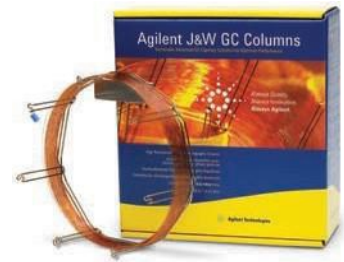


Recommended GC Columns for USP Phase Classification

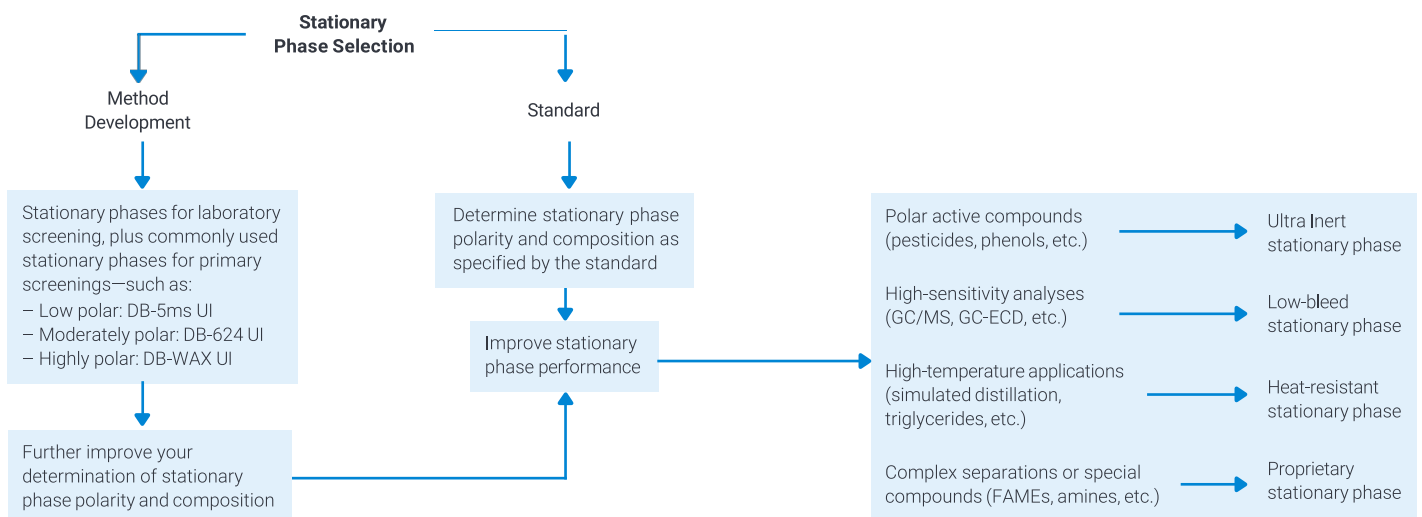


Comply with regulatory method requirements

United States Pharmacopeia (USP) monographs detail the methods used for quality control of bulk drug substances and dosage form preparations. Each method specifies a GC column type and the conditions under which the analysis is performed.

In this guide, you'll find USP codes for the GC phases used in these methods, and tips for selecting the right stationary phase.

Use this chart as your starting point, then turn the page for in-depth classification information



