

## Chromatography Solutions

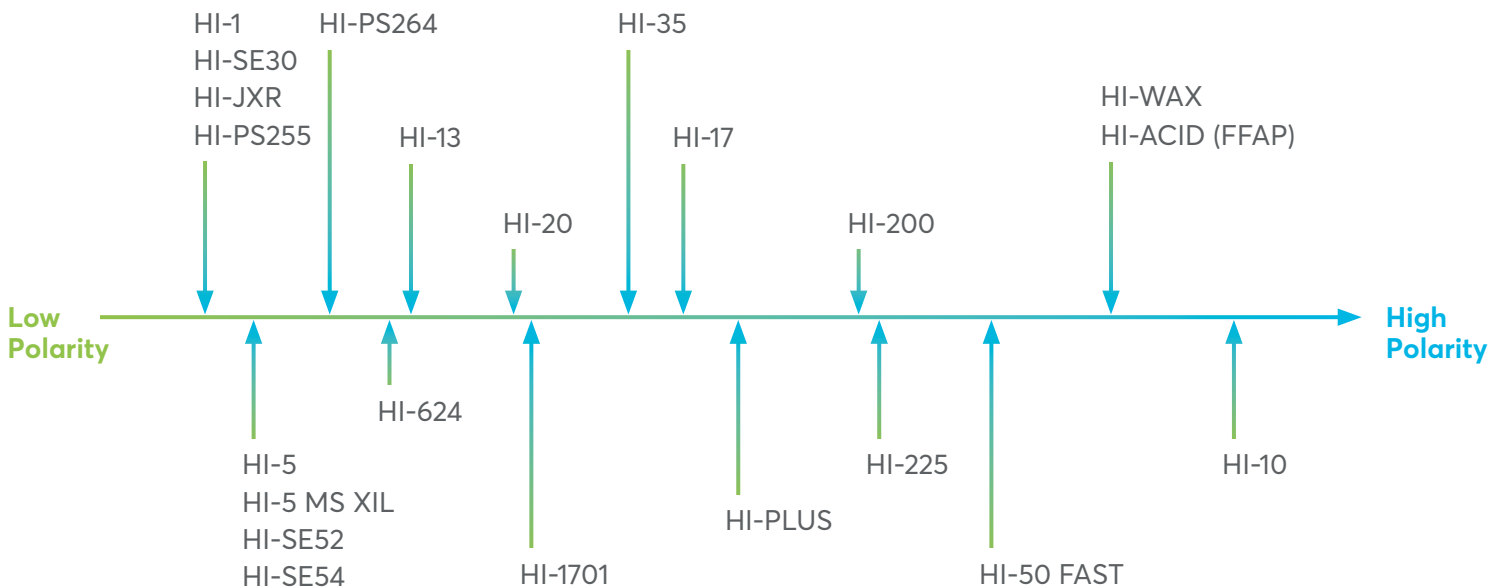
# Avantor® Hichrom GC stationary phase guide

When selecting your GC column it is necessary to consider the polarity of the stationary phase and the analytes. As like attracts like, the strongest interactions occur when the stationary phase and analytes have similar polarities. In a chromatographic sense, this means greater retention which often results in increased resolution. The composition of the stationary phase influences selectivity through the types of intermolecular forces (e.g. H bonding, dispersion, dipole-dipole & shape selectivity) that occur between it and the analytes.

This Avantor® Hichrom GC specification guide is ordered by polarity and provides details of the phase chemistry and suggested applications to help you select the most appropriate stationary phase for your method.

If additional support is required please contact our Chromatography support team at [Chromsupport@avantorsciences.com](mailto:Chromsupport@avantorsciences.com).

Examples of stationary phase polarity. Not all chemistries are included, please see tables for complete range of Avantor® Hichrom GC stationary phases.



