Polymer-to-Solvent Reference Table for GPC/SEC

Technical Overview

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Abstract

A comprehensive reference on solvents for gel permeation chromatography, with a full list of tested solvent, polymer, and column combinations, and notes on best practices.

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Introduction

Gel permeation chromatography (GPC), which is also referred to as size exclusion chromatography (SEC) or gel filtration chromatography (GFC), provides size-based separation by allowing analytes with small size in solution to diffuse into the pores of the media, while analytes that are too large to fit into these pores are swept through the column by the solvent.

Pore size and distribution can be manipulated to change the retention-to-size relationship and the range of separable sizes. This retention-to-size relationship is established with calibration standards, but becomes inaccurate over time, and must be regularly re-established.

Experimental

For GPC to yield valid data, the analytes must not stick to the surface of the particle, as this would cause the retention time to no longer reflect just size, but also surface interaction effects.

To overcome this challenge, Agilent provides three phase chemistries that minimize surface interaction in their respective solvents:

- **PLgel** – A highly cross-linked polystyrene-divinylbenzene (PS-DVB) particle compatible with organic and many polar organic solvents. Brochure: 5990-7994EN
- **PolarGel** – A proprietary particle chemistry designed for polar samples dissolved in polar organics and water/organic mixtures Brochure: 5990-7995EN
- **PL aquagel-OH**– A hydrophilic particle chemistry compatible with water, high-salt buffers, and up to 50 % methanol Brochure: 5990-7995EN

Each chemistry was formulated to be noninteractive to a wide variety of polymers dissolved in their respective solvents. Polymeric media allow for both wide pores and a single, consistent surface chemistry free of interactive silanols or metal centers found on other materials.

Over its 40-year history, Agilent has assembled a vast library of applications for GPC, which are summarized in Table 2.

Table 1. Chemical acronyms.

THF	Tetrahydrofuran
DMAc	Dimethylacetamide
NMP	N-methyl-2-pyrrolidone
HFIP	Hexafluorisopropanol
BHT	Butylated hydroxytoluene
DMF	Dimethylformamide
DMSO	Dimethylsulfoxide
TCB	1,2,4-Trichlorobenzene
NaTFA	Sodium trifluoroacetate
TEA	Triethylamine

Table 2. Agilent GPC applications.

Application	Solvent	Phase	Temperature (°C)	Publication number
Acrylonitrile butadiene styrene (ABS) plastic	DMF + 0.1 % LiBr	PolarGel	50	5991-2517EN
Acrylonitrile butadiene styrene (ABS) plastic	THF	PLgel	40	5990-8495EN
Acrylonitrile styrene acrylate (ASA) plastic	THF	PLgel	25	5990-8601EN
Adipate polyesters	THF	PLgel	25	5990-8602EN
Alkanes	TCB	PLgel	100	5990-8494EN
Alkyd resin	THF	PLgel	25	5990-6845EN
Alkyl glycerides	THF	PLgel	35	5991-1895EN
Alkyl glycerides	THF	PLgel	25	5990-8322EN
Alkyl glycerides	THF	PLgel	25	5990-8326EN
Alkylketene dimer (AKD)	THF	PLgel	25	5990-8402EN
ASA Plastic	THF	PLgel	25	5990-8601EN
Asphalt	*o*-Xylene	PLgel	60	5990-8493EN
Asphalt	THF	PLgel	50	5990-8494EN
Bisphenol-A, quantification	THF	PLgel	25	5990-8408EN
Bitumin	*o*-Xylene	PLgel	60	5990-8493EN
Bitumin	THF	PLgel	50	5990-8494EN
Butyl rubber	Hexane	PLgel	25	5990-6866EN
Carbomer (PAA)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 adjusted to pH 7	PL aquagel-OH	25	5990-6920EN
Carboxymethyl cellulose (CMC)	Water + 0.5 M Na_2SO_4	PL aquagel-OH	25	5991-5792EN
Carboxymethyl cellulose (CMC)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5827EN
Cellulose	DMAc + 0.5 % LiBr	PolarGel	50	5991-2517EN
Cellulose	DMSO + 0.1 % LiBr	PolarGel	50	5991-2517EN
Cellulose acetate	DMAc + 0.5 % LiCl	PLgel	60	5991-5809EN
Chitosan	Water + 0.5 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 2	PL aquagel-OH	50	5991-5786EN
Comb polymer, Polyacrylate	THF	PLgel	35	5991-2891EN
Comb polymer, rubber, synthetic	THF	PLgel	35	5991-2891EN
Corn flour	DMSO + 0.1 % LiBr	PLgel	50	5991-5772EN
Dextran	Water + 0.2 M NaH_2PO_4 + 0.2 M NaCl at pH 7	PL aquagel-OH	25	5991-5791EN
Dextran	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4	PL aquagel-OH	40	5991-5841EN
Diglycidyl ether bisphenol-A (DGEBA)	THF	PLgel	40	5991-5823EN
Emeraldine	NMP + 0.1 % LiBr	PLgel	80	5991-5814EN
Epoxy prepreg resin	THF	PLgel	25	5990-8218EN
Epoxy resin	DMF + 0.1 % LiBr	PolarGel	60	5991-5840EN
Epoxy resin oligomers	THF	PLgel	25	5990-8609EN
Epoxy resin oligomers	THF	PLgel	25	5990-8606EN
Epoxy resin oligomers	THF	PLgel	25	5990-8604EN
Epoxy resin, commercial	THF	PLgel	50	5990-8398EN
Epoxy resin, high MW	THF	PLgel	25	5990-6845EN
Ethylene vinyl acetate (EVA)	TCB + 0.015 % BHT	PLgel	160	5991-1690EN

