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Supelco Columns for USP Methods

The official pharmaceutical analysis monographs in the United States Pharmacopeia (USP) detail the methods used by pharmaceutical manufacturers for quality control of bulk drug substances and dosage form preparations. Each method specifies a particular high pressure liquid chromatography (HPLC) or gas chromatography (GC) column or column type and the conditions under which the analysis is performed. This poster lists the USP Codes for the phases and supports used in these methods, descriptions of the columns, and information about the Supelco products that conform to these descriptions.

HPLC Packings

USP Code	Description	Recommended Packing▲	
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.	• Titan™ C18 • Ascentis® C18 • Ascentis Express C18 • BIOshell ™ Peptide C18 • Discovery® C18	• Discovery HS F5 • Discovery BIO Wide Pore C18 • SUPELCOSIL™ LC-18 • SUPELCOSIL LC-18-DB • SUPELCOSIL LC-318
L3	Porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	• Ascentis Express HILIC • Ascentis Si	• SUPELCOSIL LC-Si • SUPELCOSIL LC-3Si
L7	Octylsilane chemically bonded to totally or superficially porous silica particles, 1.5 to 10 µm in diameter, or a monolithic silica rod.	• Ascentis C8 • Ascentis Express C8 • Discovery C8 • Discovery BIO Wide Pore C8	• SUPELCOSIL LC-8 • SUPELCOSIL LC-8-DB • SUPELCOSIL LC-308
L8	An essentially monomolecular layer of amino-propylsilane chemically bonded to totally porous silica gel support, 1.5 to 10 µm in diameter.	• SUPELCOSIL LC-NH_2 • SUPELCOSIL LC-NH_2-NP	
L9	Irregular or spherical, totally porous silica gel having a chemically bonded, strongly acidic cation-exchange coating, 3 to 10 µm in diameter.	• SUPELCOSIL LC-SCX	
L10	Nitrile groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	• Ascentis ES Cyano • BIOshell Peptide CN • Discovery Cyano	• SUPELCOSIL LC-CN • SUPELCOSIL LC-PCN
L11	Phenyl groups chemically bonded to porous silica particles, 1.5 to 10 µm in diameter.	• Ascentis Phenyl • Ascentis Express Phenyl-Hexyl	• SUPELCOSIL LC-DP • SUPELCOSIL LC-3DP
L13	Trimethylsilane chemically bonded to porous silica particles, 3 to 10 µm in diameter.	• SUPELCOSIL LC-1	
L14	Silica gel having a chemically bonded, strongly basic quaternary ammonium anion-exchange coating, 5 to 10 µm in diameter.	• SUPELCOSIL SAX1	
L17	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the hydrogen form, 6 to 12 µm in diameter.	• SUPELCOGEL™ C-610H • SUPELCOGEL H	• Proteomix® WCX
L19	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the calcium form, about 9 µm in diameter.	• SUPELCOGEL Ca • Proteomix SCX	
L20	Dihydroxypropane groups chemically bonded to porous silica or hybrid particles, 1.5 to 10 µm in diameter.	• Kromasil® Diol • SUPELCOSIL LC-Diol • SuperSW • SW	• SW mAb series • SWxl • TSKgel QC-PAK GFC
L21	A rigid, spherical styrene-divinylbenzene copolymer, 3 to 10 µm in diameter.	• Hhr • PRP-1 • SuperH	• SuperHZ • SuperMultiporeHZ series • TSKgel Hxl
