

## 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	$\pm 10^\circ\text{C}$	$\pm 5^\circ\text{C}$
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

Find it at [eu.fishersci.com/go/thermochrom](https://eu.fishersci.com/go/thermochrom) and find out more about our USP calculator at [thermofisher.com/findmylccolumn](https://thermofisher.com/findmylccolumn)

## 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 to 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 3,000 (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 opolar 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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