DAICEL chiral HPLC columns are the most referenced chiral HPLC columns. Used for their high quality, broad selectivity and high loading capacities, they separate > 99% of all recemic compounds.

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<tr>
<th>Column name</th>
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**CAUTION**

Please follow the below points for maximum column life.

1. Please use carefully to avoid any shock. Flow rate direction is indicated on the column label.
2. Operating a column in accordance with the instruction manual will result in a long column life. The instruction sheet is not applicable to any other DAICEL columns.
3. The use of guard cartridge or guard column is highly recommended.

www.velocityscientific.com.au
P: 1300 855 315
E: info@velocityscientific.com.au
DAICEL CHIRAL COLUMNS PRODUCT LIST

CHIRAL HPLC COLUMNS

Immobilized type Chiral HPLC Columns

CHIRALPAK® IA-3/IA  CHIRALPAK® ID-3/ID
CHIRALPAK® IB-3/1B  CHIRALPAK® IE-3/IE
CHIRALPAK® IC-3/IC  CHIRALPAK® IF-3/IF

Normal Phase HPLC Columns

CHIRALPAK® AD-3/AD-H/AD
CHIRALPAK® AS-3/AS-H/AS
CHIRALPAK® AY-3/AY-H
CHIRALPAK® AZ-3/AZ-H
CHIRALCEL® OD-3/OD-H/OD
CHIRALCEL® OJ-3/OJ-H/OJ
CHIRALCEL® OX-3/OX-H
CHIRALCEL® OZ-3/OZ-H
Others

Reverse Phase HPLC Columns

CHIRALPAK® AD-3R/AD-RH
CHIRALPAK® AS-3R/AS-RH
CHIRALPAK® AY-3R/AY-RH
CHIRALPAK® AZ-3R/AZ-RH
CHIRALCEL® OD-3R/OD-RH/OD-R
CHIRALCEL® OJ-3R/OJ-RH
CHIRALCEL® OX-3R/OX-RH
CHIRALCEL® OZ-3R/OZ-RH

Protein-based Chiral HPLC Columns

CHIRALPAK AGP®
CHIRALPAK CBH
CHIRALPAK HSA

DAICEL Chiral HPLC Columns for Special Applications

CROWNPAK® CR(+)/CR(−)
Crown ether HPLC columns for separation in acidic mobile phase

CHIRALPAK® ON-AX/QD-AX
Anion-exchange HPLC columns for separation of chiral acids

CHIRALPAK® WH/CHIRALPAK MA(+)
Ligand-exchange HPLC columns designed for amino-acids separations

CHIRALPAK® OP(+)/OT(+)
Polymethacrylate HPLC columns

Analytical Chromatography Accessories

Guard Cartridge Holder
Column Jacket

SFC Chiral Columns

www.velocityscientific.com.au
P: 1300 855 315
E: info@velocityscientific.com.au
Immovlized type Chiral HPLC Columns

Feature

Immovlized columns are designed for solvent flexibility for the resolution of compounds with limited solubility, outstanding solvent tolerance and excellent separations of enantiomers.

- High efficiency separation
- Comatile with organic solvents which give higher sample solubility as mobile phase
- More possibility for successful baseline separation
- More simple work for sample separation

Mobile Phase

You can use all kinds of solvents usable for ODS chromatography on Immobilized type chiral HPLC columns.

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<td>Water</td>
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※ Immobilized type columns are applicable to reverse phase.

