ChiralTek
Solutions for Chiral Separations & Sample Preparations

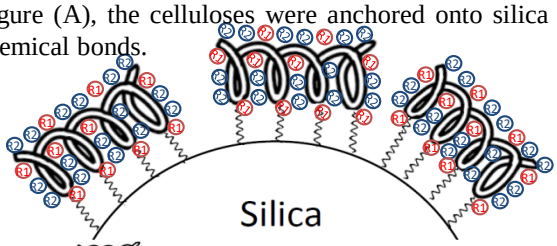
Short User Manual for ChiralCE-4 Columns

Please visit English website http://chiraltek-column.com/Downloads.php for downloading the full product manual and application notes for the ChiralCE columns.

All ChiralCE columns have been passed the quality control tests. Please kindly refer to the "Certificate of Quality Control Analysis" for information about the testing results. The column was stored in Hexane/EtOH (99:1, *v/v*) before delivery. Please carefully read this user manual before using the ChiralCE column.

1. Unique Characteristics for ChiralCE columns

ChiralCE columns are a new type of chemically-modified cellulose-immoblilized silica particles-packed chiral columns. The ChiralCE particles were prepared through a specially-designed one-step reaction procedure by bonding the different functional groups-substituted celluloses onto surface of high-quality porous silica (2, 3, 5, or 10 µm). Therefore, high column efficiency can be easily achieved on the ChiralCE columns. As shown in Figure (A), the celluloses were anchored onto silica via chemical bonds.

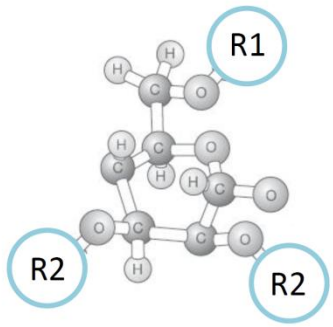


represents chemically-modified cellulose
represents ChiralTek proprietary group R1
represents another functional group R2
represents spacer arm with sigma bonds

ChiralCE-1：R2= Phenylcarbamate;
ChiralCE-2：R2= 3,5-Dimethylphenylcarbamate;
ChiralCE-3：R2= 3-Chloro-4-methyl-phenylcarbamate;
ChiralCE-4：R2= 3,5-Dichlorophenylcarbamate;
ChiralCE-5：R2= 3-Chloro-5-methyl-phenylcarbamate;
ChiralCE-6：R2= (S)-α-Methylbenzylcarbamate;
ChiralCE-7：R2= 4-Methylbenzoate;
ChiralCE-8：R2= 4-Methylphenylcarbamate;
ChiralCE-9：R2= 4-Chloro-3-methyl-phenylcarbamate;
ChiralCE-10：R2= 5-Chloro-2-methyl-phenylcarbamate;
ChiralCE-11：R2= 3-Chloro-2-methyl-phenylcarbamate;
ChiralCE-12：R2= 4-Chlorophenylcarbamate.
ChiralCE-13：R2= 3-Chlorophenylcarbamate.

Figure (A). Schematic diagram of the ChiralCE phase

The chemical structure of the chiral selectors of ChiralCE phases are different from other supplier's cellulose-based phases. The typical structure of the immobilized cellulose selector unit in ChiralCE columns is showed in the following Figure (B). Since the novel ChiralCE phases from ChiralTek have higher content of the immobilized celluloses and contain more types of functional groups, the ChiralCE columns can provide different and generally better chiral separation abilities than other supplier's cellulose-immobillized columns.



R1 is a ChiralTek proprietary chiral group;
R2 is another common functional group.

Figure (B). Typical structure of general chiral selector unit of the ChiralCE phases

2. Application and Requirements

The ChiralCE columns can be used under multiple modes conditions. For use under reversed-phase conditions, the columns need to be firstly flushed with methanol following by mobile phase until reaching a constant column pressure. Similarly, for normal phase conditions, the columns need to be flushed with isopropanol following by mobile phase until achieving a stable baseline signal. A ChiralCE or C18 guard column can be used for reversed-phase conditions and a ChiralCE or Diol guard column can be used for normal phase conditions. If non-standard mobile phases are to be used, please contact ChiralTek for technical support.