Application	Solvent	Phase	Temperature (°C)	Publication number
Fatty acid methyl esters (FAME)	THF	PLgel	35	5991-1895EN
Fatty acid methyl esters (FAME)	THF	PLgel	25	5990-8418EN
Flavonoids	THF	PLgel	25	5991-0487EN
Fluoroelastomer	THF	PLgel	40	5991-6624EN
Gelatin	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5796EN
Glycerides	THF	PLgel	35	5991-1895EN
Glycerides	THF	PLgel	25	5990-8322EN
Glycerides	THF	PLgel	25	5990-8326EN
Gum arabic	Water + 0.01 M NaH_2PO_4 + 0.2 M $NaNO_3$ at pH 7	PL aquagel-OH	25	5991-5790EN
Hyaluronic acid	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5787EN
Hydrocarbons, linear	TCB	PLgel	145	5990-6971EN
Hydrocarbons, linear	TCB	PLgel	100	5990-8494EN
Hydrocarbons, long chain	TCB	PLgel	145	5990-6971EN
Hydrocarbons, long chain	TCB	PLgel	100	5990-8494EN
Hydrocarbons, short chain	TCB	PLgel	100	5990-8494EN
Hydroxyethyl cellulose	DMF + 0.1 % LiBr	PLgel	50	5991-4299EN
Hydroxyethyl cellulose	Water + 0.05 M NaH_2PO_4 + 0.25 M NaCl at pH 7	PL aquagel-OH	50	5991-4299EN
Hydroxyethyl cellulose, Modified	Water + 0.05 M NaH_2PO_4 + 0.25 M NaCl at pH 7	PL aquagel-OH	50	5991-5793EN
Isocyanate prepolymers	Dichloromethane	PLgel	25	5990-7984EN
Isocyanate prepolymers	THF	PLgel	25	5990-8219EN
Isocyanate resin	THF	PLgel	25	5990-6845EN
Lignin	DMF + 0.1 % LiBr	PolarGel	50	5991-5829EN
Lignin	DMSO + 0.1 % LiBr	PolarGel	50	5991-5765EN
Maltodextrins, in starch	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-2029EN
Melamine resin	DMAC + 1 % LiBr	PolarGel	50	5991-5830EN
Melamine resin	DMSO + 0.1 % LiBr	PolarGel	50	5990-6845EN
Melamine-formaldehyde resin	DMF	PLgel	80	5990-8419EN
Methyl cellulose	Water + 0.05 M NaH_2PO_4 + 0.25 M NaCl at pH 7	PL aquagel-OH	50	5991-2519EN
Natural rubber, vulcanized	Toluene	PLgel	25	5990-8407EN
Novalac	DMF	PLgel	50	5990-8486EN
Novalac	THF	PLgel	25	5990-7981EN
Novalac resin	DMF + 0.1 % LiBr	PolarGel	50	5991-5767EN
Novalac resin	DMSO + 0.1 % LiBr	PolarGel	50	5991-5766EN
Nylon	HFIP + 20 mM NaTFA	HFIPgel	40	5991-0485EN
Nylon	*m*-Cresol	PLgel	100	5991-0485EN
Nylon 6, low MW	THF	PLgel	25	5990-8423EN
Odorants, essential oils, acid esters	THF	PLgel	25	5990-7982EN
Oil, lubricant, certified 3100 MW	THF	PLgel	30	5991-4312EN
Oil, lubricant, petroleum jelly	THF	PLgel	25	5991-5820EN
Oligopin	THF	PLgel	25	5991-0487EN