Reference

CHIRALPAK® IA
Solvent versatility of immobilized 3,5-dimethyloxy carbamate of amylose for enantiomeric separations by HPLC

CHIRALPAK® IB
Cellulose 3,5-dimethyloxy carbamate immobilized on silica:
A new chiral stationary phase for the analysis of enantiomers
Analytica Chimica Acta 557 (2006) 221-228

CHIRALPAK® IC
Cellulose tri(3,5-dichloro phenyl carbamate) immobilized on silica:
A novel chiral stationary phase for resolution of enantiomers
Journal of Pharmaceutical and Biomedical Analysis 46 (2008) 882-891

Screening with immobilized type columns.
Common approaches for efficient method development with immobilised polysaccharide-derived chiral stationary phases

Enantiomer resolution screening strategy using multiple immobilised polysaccharide-based chiral stationary phases
**CHIRALPAK® IA-3**

Immobilized type column of CHIRALPAK® AD-3

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*(1) 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

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**CHIRALPAK® IA**

Immobilized type column of CHIRALPAK® AD-H

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*(1) 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

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**CHIRALPAK® IB-3**

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*(1) 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

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*(1) 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*
## Immobilized type Chiral HPLC Columns

### CHIRALPAK® IC-3

**Immobilized type column of new chiral selector**

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

### CHIRALPAK® IC

**Immobilized type column of new chiral selector**

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

### CHIRALPAK® ID-3

**Immobilized type column of new chiral selector**

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### CHIRALPAK® ID

**Immobilized type column of new chiral selector**

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### CHIRALPAK® IE

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Normal Phase HPLC Columns

Feature

- Polyssacharide-based chiral stationary phases (CSPs) are most widely used for chiral separation in the world. More than 80% of enantiomers can be separated with our polysaccharide-based chiral columns.
- We prepare various size of columns from Semi-micro to Preparative type.
- We provide 3 micron series of various type of Normal Phase chiral columns.

Mobile Phase

1 Standard solvent mixtures

<table>
<thead>
<tr>
<th></th>
<th>Hexane / 2-propanol</th>
<th>Hexane / EtOH</th>
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<td>100/0 ~ 0/100</td>
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<td>CHIRALPAK® AS-3 / AS-H / AS</td>
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<tr>
<td>CHIRALPAK® AY-3 / AY-H</td>
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<td>CHIRALPAK® AZ-3 / AZ-H</td>
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</table>

1: In cast of AD, the range Hexane/EtOH 85/15—40/60 may adversely affect baseline stability due to polymer leakage.

To safely transfer the column from 15% EtOH to 60% EtOH, it is strongly recommended to use 100% 2-propanol as a transition mobile phase at a low flow rate (high viscosity of 2-propanol).
- The retention is generally shorter with Ethanol than with 2-propanol.
- The retention is generally shorter with a higher alcohol content.
- The use of other alcohols such as 1-propanol, 1-BuOH, 2-BuOH etc... is possible, but effectiveness cannot be guaranteed.
- Do not use mobile phases containing more than 15% of these alcohols.

2 Polar solvents

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<tr>
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</tbody>
</table>

1: The use of polar solvents as 100% methanol or 100% acetonitrile is possible with CHIRALPAK® AD column. Nevertheless once the column is transferred to a polar mode it should be dedicated to this specific application.

Please read carefully the column instruction manual specific to each stationary phase for mobile additives and solvent compatibility.

Notice

DAICEL coated polysaccharide chiral stationary phases are made with a spherical high quality silica support onto which the polymeric chiral selector (amylosic derivatives, cellulosic derivatives,) is physically coated. Due to the coated nature of these chiral support, solvents should be carefully selected. Please read carefully the column instruction manual specific to each column for mobile phase additives and solvent compatibility.

The following solvents should never be used.

DMF, DMSO, Dioxane, Toluene, THF, Chloroform, Methylene, Chloride, Acetone, Ethyl acetate.
Normal Phase HPLC Columns

CHIRALPAK® AD-3

<table>
<thead>
<tr>
<th></th>
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<th>Column Length (mm)</th>
<th>Particle Size (µm)</th>
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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

CHIRALPAK® AD-H

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

CHIRALPAK® AD

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**Notes:**
- **1**: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

**CSP**

Amylose tris ((S)-α-methylbenzylcarbamate) coated on silica gel

Amylose derivative coated on silica gel

**Chemical Structure:**

\[
\text{R} : \begin{array}{c}
\text{H} \\
N \\
\text{O} \\
\text{O} \\
\text{O}
\end{array}
\]

