

High Performance Packed Column for HPLC

CoreFocus

ShimOMNIA Chiral [Polysaccharide] Series

Amylose, Cellulose, iAmylose and iCellulose

INSTRUCTION MANUAL

■ Introduction

ShimOMNIA Chiral [Polysaccharide] Series are based on cellulose or amylose chiral stationary phase designed specifically for separation of enantiomers. To maintain and maximize peak performance of ShimOMNIA Chiral Series, and to ensure the long life and stability of columns, please read the following instructions before use.

■ Operating Precautions

Inspect the column for any missing parts or damage. If there are any signs of damage, notify your local Shimadzu representative at once.

Each ShimOMNIA Chiral [Polysaccharide] Series column is individually tested and includes a Column Performance Report. The report includes the column lot number, column serial number, and chromatographic test conditions. Please keep the report for future reference.

■ Column Performance

The ShimOMNIA Chiral [Polysaccharide] Series undergo rigorous QC testing to ensure quality and stability. Please refer to Column Performance Report for information on column shipping solvent.

■ Column Installation

Before installation of column, flush LC system pump and line with mobile phase (HPLC grade and miscible with column shipping solvent). Use PEEK or SUS tubing with an inner diameter of 0.25 - 0.3 mm and an outer diameter of 1.6 mm (1/16"). Never use PEEK tubing with Tetrahydrofuran (THF), chloroform, hexafluoroisopropanol (HFIP), concentrated sulfuric acid, concentrated nitric acid, dichloroacetic acid, acetone, dichloromethane or dimethyl sulfoxide (DMSO) as the mobile phase. Use the shortest possible tubing connection from the injector to the column to minimize peak broadening. The column should be connected with PEEK or SUS fittings. Ensure that the fittings are installed properly to avoid creating dead volume between the tubing and the column interface. Refer to the table below for PEEK and SUS fitting options.

Item Name	P/N	Remarks	Pressure Limit
PEEK Nut fitting	226-50106-02	2 pcs	82 MPa
UHPLC Fitting fingertight	226-50104-02	2 pcs	172 MPa
UHPLC Fitting Hex Nut	226-50100-02	2 pcs	172 MPa

NOTE

Particulates or air in the system flow line may deteriorate the column. Before connecting the column, be sure to filter all solvents and flush the flow line up to the column with mobile phase.

When installing the column, ensure that the flow direction arrow matches the mobile phase flow direction. The flow direction of the column is indicated by an arrow on the column label (→). Set flow rate to 0.1 ml/min (for 2.1 – 4.6 mm ID) and install the column. Then increase the flow rate to 0.2 ml/min (2.1 mm ID) or 1.0 ml/min (4.6 mm ID) for 5-10 min. Collect solvent in a small beaker. Stop flow and wipe the column outlet end. Remove any particulates before connecting to the detector. Install fitting/tubing into outlet end and run minimum 10 column volumes of mobile phase at low flow rate (approximately 0.2 ml/min) while monitoring back pressure. Column is ready for use when pressure and detector signal is stable.

Be sure to use appropriate internal diameter and length of tubing at the injector and detector, especially when using semi-micro size columns, to avoid dead volumes. If peaks are tailing more on the early eluting compounds than later eluting compounds, there is a possibility that there is a dead volume. In such case, check that all column connections are properly connected.

For SFC applications, install column in the SFC instrument column oven compartment. Set the SFC instrument back pressure regulator between 8-10 MPa and equilibrate the column with a minimum of 10 column volumes of the SFC mobile phase before use. A good starting choice as a SFC mobile phase is CO₂/MeOH or CO₂/EtOH (80:20) with or without additives. Optimal flow rate for 4.6 mm ID columns is between 3-6 mL/min. We recommend increasing the flow rate gradually to 3 mL/min to prevent back pressure going above 30 MPa.

■ Column Handling Precautions

To avoid damage to the column and prevent deterioration in performance, do not drop or bump the column. To maximize column life, use the column within the pressure limit. The column maximum pressure limit can be found on the column performance report which comes with the column.

ShimOMNIA Chiral Amylose and Cellulose chiral stationary phase are prepared by coating the silica with polysaccharide derivative. Therefore, any solvent that can dissolve the polysaccharide derivative such as ethers (including THF), acetone, chlorinated solvents, ethyl acetate, DMSO, DMF, N-methyl formamide, toluene, ketones, dimethylacetamide and IPA > 50% must be avoided even in trace amounts.

ShimOMNIA Chiral iAmylose and iCellulose are immobilized stationary phases with increased column robustness. They are capable of tolerating strong organic solvents such as DMSO, DCM, ethyl acetate, MtBE and THF as mobile phase.

ShimOMNIA Chiral columns will deliver consistent results when using mobile phase containing additives at concentration indicated below.