Application	Solvent	Phase	Temperature (°C)	Publication number
Oligosaccharides	NMP	PLgel	80	5990-8489EN
Oligosaccharides, xylose	Water	PL aquagel-OH	25	5990-8399EN
Paint, resin, commercial	THF	PLgel	25	5990-6845EN
Pectin	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	50	5991-4086EN
Pectin	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5794EN
Petroleum jelly	THF	PLgel	25	5991-5820EN
Phenol distillate residue	Acetone	PLgel	25	5990-8421EN
Phenol-formaldehyde resin	DMF + 0.1 % LiBr	PolarGel	50	5991-5767EN
Phenol-formaldehyde resin	THF	PLgel	25	5990-7983EN
Phthalates, dialkyl, Plasticizer	THF	PLgel	25	5990-8324EN
Polacrylate, comb	THF	PLgel	35	5991-2891EN
Poloxamer	DMF + 0.1% LiBr	PLgel	70	5990-8296EN
Poly(2-vinyl pyridine)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5780EN
Poly(2-vinyl pyridine)	Water + 0.8 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 3	PL aquagel-OH	25	5991-5881EN
Poly(4-bromostyrene)	THF	PLgel	25	5991-5839EN
Poly(acrylates)	DMAc + 0.5 % LiBr	PolarGel	50	5991-2517EN
Poly(acrylates)	DMF + 0.1 % LiBr	PolarGel	50	5991-2517EN
Polyacrylonitrile (PAN)	DMF + 0.1 % LiBr	PolarGel	50	5991-2517EN
Poly(aminostyrene - vinyl pyrrolidone)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-5781EN
poly(ester-imide)	THF	PLgel	25	5990-6845EN
Poly(ethylene oxide), high MW	DMF + 0.1 % LiBr	PolarGel	50	5991-2517EN
poly(ethylene-vinyl acetate) (PEVA)	TCB + 0.015 % BHT	PLgel	160	5991-1690EN
Poly(isobornyl methacrylate) (IBMA)	THF	PLgel	25	5991-5819EN
poly(lactic-co-glycolic acid) (PLGA)	Chloroform	PLgel	25	5990-8401EN
poly(lactic-co-glycolic acid) (PLGA)	THF	PLgel	40	5991-5776EN
Poly(methyl vinyl ether-maleic acid)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7 or pH 9 as appropriate	PL aquagel-OH	25	SI-01965
Poly(methyl vinyl ether-maleic acid) alkyl esters	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7 or pH 9, as appropriate	PL aquagel-OH	25	5991-5799EN
Poly(*n*-isopropylacrylamide) (PNIPAM)	THF + 5 % TEA	PLgel	40	5991-5834EN
Poly(styrene-isoprene) Block Copolymer	THF	PLgel	25	5990-8228EN
Poly(styrene butadiene) Copolymer (SBR)	THF	PLgel	40	5991-5771EN
Poly(vinyl chloride) (PVC)	THF	PLgel	25	5991-5813EN
Poly(vinylidene fluoride) (PVDF)	DMSO	PLgel	95	5990-8328EN
Polyacrylamide (PAM)	Water + 0.05 M Na_2SO_4 at pH 3	PL aquagel-OH	25	5991-5789EN
Polyacrylamide (PAM)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	40	5991-5773EN
Polyacrylic acid (PAA)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-5783EN
Poly-alpha-olefin (PAO)	TCB + 0.015 % BHT	PLgel	160	5990-6971EN
Polyamide	HFIP + 20 mM NaTFA	HFIPgel	40	5990-7978EN
Polyaniline	NMP + 0.1 % LiBr	PLgel	80	5991-5814EN
Polyanion, acrylic acid, sodium salt	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-5783EN