## APOLAR TO MID POLARITY PHASES

Phase	Functional group	Max. Temp.*	Crossbond	Application areas	Methods
<b>APOLAR</b>					
HI-1	100% Methyl Polysiloxane (100% Dimethylpolysiloxane)	350 °C	Yes	General purpose apolar phase - Solvent impurities, PCBs, Simulated Distillation, drugs, natural gases, hydrocarbons, essential oils, semivolatiles, pesticides, phenols	EPA: 504.1, 505, 551, 606, 612, 8141A/B USP: G1, G2, G9, G38
HI-1 HT	100% Methyl Polysiloxane (100% Dimethylpolysiloxane) - High Temperature	400 °C	Yes	High Molecular Weight Waxes, Motor Oils, Polymers/Plastics, Simulated Distillation	USP: G1, G2, G9, G38
HI-1 MS	100% Methyl Polysiloxane (100% Dimethylpolysiloxane) - low bleeding	350 °C	Yes	Low Bleed general purpose column for GC-MS. Solvent impurities, PCBs, Simulated Distillation, drugs, natural gases, hydrocarbons, essential oils, semivolatiles, pesticides, phenols	EPA: 504.1, 505, 606 USP: G1, G2, G9, G38
HI-1 PONA	100% Methyl Polysiloxane (100% Dimethylpolysiloxane) - optimized for hydrocarbon analysis	350 °C	Yes	Optimized for DHA (Detailed Hydrocarbons Analysis), PONA, PIANO and PNA analysis	ASTM D6730-01
HI-JXR	100% Methyl Polysiloxane	350 °C	Yes	General Purpose Apolar Column	USP: G1, G2, G9, G38
HI-SE30	100% Methyl Polysiloxane	350 °C	Yes	General Purpose Apolar Column	EPA: 504.1, 505, 606, 8141A USP: G1, G2, G9, G38
HI-PS255	1% Vinyl, 99% Methyl Polysiloxane	350 °C	Yes	Apolar phase to analyze solvents, alcohols, volatiles, suited to high film thicknesses	-
<b>LOW POLARITY</b>					
HI-5	5% Phenyl, 95% Methyl Polysiloxane	350 °C	Yes	General purpose low polarity phase - solvent impurities, PCBs, hydrocarbons, essential oils, semivolatiles, pesticides, phenols	EPA: 506, 611, 604, 607, 608, 8015, 8041, 8082, 8091 USP: G27, G36, G41
HI-5 Basic	5% Phenyl, 95% Methyl Polysiloxane -for Basic Compounds	350 °C	Yes	Optimized for analysis of Basic Compounds e.g. volatile amines	-
HI-5 HT	5% Phenyl, 95% Methyl Polysiloxane -High Temperature	400 °C	Yes	High Molecular Weight Waxes, Diesel Fuels, Surfactants, Simulated Distillation, Triglycerides	USP: G27, G36, G41
HI-5 MS	5% Phenyl, 95% Methyl Polysiloxane -low bleeding	360 °C	Yes	Low Bleed general purpose column for GC-MS, solvent impurities, PCBs, hydrocarbons, essential oils, semivolatiles, pesticides, phenols	EPA: 513, 528, 552, 610, 613, 1625, 1653, 8015B, 8091, 8100, 8141A/B, 8280A USP: G27, G36, G41
HI-5 MS PLUS	5% Phenyl, 95% Methyl Polysiloxane -ultra-low bleeding	360 °C	Yes	Ultra low bleed general purpose column for GC-MS. Ideal for trace analysis. Suitable for analytes including solvent impurities, PCBs, hydrocarbons, essential oils, semivolatiles, pesticides, phenols	EPA: 513, 528, 552, 610, 613, 1625, 1653, 8015B, 8091, 8100, 8141A/B, 8280A USP: G27, G36, G42