**Particle Size:**

- µm

**Column Length:**

- mm

**Reference:**

- Internal Diameter (mm)

**Website:**

www.velocityscientific.com.au

**Contact:**

P: 1300 855 315
E: info@velocityscientific.com.au
Normal Phase HPLC Columns

CHIRALPAK® AY-3

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※1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

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※1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)
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## Normal Phase HPLC Columns

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

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**1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)**

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**1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)**

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<td>Analytical</td>
<td>4.6</td>
<td>150</td>
<td>4.6</td>
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<tr>
<td>CHIRALCEL® OZ-3</td>
<td>Guard Cartridges</td>
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</tbody>
</table>

(1) 1 : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

**CHIRALCEL® OZ-H**

<table>
<thead>
<tr>
<th></th>
<th>Internal Diameter (mm)</th>
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<th>Particle Size (µm)</th>
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<tr>
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<td>CHIRALCEL® OZ-H</td>
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<tr>
<td>CHIRALCEL® OZ-H</td>
<td>Semi-prep</td>
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<tr>
<td>CHIRALCEL® OZ-H</td>
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(1) 1 : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

**CHIRALCEL® OA**

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(1) 1 : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)
## CHIRALCEL® OB-H

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<td>CHIRALCEL® OB-H</td>
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<td>CHIRALCEL® OB-H</td>
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<td>150</td>
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<td>CHIRALCEL® OB-H</td>
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*^1* : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

## CHIRALCEL® OB

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## CHIRALCEL® OC-H

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*^1* : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

## CHIRALCEL® OC

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### CHIRALCEL® OF

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<tr>
<td>CHIRALCEL® OF</td>
<td>Guard column for Analytical</td>
<td>4.6</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>CHIRALCEL® OF</td>
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</tr>
<tr>
<td>CHIRALCEL® OF</td>
<td>Guard column for Semi-prep</td>
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<td>50</td>
<td>10</td>
</tr>
<tr>
<td>CHIRALCEL® OF</td>
<td>Semi-prep</td>
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<td>250</td>
<td>10</td>
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<td>CHIRALCEL® OF</td>
<td>Guard column for Semi-prep</td>
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### CHIRALCEL® OG

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<td>CHIRALCEL® OG</td>
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### CHIRALCEL® OK

<table>
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<th>Particle Size (µm)</th>
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<td>CHIRALCEL® OK</td>
<td>Guard column for Analytical</td>
<td>4.6</td>
<td>50</td>
<td>10</td>
</tr>
</tbody>
</table>
Semi-Preparative Columns

If you consider the little amount of separation, we recommend our Semi-prep columns.

Easy to scale up from analytical to semi-preparative columns.

In case of the same length, the flow rate and injection volume are increased in proportion to the cross section area.

For example, in case of 20mm ID Semi-prep columns, you can inject twenty times of analytical column's maximum sample load.

\[ X_{\text{mg}} \times \left( \frac{10^2 \times \pi}{(2.3)^2 \times \pi} \right) = X_{\text{mg}} \times 20 \]

\[ X : \text{Analytical column's maximum sample load.} \]

<table>
<thead>
<tr>
<th>Product</th>
<th>Size</th>
<th>Mobile phase</th>
<th>Flow rate</th>
<th>Temp.</th>
<th>Detection wavelength</th>
<th>Sample temp.</th>
<th>Inj.</th>
<th>Sample load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromato1</td>
<td>4.6mm l.D.(\times)250mmL</td>
<td>Hexane/Ethyl acetate (+40/60) (v/v)</td>
<td>1.0ml/min</td>
<td>40°C</td>
<td>254nm(UV)</td>
<td>656mg/ml</td>
<td>1.0µl</td>
<td>0.001mg</td>
</tr>
<tr>
<td>Chromato2</td>
<td>4.6mm l.D.(\times)250mmL</td>
<td>Hexane/Ethylacetate (+40/60) (v/v)</td>
<td>0.5ml/min</td>
<td>40°C</td>
<td>310nm(UV)</td>
<td>656mg/ml</td>
<td>25µl</td>
<td>16.4mg</td>
</tr>
<tr>
<td>Chromato3</td>
<td>20mm l.D.(\times)250mmL</td>
<td>Hexane/Ethylacetate (+40/60) (v/v)</td>
<td>9.4ml/min</td>
<td>40°C</td>
<td>310nm(UV)</td>
<td>656mg/ml</td>
<td>500µl</td>
<td>328mg</td>
</tr>
</tbody>
</table>
Reverse Phase HPLC Columns