Application	Solvent	Phase	Temperature (°C)	Publication number
Polyanion, polyacrylamide	Water + 0.05 M Na_2SO_4 at pH 3	PL aquagel-OH	25	5991-5789EN
Polyanion, polystyrene sulfonate	80 % [Water + 0.3 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 9] + 20 % Methanol	PL aquagel-OH	25	5991-5778EN
Polybromostyrene	THF	PLgel	25	5991-5839EN
Polybutadiene	THF	PLgel	40	5991-5833EN
Polybutylene Terephthalate (PBT)	HFIP + 20 mM NaTFA	HFIPgel	40	5990-8220EN
Polybutyrate resin	THF	PLgel	25	5990-8602EN
Polycaprolactam	HFIP + 20 mM NaTFA	HFIPgel	40	5991-0485EN
Polycaprolactam	*m*-Cresol	PLgel	100	5991-0485EN
Polycaprolactam, low MW	THF	PLgel	25	5990-8423EN
Polycarbonate	Dichloromethane	PLgel	25	5990-7894EN
Polycarbonate	THF	PLgel	40	5991-5822EN
Polycation, poly(2-vinyl pyridine)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5780EN
Polycation, poly(2-vinyl pyridine)	Water + 0.8 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 3	PL aquagel-OH	25	5991-5881EN
Polycation, poly(aminostyrene-vinyl pyrrolidone)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-5781EN
Polycation, polyacrylamide	Water + 0.05 M Na_2SO_4 at pH 3	PL aquagel-OH	25	5991-5789EN
Polydimethyl siloxane (PDMS)	Toluene	PLgel	25	5990-7893EN
Polyester	THF	PLgel	50	5991-5775EN
Polyester, adipate resin	THF	PLgel	25	5990-8602EN
Polyester, polyol resin	THF	PLgel	25	5990-8325EN
Polyether ethyl ketone (PEEK)	80 % Chloroform + 20 % Dichloroacetic acid	PLgel	25	5990-8422EN
Polyether sulfone	DMF + 0.1 % LiBr	PLgel	60	5991-5811EN
Polyetherimide (PEI)	DMF + 0.1 % LiBr	PLgel	60	5990-8222EN
Polyethylene	TCB + 0.0 15 % BHT	PLgel	160	5991-5826EN
Polyethylene	TCB + 0.0 15 % BHT	PLgel	160	5990-6971EN
Polyethylene glycol (PEG)	DMF + 0.1 % LiBr	PLgel	50	5991-5825EN
Polyethylene glycol (PEG)	Water	PL aquagel-OH	25	5990-6920EN
Polyethylene glycol (PEG), branched	DMF + 0.1 % LiBr	PLgel	50	5991-5825EN
Polyethylene glycol, star	70 % [Water + 0.2 M $NaNO_3$ +0.01 M NaH_2PO_4] + 30 % methanol	PL aquagel-OH	25	5991-5798EN
Polyethylene terephthalate (PET)	4-Chlorophenol	PLgel	100	5991-5806EN
Polyethylene terephthalate (PET)	2-Chlorophenol	PLgel	100	5991-4707EN
Polyethylene, branched	TCB + 0.015 % BHT	PLgel	160	5991-2517EN
Polyethylene, LDPE	TCB + 0.015 % BHT	PLgel	160	5991-2781EN
Polyethylene, linear	TCB + 0.015 % BHT	PLgel	160	5990-8494EN
Polyethylene, linear, Metallocene (mPE)	TCB + 0.015 % BHT	PLgel	160	5991-2781EN
Polyhydroxyalkanoate (PHA)	Chloroform	PLgel	25	5991-0486EN
Polyhydroxybutyrate (PHB)	Chloroform	PLgel	50	5991-5641EN
Polyhydroxybutyrate (PHB)	Chloroform	PLgel	25	5991-0486EN
Polyisocyanate	Dichloromethane	PLgel	25	5990-7984EN
Polyisoprene	THF	PLgel	40	5990-6866EN