L22	A cation-exchange resin made of porous polystyrene gel with sulfonic acid groups, about 10 µm in size.	• SUPELCOGEL C-610H • SUPELCOGEL H	• PRP-X200 • PRP-X300
L23	An anion-exchange resin made of porous polymethacrylate or polyacrylate gel with quaternary ammonium groups, 7 to 12 µm in size.	• Discovery BIO PolyMA-WAX	
L26	Butyl silane chemically bonded to totally porous silica particles, 1.5 to 10 µm in diameter.	• BIOshell Protein C4 • SUPELCOSIL LC-304	
L27	Porous silica particles, 30 to 50 µm in diameter.	• Discovery DSC-Si • Supelclean™ LC-Si	• Pelliguard™ LC-Si
L32	A chiral ligand-exchange resin packing-L-proline copper complex covalently bonded to irregularly shaped silica particles, 5 to 10 µm in diameter.	• Astec® CLC-D • Astec CLC-L	
L34	Strong cation-exchange resin consisting of sulfonated cross-linked styrene-divinylbenzene copolymer in the lead form, about 7 to 9 µm in diameter.	• SUPELCOGEL Pb	
L38	A methacrylate-based size exclusion packing for water-soluble samples.	• TSKgel PWxl • PW • PWxl-CP	• Alpha • SuperAW series • SuperMultiporePW
L40	Cellulose tris-3,5-dimethylphenylcarbamate coated porous silica particles, 5 to 20 µm in diameter.	• Astec Cellulose DMP • Kromasil® CelluCoat®	
L41	Immobilized α_1-acid glycoprotein on spherical silica particles, 5 µm in diameter.	• Chiral-AGP	
L43	Pentafluorophenyl groups chemically bonded to silica particles by a propyl spacer, 5 to 10 µm in diameter.	• Ascentis Express F5 • Discovery HS F5	
L45	Beta cyclodextrin bonded to porous silica particles, 5 to 10 µm in diameter.	• Astec CYCLOBOND® I 2000 Series	
L49	A reversed-phase packing made by coating a thin layer of polybutadiene onto spherical porous zirconia particles, 3 to 10 µm in diameter.	• Discovery Zr-PBD	
L52	A strong cation exchange resin made of porous silica with sulfopropyl groups, 5 to 10 µm in diameter.	• SUPELCOSIL LC-SCX	
L59	Packing for the size-exclusion separations of proteins (separation by molecular weight) over the range of 5 to 7,000 kDa. It is spherical (1.5 to 10 µm), silica or hybrid packing with a hydrophilic coating.	• TSKgel: G2000SW, G3000SW, G4000SW, G2000SWxl, G3000SWxl, G4000SWxl, SuperSW2000, SuperSW3000, SuperSW mAb HR and UltraSW Aggregate • Sepax: SRT SEC-100, SRT SEC-150, SRT SEC-300, SRT SEC-500	
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.	• Ascentis RP-Amide • Ascentis Express RP-Amide • Discovery RP-AmideC16	• SUPELCOSIL ABZ+PLUS • SUPELCOSIL LC-ABZ
L63	Glycopeptide teicoplanin linked through multiple covalent bonds to a 100 Å units spherical silica.	• Astec CHIROBIOTIC® T • Astec CHIROBIOTIC T2	• Astec CHIROBIOTIC TAG
L67	Porous vinyl alcohol copolymer with a C18 alkyl group attached to the hydroxyl group of the polymer, 2 to 10 µm in diameter.	• apHera™ C18	
L68	Spherical, porous silica, 10 µm or less in diameter, the surface of which has been covalently modified with alkyl amide groups and not endcapped.	• Suplex™ pKb-100	
L88	Glycopeptide vancomycin linked through multiple covalent bonds to a 100 Å spherical silica.	• Astec CHIROBIOTIC V • Astec CHIROBIOTIC V2	