**Feature**

- For reverse phase use
- You can analyze the optical purity of metabolic substance and sample which is produced by bio-method, under water-based mobile phase condition
- Available for LC/MS (we prepare 2.1mm ID products.)
- 3 micron type is available

**Mobile Phase**

<table>
<thead>
<tr>
<th>Cellulose type</th>
<th>Amylose type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHIRALCEL® OD-3R/OD-RH/OD-R</td>
<td>CHIRALPAK® AD-3R/AD-RH</td>
</tr>
<tr>
<td>CHIRALCEL® OJ-3R/OJ-RH</td>
<td>CHIRALPAK® AS-3R/AS-RH</td>
</tr>
<tr>
<td>CHIRALCEL® OZ-3R/OZ-RH</td>
<td>CHIRALPAK® AY-3R/AY-RH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pH Condition</th>
<th>Mobile Phase Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>Water / Acetonitrile = 60 / 40 (v/v)</td>
</tr>
<tr>
<td>Acidic</td>
<td>HCOOH aqueous solution pH2.0 / Acetonitrile = 60 / 40 (v/v)</td>
</tr>
<tr>
<td></td>
<td>H₃PO₄ aqueous solution pH2.0 / Acetonitrile = 60 / 40 (v/v)</td>
</tr>
<tr>
<td></td>
<td>0.1M phosphate buffer (pH2) / Acetonitrile = 60 / 40 (v/v)</td>
</tr>
<tr>
<td>Basic</td>
<td>20mM (NH₄)HCO₃ aq. Soln. (pH9)¹ / Acetonitrile = 60 / 40 (v/v)</td>
</tr>
<tr>
<td></td>
<td>0.1M KPF₆ aq. / Acetonitrile = 60 / 40 (v/v)</td>
</tr>
<tr>
<td></td>
<td>20mM borate buffer (pH9) / Acetonitrile =60 / 40 (v/v)</td>
</tr>
</tbody>
</table>

¹: Please adjust the pH of solution to the value of 8 with Diethylamine.

Immobilized type chiral HPLC columns are applicable to the above mobile phases.

**Notice**

The use of strong basic conditions (> pH 9) must be avoided, as they are known to damage the silica gel support used to make this stationary phase.
Reverse Phase HPLC Columns

**CHIRALPAK® AD-3R**

Reverse phase mode of CHIRALPAK® AD-3

<table>
<thead>
<tr>
<th></th>
<th>Internal Diameter (mm)</th>
<th>Column Length (mm)</th>
<th>Particle Size (µm)</th>
<th>Reference</th>
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<tbody>
<tr>
<td>CHIRALPAK® AD-3R</td>
<td>Analytical</td>
<td>2.1</td>
<td>150</td>
<td>3</td>
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<tr>
<td>CHIRALPAK® AD-3R</td>
<td>Analytical</td>
<td>4.6</td>
<td>50</td>
<td>3</td>
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<tr>
<td>CHIRALPAK® AD-3R</td>
<td>Analytical</td>
<td>4.6</td>
<td>100</td>
<td>3</td>
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<tr>
<td>CHIRALPAK® AD-3R</td>
<td>Analytical</td>
<td>4.6</td>
<td>150</td>
<td>3</td>
</tr>
<tr>
<td>CHIRALPAK® AD-3R</td>
<td>Guard Cartridges ³¹</td>
<td>4</td>
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</tbody>
</table>