Application	Solvent	Phase	Temperature (°C)	Publication number
Polyisoprene	Toluene	PLgel	50	5990-6866EN
Polyisoprene, natural latex	Toluene	PLgel	50	5990-6920EN
Polylactic acid (PLLA)	THF	PLgel	40	5991-5776EN
Polymethacrylate, linear	THF	PLgel	35	5991-2891EN
Polyol	THF	PLgel	25	5990-7986EN
Polyol, prepolymer resin	THF	PLgel	40	5991-5770EN
Polyphenol	THF	PLgel	25	5991-0487EN
Polyphenylene sulphide (PPS)	1-Chloronaphthalene	PLgel	210	5991-5570EN
Polypropylene	TCB + 0.015 % BHT	PLgel	160	5990-8494EN
Polypropylene, commercial	TCB + 0.015 % BHT	PLgel	160	5990-6971EN
Polysaccarides	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4	PL aquagel-OH	40	5991-5841EN
Polysaccarides, corn flour	DMSO + 0.1 % LiBr	PLgel	50	5991-5772EN
Polysaccarides, xylose oligomers	Water	PL aquagel-OH	25	5990-8399EN
Polysaccharides	NMP	PLgel	80	5990-8489EN
Polysiloxane, commercial	THF	PLgel	40	5990-7897EN
Polysiloxane, commercial	Toluene	PLgel	40	5990-7897EN
Polyster resin	THF	PLgel	25	5990-6845EN
Polystyrene	THF	PLgel	25	5991-5803EN
Polystyrene sulfonate	80 % [Water + 0.3 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 9] + 20 % Methanol	PL aquagel-OH	25	5991-5778EN
Polystyrene, oligomers	THF	PLgel	25	5990-8323EN
Polystyrene, oligomers	THF	PLgel	25	5990-8607EN
Polystyrene, star branched	THF	PLgel	40	5991-5837EN
Polysulfone	DMF + 0.1 % LiBr	PLgel	60	5991-5811EN
Polythiophene (PT)	TCB + 0.015 % BHT	PLgel	120	5991-5828EN
Polyurethane	THF	PLgel	25	5990-8229EN
Polyurethane copolymer	DMAc + 0.02 % LiBr	PLgel	60	5990-8495EN
Polyurethane resin	Dichloromethane	PLgel	25	5990-8600EN
Polyurethane resin	THF	PLgel	25	5990-7892EN
Polyurethane, high MW	DMAc + 0.5 % LiBr	PolarGel	50	5991-2517EN
Polyurethane, high MW	DMF + 0.1 % LiBr	PLgel	60	5991-5812EN
Polyvinyl acetate (PVAc)	THF	PLgel	25	5991-5805EN
Polyvinyl alcohol (PVA) (PVOH)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5780EN
Polyvinyl alcohol (PVA) (PVOH)	Water + 0.25 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5788EN
Polyvinyl alcohol (PVA) (PVOH), acetylated	THF	PLgel	25	5991-5805EN
Polyvinyl alcohol (PVA) (PVOH), hydrophobic modified, surfactant	DMSO + 0.1 % LiBr	PLgel	60	5991-5838EN
Polyvinyl butyral (PVB)	THF	PLgel	25	5991-5835EN
Polyvinylpyrrolidone (PVP)	DMAc + 0.5 % LiCl	PLgel	60	5991-5808EN
Polyvinylpyrrolidone (PVP)	DMF + 0.1 % LiBr	PLgel	60	5991-5807EN
Polyvinylpyrrolidone (PVP)	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 3	PL aquagel-OH	25	5991-5784EN

