6mm	250×4.6mm	250×10mm
Flow Direction	Same as the direction on column		
Flow Rate	1.0ml/min (max. 1.5ml/min)	1.0ml/min (max. 1.5ml/min)	5.0ml/min (max. 7.0ml/min)

Recommended Mobile Phase

Alkanes/ isopropanol	Alkanes /ethanol	Alkanes /methanol	Methanol	Acetonitrile
100/0 ~ 0/100	100/0 ~ 0/100	100/0 ~ 0/100	With 0-100 isopropanol or ethanol	With 0-100 isopropanol

1. Alkanes here can be n-hexane, isohexane or n-pentane.
2. In this mobile phase, ethanol has higher elution than isopropanol. Increasing the ratio of alcohols in mobile phase will cause the retention time of target peak shortened.
3. Methanol has low dissolution in alkanes. The maximum content of methanol in n-hexane is 5%. To use methanol in alkanes, a certain amount of ethanol is suggested to add.
4. 100% methanol or acetontrile can be used with this column. If n-hexane shall be changed to methanol, acetontrile or other polar solvents, 100% isopropanol is highly suggested to be used as transition solvents with a bit lower transition flow rate (due to its high viscosity).
5. To analyze acidic compounds, acidic additives like TFA, acetic acid and formic acid shall be added into mobile phase. For alkali compounds, add alkali additives like diethylamine, butyl amine and ethanolamine. The content of organic acid or alkali added shall be between 0.1-0.3% (max. 0.5%).

Maintenance

1. Guard column is suggested in the analysis of the sample containing much impurities.
2. Dissolve sample well into mobile phase and filter with 0.45μm membrane.
3. For over-week storage, change the solvents inside column with storage solvent (n-hexane/isopropanol = 90/10). For storage within 1 week, use transition mobile phase as storage solvent.
4. If acidic or alkalic additives were used in the analysis, flush and store column with non-additive mobile phase or n-hexane/ isopropanol(90/10).

Ultisil® Reversed-Phase Chiral Column

Phases	Ultisil® Amy-DR	Ultisil® Amy-SR
	Ultisil® Cellu-DR	Ultisil® Cellu-JR

Notes:

1. Maximum pressure: 10MPa; Over-limit pressure used will damage the column.
2.Temperature range: 5-40℃; pH range: 2.0-9.0.
3. Applies only to reversed phase mode.
4. After use, flush and store the column with 100% methanol.

Activation of New Column

(Storage solvent: 100% methanol)

Column ID	≤3mm	>3mm
Flow Rate	0.1ml/min	0.2ml/min
Mobile Phase	100% methanol	
Time	4h	
Temperature	25℃	
Particle Size	5μm	

Dimension	150×4.6mm	250×4.6mm	250×10mm
Flow Direction	Same as the direction on column		
Flow Rate	1.0ml/min (max. 1.5ml/min)	1.0ml/min (max. 1.5ml/min)	5.0ml/min (max. 7.0ml/min)

Suggested Mobile Phase

(A)

	Acidic	Neutral	Alkalic
Water Phase	Phosphate buffer solution KPF_6 solution	Water	Borate buffer solution Phosphate buffer solution
Organic Phase	Acetonitrile, methanol, ethanol, isopropanol		

(B)

Water phase/organic phase	Buffer solution/organic phase
90/10 ~ 0/100	90/10 ~ 15/85

Forbid-used Solvents: **tetrahydrofuran (THF), acetone, dichloromethane, trichloromethane, ethyl acetate, DMSO, DMF, MTBE and DMAC etc. Please contact us for any uncertain solvents.**

Column Daily Flushing and Storage

If buffer salts were used in analysis, first flush with 30 column volumes of transition mobile phase. Then flush with 30 column volumes of 100% methanol.

In circumstances of high column pressure or low resolution etc., flush the column as following:

1. Flush with 20-30 column volumes of 10% methanol solution in low flow rate (refer to the flow rates in activation procedure).
2. Increase the methanol content to 100% linearly and flush with 20-30 column volumes.
3. Then increase the water content to 90% and flush with 20-30 column volumes.
4. If the flushing does not work, add 0.1% trifluoroacetic acid (TFA) into water and repeat the above steps.

Topsil® Series Column

Column Classification

Type	Page	Phases	Description	USP	Welch Column
Reversed-phase Column	52	C18	Octadecyl silane	L1	Topsil® C18
		C8	Octylsilane	L7	Topsil® C8
		Phenyl	Phenyl groups bonded silica	L11	Topsil® Phenyl-Hexyl
		CN	Nitrile groups bonded silica	L10	Topsil® CN
Normal-Phase Column	53	SiO_2	Porous silica	L3	Topsil® Silica
		NH_2	Aminopropylsilane	L8	Topsil® NH_2