³¹ : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

---

**CHIRALPAK® AD-RH**

Reverse phase mode of CHIRALPAK® AD-H

<table>
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<tr>
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<th>Column Length (mm)</th>
<th>Particle Size (µm)</th>
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<tr>
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<td>CHIRALPAK® AD-RH</td>
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<td>4.6</td>
<td>150</td>
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<tr>
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<td>5</td>
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</table>

³¹ : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

---

**CHIRALPAK® AS-3R**

Reverse phase mode of CHIRALPAK® AS-3

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<tr>
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<tr>
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</tr>
<tr>
<td>CHIRALPAK® AS-3R</td>
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³¹ : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)

---

**CHIRALPAK® AS-RH**

Reverse phase mode of CHIRALPAK® AS-H

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<td>5</td>
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³¹ : 3pc/set (You need Cartridge Holder when using Guard Cartridge.)
CHIRALPAK® AY-3R

Reverse phase mode of CHIRALPAK® AY-3

<table>
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<tr>
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<td>47811</td>
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*1: 3pcs/set (You need Cartridge Holder when using Guard Cartridge.)

CHIRALPAK® AY-RH

Reverse phase mode of CHIRALPAK® AY-H

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<tr>
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*1: 3pcs/set (You need Cartridge Holder when using Guard Cartridge.)

CHIRALPAK® AZ-3R

Reverse phase mode of CHIRALPAK® AZ-3

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<td>3</td>
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CHIRALPAK® AZ-RH

Reverse phase mode of CHIRALPAK® AZ-H

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### CHIRALCEL® OD-3R

Reverse phase mode of CHIRALCEL® OD-3

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

### CHIRALCEL® OD-RH

Reverse phase mode of CHIRALCEL® OD-H

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

### CHIRALCEL® OD-R

Reverse phase mode of CHIRALCEL® OD

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

### CHIRALCEL® OJ-3R

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

### CHIRALCEL® OJ-RH

Reverse phase mode of CHIRALCEL® OJ-H

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*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*

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You need Cartridge Holder when using Guard Cartridge.
## CHIRALCEL® OX-3R

Reverse phase mode of CHIRALCEL® OX-3

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## CHIRALCEL® OX-RH

Reverse phase mode of CHIRALCEL® OX-H

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## CHIRALCEL® OZ-3R

Reverse phase mode of CHIRALCEL® OZ-3

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† 1: 3pcs/set (You need Cartridge Holder when using Guard Cartridge.)

## CHIRALCEL® OZ-RH

Reverse phase mode of CHIRALCEL® OZ-H

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† 1: 3pcs/set (You need Cartridge Holder when using Guard Cartridge.)
Protein-based Chiral HPLC Columns

**Feature**

**CHIRALPAK AGP®** has extremely broad applicability for the separation of chiral drugs.

- **Basic compounds**
  - CHIRALPAK AGP®, CHIRALPAK CBH

- **Acids, Non-protoyptic compounds**
  - CHIRALPAK AGP®, CHIRALPAK HSA

- CHIRALPAK AGP® has extremely broad applicability for the separation of chiral drugs.
- The protein-based columns function entirely in the reversed-phase chromatographic mode, using buffers with low organic modifier content and at moderate pH values.
- Possibility to dynamically improve enantioseparation.

**CHIRALPAK AGP®**

- The chiral selector is alpha1-acid glycoprotein (AGP). This very stable protein is immobilized onto spherical 5 micrometer silica particles.
- The CHIRALPAK AGP® column separates enantiomers of an extremely broad range of drug compounds.
  - Amines (primary, secondary, and tertiary)
  - Acids (strong and weak)
  - Nonprotyotes (amides, esters, alcohols, sulfoxides, etc.)

**CHIRALPAK CBH**

- The chiral selector is Cellobiohydrolase (CBH). This is a stable enzyme, which has been immobilized onto 5 micrometer spherical silica particles.
- CHIRALPAK CBH is used for the separation of enantiomers of basic drugs from many compound classes. CHIRALPAK CBH separates preferentially compounds containing one or more basic nitrogen’s together with one or more hydrogen accepting or hydrogen donating groups (alcohol, phenol, carbonyl, amide, ether, sulphoxide, ester etc.)