Application	Solvent	Phase	Temperature (°C)	Publication number
Proanthocyanidin	THF	PLgel	25	5991-0487EN
Pullulan	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4	PL aquagel-OH	40	5991-5841EN
PVC plastic	THF	PLgel	25	5990-8392EN
Resol	DMF	PLgel	50	5990-8486EN
Resol	THF	PLgel	25	5990-7983EN
Silicone	Toluene	PLgel	25	5990-8490EN
Silicone, commercial	THF	PLgel	40	5990-7897EN
Silicone, commercial	Toluene	PLgel	40	5990-7897EN
Sodium polyacrylate	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-5783EN
Starch	DMSO:DMAc (4:1) + 0.1% LiBr	PLgel	60	5991-5831EN
Starch	NMP	PLgel	80	5990-8489EN
Starch, corn	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-5768EN
Starch, potato	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4, adjusted to pH 7	PL aquagel-OH	25	5991-5768EN
Styrene butadiene rubber (SBR)	THF	PLgel	40	5990-8405EN
Surfactant, enhanced oil recovery, polyacrylamide	Water + 0.05 M Na_2SO_4 at pH 3	PL aquagel-OH	25	5991-5789EN
Surfactant, modified Polyvinyl alchol	DMSO + 0.1 % LiBr	PLgel	60	5991-5838EN
Surfactant, Poloxamer, Poly(PEG-PPG-PEG)	DMF + 0.1 % LiBr	PLgel	70	5990-8296EN
Tannins	THF	PLgel	25	5991-0487EN
Tar, petroleum	*o*-Xylene	PLgel	60	5990-8493EN
Tar, petroleum	THF	PLgel	25	5991-0518EN
Tar, petroleum	THF	PLgel	50	5990-8494EN
Tar, phenol distillate residues	Acetone	PLgel	25	5990-8421EN
TINUVIN, light stabilizer, additive	THF	PLgel	40	5991-4284EN
Triacetate, cellulose triacetate	DMAc + 0.5 % LiCl	PLgel	60	5991-5809EN
Ultem (PEI)	DMF + 0.1 % LiBr	PLgel	60	5990-8222EN
Varnish, soya oil, dried	THF	PLgel	25	5990-8491EN
Vinyl, PVC plastic	THF	PLgel	25	5990-8392EN
Vitaflavan	THF	PLgel	25	5991-0487EN
Wax, beeswax	THF	PLgel	25	5990-8488EN
Wax, microcrystalline, Hydrocarbon	THF	PLgel	25	5990-8488EN
Wax, parrafin	TCB	PLgel	160	5990-6971EN
Wax, parrafin	TCB	PLgel	100	5990-8494EN
Xanthan gum	Water + 0.2 M $NaNO_3$ + 0.01 M NaH_2PO_4 at pH 7	PL aquagel-OH	25	5991-5785EN
Xylooligosaccharide	Water	PL aquagel-OH	25	5990-8399EN

Conclusions

- Exact column choice must also include consideration of MW range and temperature stability, found in each chemistry's respective brochure. Columns chosen in applications were chosen based on the sample in question and these parameters.
- Polymers not found in the table can be investigated by testing their solubility in the common solvent systems used here, using a polymer with similar structure and polarity as a starting point.
- Low MW polymers are soluble in a wide variety of solvents at low temperatures. The presence of any high molecular weight polymer can greatly reduce its solubility. Dissolution is improved with longer times, higher temperatures, and solvents with polarity similar to the polymer. Gentle shaking is recommended, but high shear mixing and sonication will degrade samples.
- Stabilizers must always be used in THF to prevent degradation of the analytes and column media by peroxides formed in air. Similarly, stabilizers must be employed at elevated temperatures, or with high MW analytes and calibrants, to prevent degradation. BHT at concentrations of 0.1 g/L (0.015 %) is recommended.
- Chlorinated solvents such as chloroform and dichloromethane (methylene chloride) decompose in UV, and react slowly with atmospheric moisture and oxygen. Byproducts, such as phosgene, are toxic and corrosive to steel. Commercial stabilizers (amylene) are often not adequate [1], and stabilization with 1 % alcohol is preferred.
- Addition of salts to aqueous and polar organic solutions is the preferred method to eliminate polar interactions by electrostatic screening. Salts should be flushed from the system after analysis.
- Lewis bases such as polyamines and polyamides may interact with polymeric media, but this can be eliminated by the addition of an amine to the mobile phase, such as triethylamine (TEA).

Reference

1. Turk, E. Phosgene from chloroform. *Chemical & Engineering News* **2 Mar 1998**, *Vol. 76, No. 9*, pp. 6. http://pubs.acs.org/cen/safety/19980302.html

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Published in the USA, March 24, 2016
5991-6802EN

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