Normal Phase
Mixture of hexane or heptane with alcohol (EtOH/IPA = 80:20). Vary alcohol composition to adjust retention time and selectivity. Add 0.1 – 0.5% TFA or acetic acid for acidic analytes. Add 0.1 – 0.5% diethylamine or triethylamine for basic analytes.
Polar Organic
Mixture of acetonitrile/IPA (95:5) or MeOH/IPA (90:10) or acetonitrile. Add 0.1 – 0.5% TFA or EtOH for acidic analytes. Add 0.1 – 0.5% diethylamine or triethylamine for basic analytes.
Reversed Phase
Acetonitrile or MeOH or EtOH / water mixture. Water content must be < 85%. Add HClO ₄ /NaClO ₄ buffer together with acetonitrile for acidic analytes. Add 0.5 – 1 N perchlorate or 0.1% TFA for basic analytes.

■ Specifications

The product specifications of ShimOMNIA Chiral [Polysaccharide] series columns are as follows:

Column	Bonded Phase	Max Temp	pH range
Amylose-1	Amylose tris-(3,5-dimethylphenylcarbamate)	50 °C	2-8
Amylose-4	Amylose tris-(3-chloro-4-methylphenylcarbamate)		
Amylose-9	Amylose tris-(5-chloro-2-methylphenylcarbamate)		
Amylose-12	Amylose tris-[(S)- α -methylbenzylcarbamate]		
Cellulose-1	Cellulose tris-(3,5-dimethylphenylcarbamate)		
Cellulose-4	Cellulose tris-(3-chloro-4-methylphenylcarbamate)		
Cellulose-7	Cellulose tris-(4-chloro-3-methylphenylcarbamate)		
Cellulose-10	Cellulose tris-(4-methylphenylcarbamate)		
Cellulose-11	Cellulose tris-(phenylcarbamate)		
Cellulose-13	Cellulose tris-(4-methylbenzoate)		
Cellulose-14	Cellulose tribenzoate		
iAmylose-1	Amylose tris-(3,5-dimethylphenylcarbamate)		
iAmylose-2	Amylose tris-(3,5-dichlorophenylcarbamate)		
iAmylose-3	Amylose tris-(3-chlorophenylcarbamate)		
iAmylose-4	Amylose tris-(3-chloro-4-methylphenylcarbamate)		
iAmylose-5	Amylose tris-(3-chloro-5-methylphenylcarbamate)		
iCellulose-1	Cellulose tris-(3,5-dimethylphenylcarbamate)		
iCellulose-2	Cellulose tris-(3,5-dichlorophenylcarbamate)		
iCellulose-6	Cellulose tris-(3-chloro-4-methylphenylcarbamate)		
iCellulose-7	Cellulose tris-(4-chloro-3-methylphenylcarbamate)		
iCellulose-8	Cellulose tris-(Phenylcarbamate)		

■ Solvent Switching

ShimOMNIA Chiral columns can be used either in normal phase (NP) mode, reversed phase (RP) mode, supercritical fluid chromatography (SFC) mode or with polar organic solvent. To switch between modes, please follow the procedures below:

Normal Phase to Polar Organic or Reversed Phase

Set the flow rate to 0.5 mL/min. Flush the column with 10 column volume of 2-propanol/ethanol (90:10). Condition the column with at least 10 column volumes of the new mobile phase.

** If the salt in your reversed phase mobile phase is insoluble in methanol and/or ethanol, flush column briefly with water before conditioning with 10 column volumes of new mobile phase.

Reversed Phase to Normal Phase

Once a ShimOMNIA Chiral column is in reversed phase mode, it is not recommended to switch back to normal phase mode.

Polar Organic to Normal Phase

Once a ShimOMNIA Chiral column is in polar organic mode, it is not recommended to switch back to normal phase mode.

■ Storage of Columns

For short-term storage (1-2 days), the column can be stored in the mobile phase, however, remove any buffer or additives prior to storage by flushing the column with the mobile phase composition without the buffer or additives.

For long-term storage:

If the column is in reversed phase mode, store in acetonitrile/water (85:15).

If the column is in normal phase mode, store in n-hexane:2-propanol (90:10).

If column is in SFC mode, store in 100% Methanol.

■ Disposal Precautions

When disposing of the column, do so in accordance with your local processing standards determined by law, which may be separate from general industrial waste and household garbage requirements.

■ Technical Support

ShimOMNIA Chiral series are manufactured, inspected, packaged, and shipped under strict standards of quality control. Should you find any defect in performance, please contact your local Shimadzu representative for assistance, who will ensure your complete satisfaction.

We regret that we cannot guarantee the lifetime of columns and cannot accept any claim when performance deteriorated due to noncompliance with the operating procedures elucidated above, or as a result of normal aging.