Classification of stationary phases for GC columns

USP Classification	Stationary Phase Composition	Corresponding Agilent Stationary Phase
G1	Dimethylpolysiloxane oil	HP-1ms UI, DB-1ms UI, HP-1ms, DB-1ms, VF-1ms, HP-1, DB-1, DB-1ht, Ultra-1, CP-Sil 5 CB, CP-Sil 5 CB Low-bleed/MS
G2	Dimethylpolysiloxane gum	HP-1ms UI, DB-1ms UI, HP-1ms, DB-1ms, VF-1ms, HP-1, DB-1, DB-1ht, Ultra-1, CP-Sil 5 CB, CP-Sil 5 CB Low-bleed/MS, CP-SimDist, DB-HT SimDis
G3	50% Phenyl 50% Methylpolysiloxane	DB-17ms, VF-17ms, DB-17ht, DB-17, CP-Sil 24 CB
G5	≥70% 3-Cyanopropylpolysiloxane	DB-FastFAME, CP-Sil 88 for FAME, VF-23ms, DB-23, Select FAME, HP-88
G6	Trifluoropropylmethylpolysiloxane	VF-200ms, DB-200, DB-210
G7	50% 3-Cyanopropyl 50% Phenylmethylsilicone	DB-225ms, DB-225, CP-Sil 43 CB
G8	80% Bis (3-cyanopropyl) 20% 3-cyanopropylphenylpolysiloxane	CP-Sil 88 for FAME, VF-23ms, DB-23, Select FAME, HP-88, CP-Sil 88
G9	Methylvinylpolysiloxane	HP-1ms UI, DB-1ms UI, HP-1ms, DB-1ms, VF-1ms, DB-1ht, Ultra-1, DB-HT SimDis, CP-SimDist, CP-Sil 5 CB, CP-Sil 5 CB Low-bleed/MS
G16	Polyethylene glycol (molecular weight: about 15,000)	DB-WAX UI, DB-HeavyWAX, DB-FATWAX UI, VF-WAXms, DB-WAX, CP-Wax 52 CB, CP-Wax 57 CB, DB-WAXetr, HP-INNOWax
G17	75% Phenyl 25% Methylpolysiloxane	DB-17ms, DB-17
G19	25% Phenyl 25% Cyanopropylmethylsilicone	DB-225ms, DB-225, CP-Sil 43 CB
G20	Polyethylene glycol (average molecular weight: 380–420)	DB-WAX UI, DB-HeavyWAX, VF-WAXms, DB-FATWAX UI, DB-WAX, DB-WAXetr, HP-INNOWax
G25	Polyethylene glycol TPA	DB-FFAP, HP-FFAP, CP-WAX 58 FFAP CB
G27	5% Phenyl 95% Methylpolysiloxane	DB-5ms UI, HP-5ms UI, DB-5ms, HP-5ms, VF-5ms, DB-5, HP-5, DB-5ht, Ultra-2, CP-Sil 8 CB, CP-Sil 8 CB Low-bleed/MS
G28	25% Phenyl 75% Methylpolysiloxane	DB-35ms UI, DB-35ms, VF-35ms, HP-35
G32	20% Phenyl 80% Methylpolysiloxane	DB-35ms UI, DB-35ms, VF-35ms, HP-35
G35	Polyethylene glycol and diepoxide esterified with nitroterephthalic acid	DB-FFAP, HP-FFAP, CP-WAX 58 FFAP CB
G36	1% Vinyl 5% Phenylmethylpolysiloxane	DB-5ms UI, HP-5ms UI, DB-5ms, HP-5ms, VF-5ms, DB-5, HP-5, DB-5ht, Ultra-2, CP-Sil 8 CB, CP-Sil 8 CB Low-bleed/MS
G38	Phase G1, plus a tailing inhibitor	HP-1ms UI, DB-1ms UI, HP-1ms, DB-1ms, HP-1, DB-1, DB-1ht, Ultra-1
G39	Polyethylene glycol (average molecular weight: 1,500)	DB-WAX UI, DB-HeavyWAX, VF-WAXms, DB-FATWAX UI, DB-WAX, DB-WAXetr, CP-Wax 52 CB, HP-INNOWax
G42	35% Phenyl 65% Dimethylvinylsiloxane	DB-35ms UI, DB-35ms, VF-35ms, HP-35
G43	6% Cyanopropylphenyl 94% Dimethylpolysiloxane	DB-624 UI, DB-Select 624 UI for USP 467, VF-624ms, DB-1301, VF-1301ms, CP-1301, CP-Select 624 CB
G45	Divinylbenzene-ethylene glycol-dimethylacrylate	HP-PLOT U, PoraPLOT U
G46	14% Cyanopropylphenyl 86% Methylpolysiloxane	VF-1701ms, DB-1701, DB-1701P, CP-Sil 19 CB
G47	Polyethylene glycol (average molecular weight: 8,000)	DB-WAX UI, DB-HeavyWAX, DB-FATWAX UI, VF-WAXms, DB-WAX, CP-Wax 52 CB, DB-WAXetr, HP-INNOWax
G48	Highly polar, partially cross-linked cyano-polysiloxane	DB-FastFAME, CP-Sil 88, CP-Sil 88 for FAME, HP-88, Select FAME
G50	Base-deactivated Carbowax	CP-Wax 51 for amines, CP-WAX for volatile amines and diamines, CAM
G52	Polyethylene glycol (average molecular weight: > 20,000)	DB-WAX UI, DB-HeavyWAX, DB-FATWAX UI, DB-WAX, DB-WAXetr, CP-Wax 52 CB, HP-INNOWax
G53	5% Polyalkylfluorobenzylsiloxane	DB-VRX

