

LC columns

# Allowable adjustments of chromatographic conditions

## United States Pharmacopeia USP chapter <621>

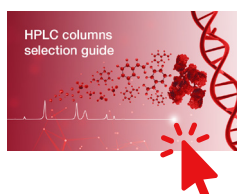
### Need to change your method?

This guide describes general procedures, definitions, and calculations of common parameters and applicable system suitability requirements. Follow the listing of suitable Thermo Scientific chromatography columns for LC chromatography according to USP 621.

- Changed LC column dimensions?
- Existing column or supplier not available anymore?
- Need to modernize existing methods to increase lab productivity?



Variable	Isocratic separations	Gradient separations
Stationary phases	No change in the physio-chemical characteristic of the stationary phase (Same L category)	
Particle size/column length	Per constant L/dp or N: -25% to +50%	
Flow rate	An additional change in flow rate of $\pm 50\%$ is permitted	After the flow rate calculation, change in flow rate is not permitted
Injection volume	Optional flexible	
Column temperature	$\pm 10\text{ }^{\circ}\text{C}$	$\pm 5\text{ }^{\circ}\text{C}$
Mobile phase pH	$\pm 0.2$ pH units, unless otherwise prescribed	
Buffer concentration	The concentration of salts in the buffer component of a mobile phase: $\pm 10\%$	
Dwell volume	N/A	If the configuration of the equipment is changed, t min should adjust in the gradient table
Changes from TPP columns to SPP columns	The plate number (N) is within -25% to +50%	



Help us help you to  
modernize your USP methods

Try our modernization calculator  
in our LC column tool

## HPLC column selection by USP specifications

USP code	Description	Recommended phase
L1	Octadecyl silane chemically bonded to porous or non-porous silica or ceramic micro-particles, 1.5 to 10 µm in diameter, or a monolithic rod	Thermo Scientific™ Acclaim™ 120 C18
		Thermo Scientific™ Acclaim™ RSLC C18
		Thermo Scientific™ Accucore™ C18
		Thermo Scientific™ Accucore™ aQ
		Thermo Scientific™ Accucore™ 150-C18
		Thermo Scientific™ Accucore™ XL C18
		Thermo Scientific™ AQUASIL™ C18
		Thermo Scientific™ Hyperprep™ HS C18
		Thermo Scientific™ Hypersil™ 100 C18
		Thermo Scientific™ Hypersil™ BDS C18
		Thermo Scientific™ Hypersil™ GOLD
		Thermo Scientific™ Hypersil™ GOLD aQ
		Thermo Scientific™ Hypersil™ ODS
		Thermo Scientific™ Hypersil™ ODS-2
		Thermo Scientific™ Synchronis™ C18
Thermo Scientific™ Synchronis™ aQ		
L3	Porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod	Thermo Scientific™ Accucore™ HILIC
		Thermo Scientific™ Hypersil GOLD™ Silica
		Thermo Scientific™ Hypersil™ Silica
		Thermo Scientific™ HyperPrep™ HS Silica
		Thermo Scientific™ Synchronis™ Silica
L7	Octylsilane chemically bonded to totally or superficially porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod	Thermo Scientific™ Acclaim™ 120 C8
		Thermo Scientific™ Accucore™ C8
		Thermo Scientific™ Accucore™ XL C8
		Thermo Scientific™ Hypersil™ BDS C8
		Thermo Scientific™ Hypersil GOLD™ C8
		Thermo Scientific™ Hypersil™ MOS
		Thermo Scientific™ Hypersil™ MOS-2
Thermo Scientific™ Hypersil™ HS C8		
L8	An essentially monomolecular layer of aminopropylsilane chemically bonded to totally porous silica gel support, 1.5 to 10 µm in diameter, or a monolithic silica rod	Thermo Scientific™ Hypersil™ APS-2
		Thermo Scientific™ Hypersil GOLD™ Amino
		Thermo Scientific™ Synchronis™ Amino
L10	Nitrile groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod	Thermo Scientific™ Hypersil™ BDS CN
		Thermo Scientific™ Hypersil™ CPS
		Thermo Scientific™ Hypersil™ CPS-2
		Thermo Scientific™ Hyperprep™ GOLD CN

