

## AMBERCHROM™ CG71 Chromatographic Grade Resin For Chromatographic Purification

### Description

AMBERCHROM chromatographic media are macroporous, polymeric resins useful for adsorption and reversed phase liquid chromatography. They are designed for laboratory and process scale purifications of proteins, peptides, nucleic acids, antibiotics, and small molecular weight pharmaceuticals.

AMBERCHROM CG71 chromatographic grade resin is an insoluble aliphatic (acrylic ester) polymer manufactured for high value chromatographic applications. Its high surface area, unique pore size and pore volume distribution make it ideally suited for separation of peptides. It is the most hydrophilic AMBERCHROM chromatographic resin.

AMBERCHROM CG71 has high capacity for many pharmaceutical compounds and has been commercially proven for many years. It is an excellent technical and economical alternative to RPC silica, and can be used in high resolution, low pressure chromatography.

AMBERCHROM CG71 is suitable for use in many pharmaceutical applications in the front end capture, purification, and desalting modes of operation depending on the particle size selected.

AMBERCHROM CG71 is available in three different particle size ranges (35, 75, and 120 microns), and is supplied as a slurry in 20% ethanol.

AMBERCHROM CG71 is ideally suited for operation within the entire pH range, and can be easily cleaned in place (CIP) with most organic solvents and dilute acids and bases.

### Regulatory Status

A Material Regulatory Support (MRS) package is developed for AMBERCHROM CG71 resin users requiring assistance in supporting use of the resin in regulated applications. It is developed under CDA with users of this product and tailored to the customer's process parameters.

This material is manufactured under strict controls, and plant audits by potential customers are welcomed.

### Clean in Place

Unlike RPC silica, AMBERCHROM CG71, due to its polymeric nature and lack of bonded phase, can be cleaned in place (CIP) with most organic solvents and low concentrations of acids and bases. As the graph below demonstrates, there is no loss in capacity for insulin after prolonged exposure to 0.5 M NaOH. Tests spanned 180 days at ambient temperature and 100 days at 60°C.

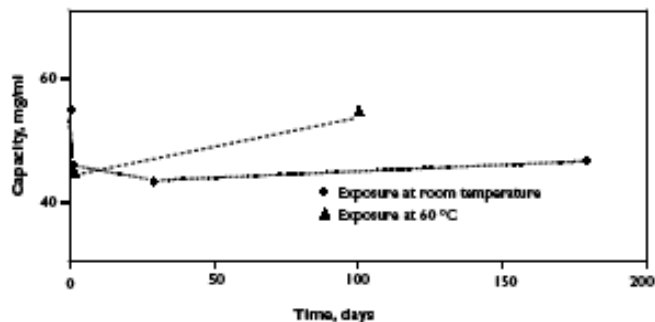


Figure 1: Insulin Adsorption

In addition to the excellent chemical resistance of AMBERCHROM CG71, it also exhibits low swelling in common solvents as shown below:

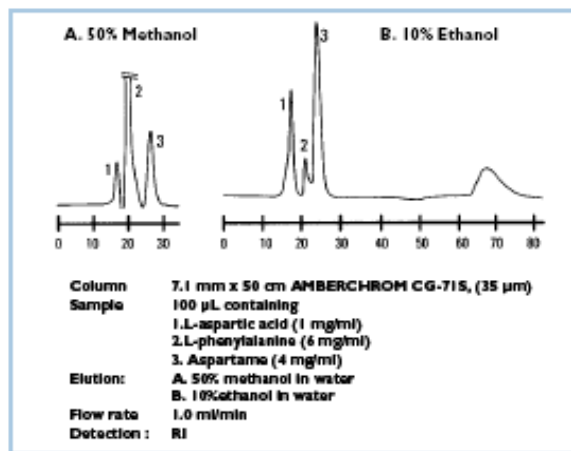
Solvent	Swelling
Water	100
Methanol	102
Ethanol	105
Isopropanol	107
Acetonitrile	107
Acetone	106
Toluene	104
Dry	57

### Separation Strategies for Small Peptides

An application that demonstrates the advantages of the hydrophilic resin, AMBERCHROM CG71, is the purification of the small peptide, aspartame, from its precursors(8), shown below.

The hydrophilic AMBERCHROM CG71 resin provides excellent results with high polarity aqueous alcoholic eluents. Although 50 percent methanol provided a quicker run time, 10 percent ethanol provided the highest solubility and loading of the mixture.

For comparison, the polystyrene based resins AMBERCHROM CG161 and AMBERCHROM CG1000 often work better with acetonitrile/water eluents.



**Figure 2: Purify Peptides with AMBERCHROM CG71**

For small polar molecules such as amino acids, carboxylic acids, alcohols, ethers and dipeptides, the capacity factors,  $k'$ , with AMBERCHROM CG71 resin are listed in the table below. In general, non-aromatic amino acids are eluted quickly in water. When 10 percent ethanol is the eluent, instead of water, the retention times of weakly retained species increase and retention times of strongly held species decrease.