Specification

Column	pH Range	Surface Area(m^2/g)	Pore Size(Å)	Carbon Load(%)	USP	Max. Temp.	Max. Pressure
Topsil® C18	2.0-9.5	260	150	12	L1	60 C (mobile phase pH≤6.5) 40 C (mobile phase pH>6.5)	40 MPa
Topsil®C8	2.0-9.5	260	150	10	L7		
Topsil® Phenyl-Hexyl	2.0-9.5	260	150	12	L11		
Topsil® CN	2.0-8.0	260	150	6	L10		
Topsil® Silica	2.0-8.0	260	150	/	L3		
Topsil® NH_2	2.0-8.0	260	150	3	L8		

Topsil® Reversed-Phase Series

Phases	Topsil® C18	Topsil® C8
	Topsil® Phenyl-Hexyl	Topsil® CN

Activation of New Column

(Storage solvent: methanol/water)

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.5ml/min	0.2ml/min	1ml/min
Mobile Phase	80% methanol		10% methanol	
Time	4h		1h	
Temperature	30 C		30 C	
Note	No transition required for analysis mobile phase without buffer.			

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction).

Analysis Mobile phase	Without acid, alkali or salts	Containing acid, alkali or salts	Containing ion-pair reagents
Flow Rate	Analysis flow rate		
Flushing Mobile Phase	80% methanol	10% methanol – 80% methanol	10% methanol – 50% methanol – 80% methanol
Time	Column length≤ 100mm, 30min each step		
	Column length>100mm, 40min each step		
Storage	Store in the last flushing solvents, kept in cool dry places		
Note	The methanol in mobile phase can be changed into acetonitrile.		

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following; If mobile phase contains ion-pair reagents, use 50% methanol in the first step and flush as following:

Back flushing recommended (reverse to the normal flow direction).

Flow Rate	1/4 analysis flow rate
Mobile Phase	100% methanol – 100% acetonitrile– 100% isopropanol– 100% acetonitrile
Temperature	Column length≤100mm, 100min each step
	Column length>100mm, 120min each step

Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.

Topsil® Normal-Phase Series

Phases	Topsil® Silica	Topsil® NH_2

Activation of New Column

(Storage solvent: n-hexane/isopropanol)

For reversed-phase mode: analysis mobile phase contains polar solvents like methanol, acetonitrile and water etc.

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.3ml/min	0.2ml/min	1ml/min
Mobile Phase	100% isopropanol		100% acetonitrile	
Time	12h		1h	
Temperature	30 C		30 C	
Note	No transition required for mobile phase without buffer.			

For normal-phase mode: analysis mobile phase contains weak polar solvents like n-hexane and isopropanol etc.

	Activation		Transition	
Column ID	≤3mm	>3mm	≤3mm	>3mm
Flow Rate	0.1ml/min	0.2ml/min	0.2ml/min	1ml/min
Mobile Phase	100% isopropanol		Analysis mobile phase	
Time	4h		2h	
Temperature	30 C		30 C	
Note	No transition required for mobile phase without buffer.			

Column Daily Flushing

Back flushing recommended (reverse to the normal flow direction).

Analysis Mobile phase	Acetonitrile/water without acid, alkali or salts	Acetonitrile/water containing acid, alkali or salts	N-hexane and isopropanol etc.
Flow Rate	Analysis flow rate		
Flushing Mobile Phase	100% acetonitrile	60% acetonitrile–100% acetonitrile	100% n-hexane
Time	Column length≤100mm, 30min each step		
	Column length>100mm, 40min each step		
Storage	Store in the last flushing solvents, kept in cool dry places		

Abnormal Column Flushing

In circumstances of high column pressure, abnormal peak shape, low column efficiency or low resolution etc., use transition mobile phase to flush off the salts in column, then flush as following:

Back flushing recommended (reverse to the normal flow direction).

Analysis Mobile Phase	Methanol, acetonitrile and water etc.	N-hexane and isopropanol etc.
Flow Rate	Analysis flow rate	
Mobile Phase	100% acetonitrile – 100% methanol – 100% isopropanol – 100% acetonitrile	100% n-hexane – 100% isopropanol
Time	Column length≤100mm, 30min each step	
	Column length>100mm, 40min each step	
Note	Isopropanol has high viscosity, causing high pressure. Please adjust the flow rate as needed.	

In normal-phase mode, shifts of retention time may occur easily due to the change of water content in stationary phase, mobile phase and other solvents used, while the packing material remains undamaged. Water content in stationary phase affects selectivity

and water content in mobile phase affects retention time and resolution. Most solvents contain a certain amount of dissolved water (e.g. 20℃ n-hexane has 0.0111% w/w water content).
Suggestions:
1. Remove the water in stationary phase
Flush the column with 30 column volumes of n-hexane contain 2.5% dimethoxypropane and 2.5% glacial acetic acid
2. Use mobile phase with controllable water content
Half-saturation mobile phase method: divide the anhydrous non-polar mobile phase in half. Add proper amount of water into one half. Stir for 1h to mix and remove all the water phase after stratification. Then mix the two half together to get half-saturation mobile phase.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