HI-5 MS Xil	Silphenylene Methyl Polysiloxane -Ultra-low bleeding	360 °C	Yes	Ultra low bleed column, Dioxins, Furans, Herbicides, Phthalate Esters, POCs, Chlorinated Acids	EPA: 513, 515.2, 521, 525, 529, 552.2, 604, 610, 625, 1613, 1625, 8041 8061A, 8081A, 8121, 8270C USP: G27, G36, G41
HI-SE52	5% Phenyl, 95% Methyl Polysiloxane	350 °C	Yes	Solvent impurities, PCBs, hydrocarbons, essential oils, semivolatiles, triglycerides, pesticides, polywaxes	USP: G27, G36, G41
HI-SE54	5% Phenyl, 1% Vinyl, 94% Methyl Polysiloxane	350 °C	Yes	Solvent impurities, PCBs, hydrocarbons, essential oils, semivolatiles, allergens, pesticides	USP: G27, G36, G41
HI-SE54 HT	5% Phenyl, 1% Vinyl, 94% Methyl Polysiloxane - High Temperature	400 °C	Yes	High boiling Petroleum products, Long chained hydrocarbons	-
HI-PS264	5.8% Phenyl, 0.2% Vinyl, 94% Methyl Polysiloxane	350 °C	Yes	Low polarity phase to analyze solvents, alcohols, volatiles, suited to high film thicknesses	-
HI-8 HT	Proprietary High temperature phase	400 °C	Yes	Pesticides, PCBs, environmental analysis	-
HI-Biodiesel 105	Proprietary	380 °C	Yes	Free and total glycerol, and mono-, di- and tri-glyceride content in biodiesel analysis, method specific	EN14105, ASTM D6584
HI-DAI 1	Proprietary	320 °C	Yes	Low polarity phase for Direct Aqueous Injections to minimize sample preparation, alternative selectivity to HI-DAI 2	-
HI-OVW	Proprietary	350 °C	Yes	Unique phase developed for analysis of waxes in edible oils	-
HI-XMLB	Proprietary	360 °C	Yes	Unique selectivity columns for Pesticides, PCBs and PAHs. Excellent confirmation column for semi-volatile environmental analysis	-
<b>MID POLARITY</b>					
HI-624	6% Cyanopropylphenyl, 94% Methyl Polysiloxane	280 °C	Yes	Volatile organic pollutants, purgeable aromatics, purgeable hydrocarbons, VOCs, pharmaceuticals	EPA: 501.3, 502.1, 502.2, 601, 624, 1624, 8020, 8021 USP: G43, 467 (OVIs)
HI-624 MS	6% Cyanopropylphenyl, 94% Methyl Polysiloxane -low bleeding	280 °C	Yes	Low Bleed for GC-MS, for the analysis of volatile organic pollutants, purgeable aromatics, purgeable hydrocarbons, VOCs, pharmaceuticals	EPA: 8260B USP: G43, 467 (OVIs)
HI-1301	6% Cyanopropylphenyl, 94% Methyl Polysiloxane	280 °C	Yes	Low Bleed for GC-MS, for the analysis of volatile organic pollutants, purgeable aromatics, purgeable hydrocarbons, VOCs, pharmaceuticals	EPA: 8260B USP: G43, 467 (OVIs)
HI-13	13% Phenyl, 87% Methyl Polysiloxane (13% Phenyl, 87% Dimethylpolysiloxane)	350 °C	Yes	General Purpose Mid-Polar column	EPA: 601, 602, 624