These data suggest that a shallow gradient from water to aqueous ethanol will effectively separate many non-aromatic species from aromatic species.

Capacity Factors For Selected Solutes: AMBERCHROM CG71

Compound	In Water	In 10% Ethanol
NaCl	0	0
Fumarate, disodium	0	-
L-Aspartic acid	0	0.13
Glutathione	0	0.108
L-Lysine	0.018	-
L-Glutamic acid	0.021	0.1
L-Cystine	0.023	-
Diglycine HCl	0.026	-
L-Arginine	0.028	-
L-Alanine	0.031	-
Glycine	0.038	0.037
Cellobiose	0.041	0.066
L-Asparagine	0.041	0.161
L-Serine	0.044	0.056
L-Hydroxyproline	0.046	0.111
L-Proline	0.048	0.000
Glucose	0.051	0.069
Fructose	0.067	0.140
Citric acid	0.100	0.244
L-Valine	0.107	-
L-Isoleucine	0.197	-
L-Methionine	0.225	0.323
L-Leucine	0.230	0.220
Methanol	0.238	0.196
Glycine anhydride	0.263	0.257
Ethanol	0.494	0.302
L-Tyrosine	0.618	-
L-Phenylalanine	0.829	0.614
Succinic acid	1.40	0.896
t-Butanol	1.89	0.331
L-Tryptophan	4.40	1.770
Aspartame	Did not elute*	3.600
Benzoic Acid	Did not elute*	6.930

## IR Spectrum of AMBERCHROM CG71

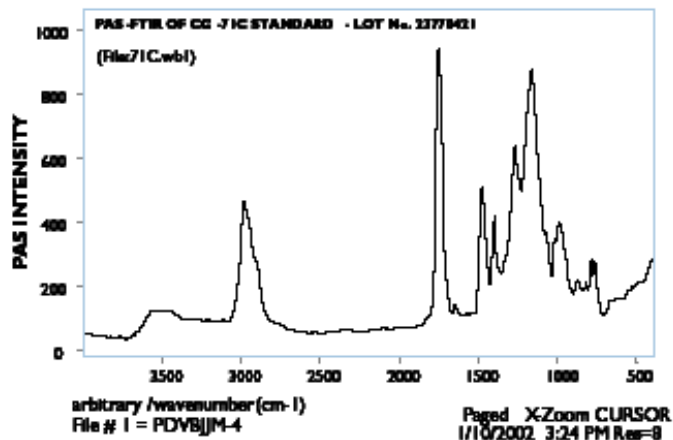


Figure 3: AMBERCHROM CG71 IR Spectrum

### Typical Physical Properties

These properties are typical but do not constitute specifications.

Matrix	Acrylic ester macroreticular adsorbent
Functional groups	None
Physical form	Opaque white beads
Shipping solvent	20% ethanol
Surface area	500 m <sup>2</sup> /g
Pore size <sup>[1]</sup>	250 Å
Mean diameter	S grade: 35 microns M grade: 75 microns C grade: 120 microns
Uniformity coefficient	1.7
Chemical resistance	Insoluble in dilute solutions of acids or bases and common solvents: IPA, ACN, MeOH.

<sup>[1]</sup> Test methods are available on request.

### Selected References

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- Strategies for Optimizing Peptide Purifications Using AMBERCHROM CG300S; Kinzey, M.; Deissler, K.; Fisher, J.; Maikner, J.; Kraus, M.; Rosen, R.; European Forum on Advances in Industrial Downstream Processing; May 13-15, 1998, Stuttgart, Germany.
- Process Economics Aspects of RPC Purification; Kinzey, M.; Kraus, M.; Fisher, J.; Maikner, J.; Rosen, R.; 3rd HIC/RPC Bioseparations Conference; February 5-9, 2001; Athens, Greece.

## Ordering Information

Part Number	Description	Particle Size	Packaging
10235573	AMBERCHROM CG71S	35 µm	25 ml
10235574	AMBERCHROM CG71S	35 µm	100 ml
10235575	AMBERCHROM CG71S	35 µm	1000 ml
10097851	AMBERCHROM CG71S	35 µm	5 L
10097850	AMBERCHROM CG71S	35 µm	50 L
10235576	AMBERCHROM CG71M	75 µm	25 ml
10235577	AMBERCHROM CG71M	75 µm	100 ml
10235578	AMBERCHROM CG71M	75 µm	1000 ml
10097855	AMBERCHROM CG71M	75 µm	5 L
10097854	AMBERCHROM CG71M	75 µm	50 L
10235579	AMBERCHROM CG71C	120 µm	25 ml
10235580	AMBERCHROM CG71C	120 µm	100 ml
10235581	AMBERCHROM CG71C	120 µm	1000 ml
10097859	AMBERCHROM CG71C	120 µm	5 L
10097858	AMBERCHROM CG71C	120 µm	50 L

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