When using ChiralCE columns with 2 µm and 3 µm particles, low flow rate (e.g., 0.1-0.3 mL/min) should be applied when used in traditional HPLC with highly viscous mobile phases in order to avoid high back pressure. However, there is no special flow rate limitation for use in UPLC and SFC.

Flow direction:	Arrow direction on the label
Pressure:	< 860 bar (~12500 psi , 2 µm, 3 µm)
	< 600 bar (~9000 psi , 5 µm, HPLC)
Temperature:	0 – 40 °C
Guard column:	ChiralCE, C18 or Diol column
Mode:	HPLC, SFC, or UPLC

3. Care and Maintenance of the ChiralCE Columns

[1] It is strongly recommended to use ChiralCE, C18 or Diol guard columns to protect the ChiralCE columns;
[2] It'd better to resolve samples in mobile phases and filter through 0.5µm membrane before injection;
[3]The solvent in the ChiralCE-4 columns should be replaced with Hexane/EtOH (99:1, v/v) if the columns need to be stored for over a week's time.
[4] The ChiralCE columns can be easily cleaned by flushing with 100% methanol (reversed phase conditions) or 100% IPA (normal phase conditions) at a proper flow rate for 3 hours.
[5]When worked in high pressure conditions, it's strongly recommended to gradually decrease flow rate to ensure column pressure lower than 100 bar (~1450 psi) before switching off the chromatograph pump.

4. Notice and Other Considerations

[1] The ChiralCE columns can be used under normal phase, reversed phase, and polar organic mobile phase conditions. It is strongly recommended to use 100% IPA as intermediate solvent when switching between different mobile phase conditions. Due to the high viscosity of the IPA, a low flow rate of about 0.1 mL/min should be applied in traditional HPLC in order to avoid extreme high pressure. However, there is no special flow rate limitation for UPLC.
[2]Diethylamine, butylamine, or amino ethyl alcohol (0.1%) can be used as mobile phase additives for basic compounds.
[3] Formic acid, acetic acid, or trifluoroacetic acid (0.1%) can be used as mobile phase additives for acidic compounds.
[4] Since the strong alkalic compounds (e.g., NaOH etc.) can cause damages to the ChiralCE column bed, they cannot be used as mobile phase additives or sample solution additives.