\* Maximum temperature limits may change depending on the film thickness

## MID TO HIGH POLARITY PHASES

Phase	Functional group	Max. Temp.*	Crossbond	Application areas	Methods
HI-ALC 1	Proprietary	280 °C	Yes	Low to mid polarity phase designed for blood alcohol analysis. Alternative selectivity to HI-ALC 2	-
HI-DAI 2	Proprietary	320 °C	Yes	Low to mid polarity phase designed for direct aqueous injections to minimize sample preparation. Alternative selectivity to HI-DAI 1	-
HI-PAH	Proprietary	350 °C	Yes	Low to mid polarity phase designed for Polycyclic Aromatic Hydrocarbons (PAH) analysis. Alternative selectivity to HI-PAH 2	-
HI-POF 1	Proprietary	280 °C	Yes	Mid polarity phase designed for Pesticides, Herbicides and Insecticides Analysis	-
HI-VOC 1	Proprietary	300 °C	Yes	Mid polarity phase optimised for Volatile Organic Compounds (OVIs), solvents and purgeable compounds, alternative selectivity to HI-VOC 2	-
HI-VOC 2	Proprietary	320 °C	Yes	Low to mid polarity phase designed for Volatile Organic Compounds (OVIs), solvents and purgeable compounds, alternative selectivity to HI-VOC 1	-
HI-35 HT	35% Phenyl, 65% Methyl Polysiloxane -High Temperature	370 °C	Stabilized	Semi-Volatile Compounds, Pesticides, Pharmaceuticals	-
HI-35 MS	35% Phenyl, 65% Methyl Polysiloxane -low bleeding	340 °C	Stabilized	Low Bleed general purpose column for GC-MS, suitable for confirmational analysis	EPA: 507, 508, 552, 614, 615, 622, 8141A, 8151A USP: G28, G32, G42
HI-PLUS 10	Copolymer 10% Polyethylene glycol (PEG), 90% Methyl Polysiloxane	270 °C	Yes	Alternate Selectivity Mid-Polar column	-
HI-PLUS 25	Copolymer 25% Polyethylene glycol (PEG), 75% Methyl Polysiloxane	270 °C	Yes	Alternate Selectivity Mid-Polar column	-
HI-17	50% Phenyl, 50% Methyl polysiloxane	340 °C	Stabilized	Phthalate esters, herbicides, pharmaceuticals, more polar phase suitable for GCxGC	EPA: 604, 608, 619, 8060, 8081 USP: G3, G17
HI-17 HT	50% Phenyl, 50% Methyl polysiloxane – high temperature	370 °C	Stabilized	High Polarity column for confirmation analysis - ideal for GCxGC-HT applications	-
HI-17 MS	50% Phenyl, 50% Methyl polysiloxane – low bleed	340 °C	Stabilized	Low Bleed for GC-MS - Phthalate esters, herbicides, pharmaceuticals, more polar phase suitable for GCxGC	EPA: 505, 610, 614, 619, 8040, 8041 USP: G3, G17
HI-225	25% Cyanopropyl, 25% Phenyl, 50% Methyl polysiloxane	260 °C	Stabilized	Carbohydrates, sterols, flavor compounds	EPA: 8095 USP: G7, G19
HI-225 MS	25% Cyanopropyl, 25% Phenyl, 50% Methyl polysiloxane – low bleed	240 °C	Stabilized	Low Bleed for GC-MS, Carbohydrates, sterols, flavor compounds	EPA: 8095 USP: G7, G19
HI-200	Trifluoropropyl Methyl Polysiloxane	250 °C	Yes	Freon fluorocarbons, ketones, alcohols, organophosphorus pesticides	EPA: 551, 612, 625, 8095 USP: G6
HI-PLUS	Copolymer 50% Polyethylene glycol (PEG), 50% Methyl Polysiloxane	270 °C	Yes	Alternate Selectivity Mid-High Polar column	-
<b>HIGH POLARITY</b>					
HI-10	100% Cyanopropyl polysiloxane	260 °C	Stabilized	cis/trans FAMES isomers analysis	EPA: 613, 1613, 8290B USP: G5, G8, G48
HI-50	50% Cyanopropyl, 50% Methyl Polysiloxane	260 °C	Stabilized	Carbohydrates, sterols, FAMES, flavor compounds, dioxin isomers	USP: G8
HI-65 HT	65% Phenyl, 35% Methyl Polysiloxane – high temperature	360 °C	Yes	Triglycerides separations based on carbon number and degree of unsaturation	-
HI-ACID (FFAP)	Acid modified Polyethylene Glycol (PEG)	250 °C	Yes	Ideal for free acids, FAMES, BTX aromatics, favor compounds, alcohols, spirits, polar compounds	USP: G14, G15, G16, G25, G35, G39
HI-FFAP EXT	Acid modified Polyethylene Glycol (PEG) – extended temperature range	260 °C	Yes	Extended temperature & aqueous sample stability for free acids, FAMES, BTX aromatics, flavor compounds, alcohols, spirits, polar compounds	EPA: 8032 USP: G14, G15, G16, G25, G35, G39
HI-BASIC	Proprietary	140 °C	Stabilized	Aliphatic Amines, Aromatic Amines, low temperature analysis	-
HI-POF 2	Proprietary	320 °C	Yes	Mid to high polarity phase designed for Pesticides, Herbicides and Insecticides Analysis. Alternative selectivity to HI-POF 1	-
HI-PLUS 75	Copolymer 75% Polyethylene glycol (PEG), 25% Methyl Polysiloxane	270 °C	Yes	Alternate Selectivity Highly Polar column	-
HI-PLUS 90	Copolymer 90% Polyethylene glycol (PEG), 10% Methyl Polysiloxane	270 °C	Yes	Alternate Selectivity, Highly Polar column	-
HI-TCEP	1,2,3-tris-(2-cyanoethoxy) propane	150 °C	Stabilized	Application specific column for aromatics and oxygenates in gasoline	-
HI-WAX	Polyethylene Glycol (PEG)	250 °C	Yes	FAMES, flavor compounds, essential oils, BTX aromatics, solvents, alcohols, VOC's	EPA: 602, 603, 619, 8015C USP: G14, G15, G16, 467 (OVIs)
HI-WAX HT	Polyethylene Glycol (PEG) - High Temperature	300 °C	Yes	For applications that require rapid analysis or GCXGC methods while using a polar WAX phase	-