## HPLC column selection by USP specifications (continued)

USP code	Description	Recommended phase
L11	Phenyl groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod	Thermo Scientific™ Accucore™ Phenyl-Hexyl
		Thermo Scientific™ Accucore™ Biphenyl
		Thermo Scientific™ Hypersil™ BDS Phenyl
		Thermo Scientific™ Hypersil GOLD™ Phenyl
		Thermo Scientific™ Hypersil™ Phenyl
L13	Trimethylsilane chemically bonded to porous silica particles, 3 to 10 µm in diameter	Thermo Scientific™ Hypersil™ SAS (C1)
		Thermo Scientific™ Hypersil GOLD™ SAX
L14	Silica gel having a chemically bonded strongly basic quaternary ammonium anion-exchange coating, 5 to 10 µm in diameter	Thermo Scientific™ Hypersil™ SAX
		Thermo Scientific™ Retain SAX (SEP cartridge)
		Thermo Scientific™ HyperREZ™ XP Carbohydrate H
L17	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 6 to 12 µm in diameter	Thermo Scientific™ HyperREZ™ XP Organic Acids
		Thermo Scientific™ HyperREZ™ XP Carbohydrate Ca
L19	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, 5 to 15 µm in diameter	Thermo Scientific™ HyperREZ™ XP Sugar Alcohols
		Thermo Scientific™ HyperREZ™ XP RP 100
L21	A rigid, spherical styrene-divinylbenzene copolymer, 3 to 30 µm in diameter	Thermo Scientific™ MAbPac™ RP
		Thermo Scientific™ HyperREZ™ XP SCX
L22	A cation-exchange resin made of porous polystyrene gel with sulfonic acid groups, 5 – 15 µm in diameter	Thermo Scientific™ HyperREZ™ XP SCX
L26	Butyl silane chemically bonded to totally porous or superficially porous silica particles, 1.5 to 10 µm in diameter	Thermo Scientific™ Accucore™ 150-C4
		Thermo Scientific™ Hypersil GOLD™ C4
L33	Packing having the capacity to separate dextrans by molecular size over a range of 4,000 to 500,000 Da. It is spherical, silica-based, and processed to provide pH stability	Thermo Scientific™ BioBasic™ SEC 120
		Thermo Scientific™ BioBasic™ SEC 300
		Thermo Scientific™ BioBasic™ SEC 1000
L34	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the lead form, 7 to 9 µm in diameter	Thermo Scientific™ HyperREZ™ XP Carbohydrate Pb
L38	A methacrylate-based size-exclusion packing for water-soluble samples	Thermo Scientific™ Acclaim™ SEC-300
		Thermo Scientific™ Acclaim™ SEC-1000
L40	Cellulose tris-3,5-dimethylphenylcarbamate coated porous silica particles, 3 µm to 20 µm in diameter	Thermo Scientific™ Hypersil™ Chiral OT
L43	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 1.5 to 10 µm in diameter	Thermo Scientific™ Accucore™ PFP
		Thermo Scientific™ Hypersil GOLD™ PFP
L51	Amylose tris-3,5-dimethylphenylcarbamate-coated, porous, spherical, silica particles, 3 to 10 µm in diameter	Thermo Scientific™ Hypersil™ Chiral AT
L52	A strong cation exchange resin made of porous silica with sulfopropyl or sulfoethyl groups, 1 to 10 µm in diameter	Thermo Scientific™ BioBasic™ SCX
L58	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the sodium form, about 6 to 30 µm diameter	Thermo Scientific™ HyperREZ™ Carbohydrate XP Na

## HPLC column selection by USP specifications (continued)

USP code	Description	Recommended phase
L59	Packing for the size-exclusion separations of proteins (separation by molecular weight) over the range of 5 to 7000 kDa. The packing is spherical 1.5 to 10 µm, silica or hybrid packing with a hydrophilic coating	Thermo Scientific™ MabPac™ SEC-1
L60	Spherical, porous silica gel, 10 µm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and endcapped	Thermo Scientific™ Acclaim™ Polar Advantage (PA)
		Thermo Scientific™ Acclaim™ Polar Advantage II (PA2)
		Thermo Scientific™ Accucore™ Polar Premium
L62	C30 silane bonded phase on a fully porous spherical silica, 3 to 15 µm in diameter	Thermo Scientific™ Acclaim™ C30
		Thermo Scientific™ Accucore™ C30
L78	A silane ligand that consists of both reversed-phase (an alkyl chain longer than C8) and anion-exchange (primary, secondary, or tertiary amino groups) functional groups chemically bonded to porous or non-porous or ceramic micro-particles, 1.0 to 50 µm in diameter or a monolithic rod	Thermo Scientific™ Acclaim™ Mixed-Mode WAX-1
		Thermo Scientific™ Acclaim™ Surfactant Plus
L80	Cellulose tris(4-methylbenzoate)-coated, porous, spherical, silica particles, 5 to 20 µm in diameter	Thermo Scientific™ Hypersil™ Chiral JT
L89	Packing having the capacity to separate compounds with a molecular weight range from 100 to 3000 (as determined by polyethylene oxide), applied to neutral and anionic water-soluble polymers. A polymethacrylate resin base, cross-linked with polyhydroxylate ether (surface contains some residual cationic functional groups)	Thermo Scientific™ Acclaim™ SEC-300
L96	Alkyl chain, reversed-phase bonded totally or superficially porous silica designed to retain hydrophilic and other polar compounds when using highly aqueous mobile phases, including 100% aqueous, 1.5 µm to 10 µm in diameter	Thermo Scientific™ Acclaim™ C30
		Thermo Scientific™ Accucore™ C30
		Thermo Scientific™ Hypersil GOLD™ aQ
		Thermo Scientific™ Synchronis™ aQ
L109	Spherical particles of porous graphitic carbon, 3 to 30 µm in diameter	Thermo Scientific™ Hypercarb™
L111	Polyamine chemically bonded to porous spherical silica particles, 5 µm in diameter	Thermo Scientific™ Hypersil GOLD™ AX
L116	Sulfonated ethylvinylbenzene/divinylbenzene substrate agglomerated with hydrophilic quaternary amine functionalized glycidyl-derivative methacrylate microbeads, approximately 2 to 50 µm in diameter	Thermo Scientific™ DNAPac™ PA200
L##	(Polyethylene Glycol 3350, Aquagel OH 40) – Packing having the capacity to separate compounds with a molecular weight range from 10,000 to 200,000 g/mol (as determined by polyethylene oxide), applied to neutral, anionic, and cationic water-soluble polymers, composed of a rigid macroporous material with a hydrophilic surface	Thermo Scientific™ Acclaim™ SEC-300
		Thermo Scientific™ Acclaim™ SEC-1000

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