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- Less instrument maintenance and longer run time
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Column	Unique Features	Stationary Phase and Temperature Range	Typical Applications
DB-1ms UI HP-1ms UI	Low bleed Ultra Inert	• 100% Dimethylpolysiloxane • -60 to 325/350 °C	• Common analyses • Analyses of hydrocarbons, sulfur compounds, fragrances/flavors, phenols, and PCBs • Pesticide residues
DB-5ms UI HP-5ms UI	Low bleed Ultra Inert	• 5% Phenyl 95% Methylpolysiloxane • -60 to 325/350 °C	• Semi-volatiles • Pesticide residues • Screening of halides, amines, and unknown samples • Polycyclic aromatic hydrocarbons
DB-35ms UI	Low bleed Ultra Inert	• 35% Phenyl 65% Methylpolysiloxane • 50 to 340/360 °C	• Aryl chlorides, drugs, pesticides, herbicides, and polychlorinated biphenyls
DB-624 UI	Ultra Inert	• 6% Cyanopropylphenyl 94% Methylpolysiloxane • -20 to 260 °C	• Volatiles • Residual solvents
DB-WAX UI	Ultra Inert	• Polyethylene glycol • 20 to 250/260 °C	• Alcohols, solvents, food/fragrance/flavor compounds, and aromatic hydrocarbons • Methanol, propionic acid, propylene glycol, etc.
VF-17ms	Low bleed	• 50% Phenyl 50% Methyl arylene siloxane • 40 to 330/360 °C	• Drugs, ethylene glycol, pesticides, and steroids • Pesticide residues
VF-1701ms	Low bleed	• 14% Cyanopropylphenyl 86% Methylpolysiloxane • -20 to 280/300 °C	• Pesticide residues • PCBs and semi-volatiles
VF-624ms	Low bleed	• 6% Cyanopropylphenyl 94% Methylpolysiloxane • -40 to 280/300 °C	• Drugs, ethylene glycol, pesticides, and steroids • Volatile amines
VF-WAXms	Low bleed	• Polyethylene glycol • 20 to 250/260 °C	• Genotoxic impurities • Alcohols, solvents, FAMES, food/fragrance/flavor compounds, and aromatic hydrocarbons
DB-FastFAME	Proprietary stationary phase	• A moderate content of polar cyanopropylpolysiloxane • Cross-linked • 40 to 250/260 °C	• Rapid separation of saturated and polyunsaturated FAMES (including some difficult-to-separate cis-trans isomers) • Compliance with AOAC, AOCS, IOC, and GB regulations and methods
CP-Volamine	Proprietary stationary phase	• 100% Dimethylpolysiloxane • MPD (multipurpose deactivation) technology-based alkaline deactivation • -60 to 265/300 °C	• The best column for volatile amine compounds
DB-Select 624UI for <467>	Ultra Inert Proprietary stationary phase	• Stationary phase for USP G43 • 40 to 260 °C	• USP 467 residual solvents
DB-FATWAX UI	Ultra Inert Proprietary stationary phase	• Polyethylene glycol • 20 to 250/260 °C	• Fatty acids, fatty acid methyl esters (FAMES), and fatty acid ethyl esters (FAEEs) • Reproducible separation of the fatty acid methyl esters of EPA, DPA, and DHA
DB-HeavyWAX	Heat resistant Low bleed	• Polyethylene glycol • 40 to 280/290 °C	• Analyzing aromatic solvents, pyrolysis gasoline, jet fuel, etc. • Expanding the range of compound analyses • Reducing analysis time • Decreasing residual matrix contaminants

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