\* Maximum temperature limits may change depending on the film thickness

## HIGHLY POLAR & CHIRAL PHASES

Phase	Functional group	Max. Temp.*	Crossbond	Application areas	Methods
HI-WAX MS	Polyethylene Glycol (PEG) - low bleeding	270 °C	Yes	Low Bleed for GC-MS, for the analysis of FAMES, flavor compounds, essential oils, BTX aromatics, solvents, alcohols, VOC's	EPA: 602, 603, 619, 8015C, 8121 USP: G14, G15, G16
HI-WAX Plus	Polyethylene Glycol (PEG) – ultra inert & water resistant	270 °C	Yes	Highly Stable, Inert PEG Phase designed for FAMES, flavor compounds, essential oils, BTX aromatics, solvents, alcohols	EPA: 602, 603, 619, 8015C USP: G14, G15, G16, 467 (OVIs)
HI-WAX BA	Polyethylene Glycol (PEG) for Basic Compounds	250 °C	Yes	WAX column for Basic Compounds - alkylamines, diamines & triamines	EPA: 602, 603, 619, 8015C USP: G14, G15, G16, 467 (OVIs)
HI-WAX Spirit	Polyethylene Glycol (PEG) optimised for Spirits Analysis	250 °C	Yes	WAX column designed for Spirits Analysis	EPA: 602, 603, 619, 8015C USP: G14, G15, G16, 467 (OVIs)
HI-ALC 2	Proprietary	280 °C	Yes	Polar phase designed for blood alcohol analysis. Alternative selectivity to HI-ALC 1	-
HI-Biodiesel 103	Proprietary	270 °C	Yes	Method specific column designed for the FAMES in biodiesel	EN14103
HI-Biodiesel 110	Proprietary	270 °C	Yes	Method specific column for methanol content in biodiesel	EN14110
HI-LAP	Proprietary	370 °C	Yes	Lipid analysis phase, suitable for Saturated and Unsaturated Triglycerides, Sterols and Lipids	-
HI-PAH 2	Proprietary	360 °C	Yes	Polycyclic Aromatic Hydrocarbons (PAH) - EU method	-
HI-SOLVE 1	Proprietary	140 °C	Stabilized	Complex solvent mixtures	-
HI-SOLVE 2	Proprietary	140 °C	Stabilized	Complex solvent mixtures and suitable for aromatic and oxygenates in gasoline	-
<b>CHIRAL PHASES</b>					
HI-DEX DAC Beta	Diacetyl modified beta-cyclodextrin	230 °C	No	Suitable for the analysis of chiral compounds in fragrances, pesticides and pharmaceuticals.	-
HI-DEX DAC Gamma	Diacetyl modified gamma-cyclodextrin	230 °C	No	Suitable for the analysis of chiral compounds in fragrances, pesticides and pharmaceuticals.	-
HI-DEX DET Beta	Diethyl modified beta-cyclodextrin	230 °C	No	Suitable for the analysis of chiral compounds in fragrances, pesticides and pharmaceuticals.	-
HI-DEX DET Gamma	Diethyl modified gamma-cyclodextrin	230 °C	No	Suitable for the analysis of chiral compounds in fragrances, pesticides and pharmaceuticals.	-
HI-DEX DMP Beta	Dimethyl pentyl modified beta-cyclodextrin	230 °C	No	Suitable for the analysis of chiral compounds in fragrances, pesticides and pharmaceuticals .	-
HI-DEX DMT Beta	Dimethyl modified beta-cyclodextrin	230 °C	No	Suitable for the analysis of chiral compounds in fragrances, pesticides and pharmaceutical.	-
HI-DEX B-03	Proprietary modified cyclodextrin	230 °C	No	Unique selectivity for the separation of enantiomers.	-
HI-DEX B-SE	Proprietary modified cyclodextrin	230 °C	No	Unique selectivity for the separation of enantiomers.	-
HI-DEX G-01	Proprietary modified cyclodextrin	230 °C	No	Unique selectivity for the separation of enantiomers. Capable of separating Bornyl Acetate enantiomers.	-
HI-DEX G-03	Proprietary modified cyclodextrin	250 °C	No	Unique selectivity for the separation of enantiomers. Developed for pyrethroids and pesticide chiral separations.	-

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