GC Phases

USP Code	Description	Recommended Phase▲	
G1	Dimethylpolysiloxane oil	• SP®-2100 • OV®-101 • SE-30	• Equity®-1 (capillary) • SPB®-1 (capillary)
G2	Dimethylpolysiloxane gum	• SP-2100 • OV-1 • SE-30	• Equity-1 (capillary) • SPB-1 (capillary)
G3	50% Phenyl-50% methylpolysiloxane	• SP-2250 • OV-17	• SPB-50 (capillary)
G4	Diethylene glycol succinate polyester	• Diethylene glycol succinate (DEGS)	
G5	3-Cyanopropylpolysiloxane	• SP-2340 • Silar 10 CP	• SP-2340 (capillary) • SP-2560 (capillary)
G6	Trifluoropropylmethylpolysiloxane	• SP-2401 • OV-210	
G7	50% 3-Cyanopropyl-50% phenylmethylsilicone	• SP-2300 • Silar 5 CP	• SPB-225 (capillary)
G8	80% Bis(3-cyanopropyl)-20% 3-cyanopropylphenyl-polysiloxane (percentages refer to molar substitution)	• SP-2330 • SP-2330 (capillary)	
G9	Methylvinylpolysiloxane	• OV-1 • UCW 98	• Equity-1 (capillary) • SPB-1 (capillary)
G11	Bis(2-ethylhexyl)sebacate polyester	• Di(2-ethylhexyl)sebacate	
G12	Phenyldiethanolamine succinate polyester	• Phenyldiethanolamine succinate	
G13	Sorbitol	• Sorbitol	
G14	Polyethylene glycol (av. mol. wt. of 950 to 1,050)	• Carbowax® 1000	
G15	Polyethylene glycol (av. mol. wt. of 3000 to 3,700)	• Carbowax 4000	
G16	Polyethylene glycol compound (av. mol. wt. about 15,000). A high molecular weight compound of polyethylene glycol with a diepoxide linker.	• Carbowax 20M • Omegawax® (capillary) • SUPELCOWAX® 10 (capillary)	
G17	75% Phenyl-25% methylpolysiloxane	• OV-25	
G18	Polyalkylene glycol	• UCON™ LB-550-X • UCON LB-1800-X	• PAG (capillary)
G19	25% Phenyl-25% cyanopropyl-50% methylsilicone	• OV-225 • SPB-225 (capillary)	
G20	Polyethylene glycol (av. mol. wt. of 380 to 420)	• Carbowax 400	
G21	Neopentyl glycol succinate	• Neopentyl glycol succinate	
G22	Bis(2-ethylhexyl) phthalate	• Bis(2-ethylhexyl)phthalate	
G23	Polyethylene glycol adipate	• Ethylene glycol adipate (EGA)	
G24	Diisodecyl phthalate	• Diisodecyl phthalate	
G25	Polyethylene glycol compound TPA. A high molecular weight compound of a polyethylene glycol and a diepoxide that is esterified with terephthalic acid.	• Carbowax 20M-terephthalic acid • Carbowax 20M-TPA • SP-1000	• Free Fatty Acid Phase (FFAP) • SPB-1000 (capillary) • Nukol™ (capillary)
G27	5% Phenyl-95% methylpolysiloxane	• SE-52 • SLB®-5ms (capillary)	• Equity-5 (capillary) • SPB-5 (capillary)
G28	25% Phenyl-75% methylpolysiloxane	• DC-550	
G29	3,3′-Thiodipropionitrile	• ßß′-Thiodipropionitrile (TDPN)	
G30	Tetraethylene glycol dimethyl ether	• Tetraethylene glycol dimethyl ether	
G31	Nonylphenoxypoly(ethyleneoxy)ethanol (av. ethyleneoxy chain length is 30); Nonoxynol 30	• IGEPAL® CO-880 (Nonoxynol)	
G32	20% Phenylmethyl-80% dimethylpolysiloxane	• OV-7 • SPB-20 (capillary)	
G33	20% Carborane-80% methylsilicone	• Dexsil® 300	
G34	Diethylene glycol succinate polyester stabilized with phosphoric acid	• DEGS-PS	
G35	A high molecular weight compound of polyethylene glycol and a diepoxide that is esterified with nitroterephthalic acid	• Carbowax 20M-terephthalic acid • Carbowax 20M-TPA • SP-1000	• Free Fatty Acid Phase (FFAP) • SPB-1000 (capillary) • Nukol (capillary)
G36	1% Vinyl-5% phenylmethylpolysiloxane	• SE-54 • SLB-5ms (capillary)	• Equity-5 (capillary) • SPB-5 (capillary)
G38	Phase G1 containing a small percentage of a tailing inhibitor	• SP-2100 + 0.1% Carbowax 1500 • SP-2100 + 0.2% Carbowax 1500	
G40	Ethylene glycol adipate	• Ethylene glycol adipate (EGA)	
G41	Phenylmethyldimethylsiloxane (10% phenyl-substituted)	• OV-3	
G42	35% Phenyl-65% dimethylpolysiloxane (percentages refer to molar substitution)	• OV-11 • SPB-35 (capillary)	
G43	6% cyanopropylphenyl-94% dimethylpolysiloxane (percentages refer to molar substitution)	• OV-1301 • OVI-G43 (capillary)	• SPB-624 (capillary)
G44	2% low molecular weight petrolatum hydrocarbon grease and 1% solution of potassium hydroxide	• Apiezon® L + 1% KOH	
G45	Divinylbenzene-ethylene glycol-dimethylacrylate	• HayeSep® A • HayeSep N	• Porapak™ N
G46	14% Cyanopropylphenyl-86% methylpolysiloxane	• OV-1701 • Equity-1701 (capillary)	
G47	Polyethylene glycol (av. mol. wt. of about 8,000)	• Carbowax 8000	
G48	Highly polar, partially cross-linked cyanopolysiloxane	• SP-2380 • SP-2380 (capillary)	