5. List of the ChiralCE Columns with Different Specifications

Product List of Some ChiralAM Immobilized Columns from ChiralTek

Part Number	*Type*	*Dimension*	*Description*
812-CE1-01	ChiralCE-1	2μm, 120Å, 50 × 2.1mm	2μm Phenylcarbamate-cellulose immobilized CE-1column
8512-CE2-02	ChiralCE-2	2μm, 500Å, 100 × 2.1mm	2μm 3,5-Dimethylphenylcarbamate-cellulose immobilized CE-2 column
8912-CE3-03	ChiralCE-3	2μm, 1000Å, 150 × 2.1mm	2μm 3-Chloro-4-methylphenylcarbamate-cellulose immobilized CE-3 column
8513-CE4-04	ChiralCE-4	3μm, 500Å, 200 × 2.1mm	3μm 3,5-Dichlorophenylcarbamate-cellulose immobilized CE-4 column
8513-CE5-01	ChiralCE-5	3μm, 500Å, 50 × 2.1mm	3μm 3-Chloro-5-methylphenylcarbamate-cellulose immobilized CE-5 column
8513-CE6-02	ChiralCE-6	3μm, 500Å, 100 × 2.1mm	3μm (S)-α-Methylbenzylcarbamate-cellulose immobilized CE-6 column
8513-CE7-61	ChiralCE-7	3μm, 500Å, 50 × 4.6mm	3μm 4-Methylbenzoate-cellulose immobilized CE-7 column
8513-CE8-62	ChiralCE-8	3μm, 500Å, 100 × 4.6mm	3μm 4-Methylphenylcarbamate-cellulose immobilized CE-8 column
8513-CE9-03	ChiralCE-9	3μm, 500Å, 150 × 2.1mm	3μm 4-Chloro-3-methylphenylcarbamate-cellulose immobilized CE-9 column
8513-CE10-04	ChiralCE-10	3μm, 500Å, 200 × 2.1mm	3μm 5-Chloro-2-methylphenylcarbamate-cellulose immobilized CE-10 column
8513-CE11-05	ChiralCE-11	3μm, 500Å, 250 × 2.1mm	3μm 3-Chloro-2-methylphenylcarbamate-cellulose immobilized CE-11 column
8913-CE12-01	ChiralCE-12	3μm, 1000Å, 50 × 2.1mm	3μm 4-Chlorophenylcarbamate-cellulose immobilized CE-12 column
8913-CE13-03	ChiralCE-13	3μm, 1000Å, 150 × 2.1mm	3μm 3-Chlorophenylcarbamate-cellulose immobilized CE-13 column
8913-CE5-62	ChiralCE-5	3μm, 1000Å, 100 × 4.6mm	3μm 3-Chloro-5-methylphenylcarbamate-cellulose immobilized CE-5 column
8913-CE5-03	ChiralCE-5	3μm, 1000Å, 150 × 2.1mm	3μm 3-Chloro-5-methylphenylcarbamate-cellulose immobilized CE-5 column
8913-CE5-04	ChiralCE-5	3μm, 1000Å, 200 × 2.1mm	3μm 3-Chloro-5-methylphenylcarbamate-cellulose immobilized CE-5 column
8913-CE5-05	ChiralCE-5	3μm, 1000Å, 250 × 2.1mm	3μm 3-Chloro-5-methylphenylcarbamate-cellulose immobilized CE-5 column
8915-CE2-05	ChiralCE-2	5μm, 1000Å, 250 × 4.6mm	5μm 3,5-Dimethylphenylcarbamate-cellulose immobilized CE-2 column
8915-CE3-05	ChiralCE-3	5μm, 1000Å, 250 × 4.6mm	5μm 3-Chloro-4-methylphenylcarbamate-cellulose immobilized CE-3 column
8915-CE4-05	ChiralCE-4	5μm, 1000Å, 250 × 4.6mm	5μm 3,5-Dichlorophenylcarbamate-cellulose immobilized CE-4 column
8915-CE5-05	ChiralCE-5	5μm, 1000Å, 250 × 4.6mm	5μm 3-Chloro-5-methylphenylcarbamate-cellulose immobilized CE-5 column
8915-CE6-05	ChiralCE-6	5μm, 1000Å, 250 × 4.6mm	5μm (S)-α-Methylbenzylcarbamate-cellulose immobilized CE-6 column
7915-CE2-14	ChiralCE-2	5μm, 1000Å, 200 × 10.0mm	5μm 3,5-Dimethylphenylcarbamate-cellulose CE-2 preparative column
7915-CE4-25	ChiralCE-4	5μm, 1000Å, 250 × 20.0mm	5μm 3,5-Dichlorophenylcarbamate-cellulose CE-4 preparative column
8933-SK1-61	ChiralKit-1	3μm, 1000Å, 50 × 4.6mm	Screening Kit-1（3 analytical columns）
8933-SK2-61	ChiralKit-2	3μm, 1000Å, 50 × 4.6mm	Screening Kit-2（6 analytical columns）

ChiralCE columns with other dimensions are also available. This manual may not be updated on time, please visit English website http://chiraltek-column.com/Downloads.php for downloading the latest version of full product manual and application notes for ChiralCE columns. Please call an international phone number (+65)-93656129 to directly contact ChiralTek technical support team in Singapore. You also can call a special local phone number (+86)-95040358310 in the mainland of China to directly contact ChiralTek support team in Singapore.