GC Supports▼

USP Code	Description	Recommended Support▲
S1A	Siliceous earth for gas chromatography has been flux-calcined by mixing diatomite with Na_2CO_3 flux and calcining above 900 °C. The siliceous earth is acid-washed, then water-washed until neutral, but not base-washed. The siliceous earth may be silanized by treating with an agent such as dimethyldichlorosilane to mask surface silanol groups. ***Note:*** *Unless otherwise specified in the individual monograph, silanized support is intended.*	• SUPELCOPORT® • Chromosorb® W AW • Chromosorb W HP
S1AB	The siliceous earth as described above is both acid- and base-washed. ***Note:*** *Unless otherwise specified in the individual monograph, silanized support is intended.*	• SUPELCOPORT BW
S1C	A support prepared from crushed firebrick and calcined or burned with a clay binder above 900 °C with subsequent acid-wash. It may be silanized.	• Chromosorb P AW • Chromosorb P AW-DMCS
S1D	A support prepared from crushed firebrick and calcined or burned with a clay binder above 900 °C, not acid washed. It may be silanized.	• Chromosorb P NAW
S1NS	The siliceous earth is untreated.	• Chromosorb W NAW
S2	Styrene-divinylbenzene copolymer having a nominal surface area of less than 50 m^2 per g and an average pore diameter of 0.3 to 0.4 µm.	• Chromosorb 101
S3	Copolymer of ethylvinylbenzene and divinylbenzene having a nominal surface area of 500 to 600 m^2 per g and an average pore diameter of 0.0075 µm.	• HayeSep Q • Porapak Q • Super Q
S4	Styrene-divinylbenzene copolymer with aromatic –O and –N groups, having a nominal surface area of 400 to 600 m^2 per g and an average pore diameter of 0.0076 µm.	• HayeSep R • Porapak R
S5	40- to 60-mesh, high molecular weight tetrafluorethylene polymer.	• Chromosorb T
S6	Styrene-divinylbenzene copolymer having a nominal surface area of 250 to 350 m^2 per g and an average pore diameter of 0.0091 µm.	• HayeSep P • Porapak P • Chromosorb 102
S7	Graphitized carbon having a nominal surface area of 12 m^2 per g.	• Carbopack™ C
S8	Copolymer of 4-vinyl-pyridine and styrene-divinylbenzene.	• HayeSep S • Porapak S
S9	A porous polymer based on 2,6-diphenyl-p-phenylene oxide.	• Tenax® TA
S10	A highly polar cross-linked copolymer of acrylonitrile and divinylbenzene.	• HayeSep C
S11	Graphitized carbon having a nominal surface area of 100 m^2 per g modified with small amounts of petrolatum and polyethylene glycol compound.	• 3% SP-1500 on 80/120 Carbopack B
S12	Graphitized carbon having a nominal surface area of 100 m^2 per g.	• Carbopack B

Supelco's Molecular sieve 5A GC material meets USP/NF criteria for analysis of nitrogen purity: *"…a molecular sieve prepared from a synthetic alkali-metal aluminosilicate capable of absorbing molecules having diameters of up to 0.5 nm, which permit complete separation of oxygen from nitrogen."*

Contact our Technical Service Department for expert answers to your questions.
Phone: 800-325-5832; Fax: 314-286-7828; email: techserv@sial.com

Footnotes: ▲ Indicates availability of material(s) matching the description. Supelco is not necessarily the manufacturer of the material.
▼ Unless otherwise specified, mesh sizes of 80 to 100 or, alternatively, 100 to 120 are intended.

Reference: United States Pharmacopeia 37, National Formulary 32, (November 1, 2013). Request from United States Pharmacopeial Convention, Inc., 12601 Twinbrook Parkway, Rockville, MD USA 20852 (tel. 800-227-8772).

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