**CHIRALPAK HSA**

- The chiral selector is human serum albumin (HSA). The protein has been immobilized onto spherical 5 micrometer particles.
- CHIRALPAK HSA is especially suited for the separation of weak and strong acids, zwitterionic and nonprotyotypic compounds.

**Application**

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## CHIRALPAK AGP®

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9/1: 2pc/set (You need the Guard Cartridge Holder especially for CHROMTECH type, when using the guard cartridge.)

### Accessory

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*9 This guard cartridge holder for AGP is applicable to all of ID: 2mm, 3mm, and 4mm.*
## Protein-based Chiral HPLC Columns

### CHIRALPAK CBH

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⁶¹: 2pc/set (You need the Guard Cartridge Holder especially for CHROMTECH type, when using the guard cartridge.)

### CHIRALPAK HSA

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DAICEL Chiral HPLC Columns for Special Applications

Crown Ether Chiral Stationary Phases
CROWNPAK® CR(+) / CR(−) columns

These columns contain a chiral crown ether as a chiral selector which is a coated onto a 5μm silica support. Acidic mobile phases such as Perchloric acid pH 1 to 2, are used to operate these columns under standard conditions. Note that to shorten the retention time of hydrophobic samples, the addition of Methanol (15% maximum v/v) has been shown to be effective. These columns are the reference columns for achieving amino acid separations, with the advantage that the elution order of the enantiomers can be reversed when necessary (CR(−) column gives the reversed elution order compared to CR(+) column).

<table>
<thead>
<tr>
<th>Separation compounds</th>
<th>Amino acid</th>
<th>Amino alcohol</th>
<th>Amines</th>
</tr>
</thead>
</table>

Anion Exchange Chiral Stationary Phases
CHIRALPAK® QN-AX / QD-AX columns

These columns are enantioselective weak anion-exchange (AX) HPLC columns. They were developed by Prof. W. Kindber’s group in Vuena and are designed specifically for enantioselective HPLC of chiral acids and possess exceptional enantiomer separation capabilities for acidic chiral compounds containing carboxylic, phosphoric, phosphonic or sulfonic acid groups. In some cases, weakly acidic compounds such as phenols can also be separated.

<table>
<thead>
<tr>
<th>Separation compounds</th>
<th>N-derivatised amino acids</th>
<th>Aryloxycarboxylic acids</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aminosulfonic acids</td>
<td>N-derivatised peptides</td>
</tr>
<tr>
<td></td>
<td>Aminophosphonic acids</td>
<td></td>
</tr>
</tbody>
</table>

Ligand Exchange Chiral Stationary Phases
CHIRALPAK® WH / CHIRALPAK® MA(+) columns

The chiral stationary phases in these columns are made of amino acids and its derivatives coated or bonded to silica supports (with a particle size of 10μm for WH and 3μm for MA (+)) . Since these columns are ligand-exchange type columns, the standard mobile phase to use is an aqueous solution of CuSO₄ (0.1 to 2mM) . These columns can tolerate organic modifiers such as Methanol and Acetonitrile according to the specifications in the instruction manual.

<table>
<thead>
<tr>
<th>Separation compounds</th>
<th>Amino acids and amino acid derivatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hydroxycarboxonic acids</td>
</tr>
</tbody>
</table>

Polymethacrylate Chiral Stationary Phases
CHIRALPAK® OP(+) / CHIRALPAK® OT(+) columns

The chiral selector is a chiral synthetic methacrylate polymer coated onto a 10μm silica support. The best chromatographic results are obtained using 100% Methanol as mobile phase. The polymer used for the CHIRALPAK OT (+) column is very delicate and is slowly degraded by alcohols. To avoid this phenomenon, we recommend to run the analyses at low temperatures (0~5 °C).
# DAICEL Chiral HPLC Columns for Special Applications

## CROWNPAK® CR(+)/CR(−)

Crown Ether Chiral Stationary Phase Analytical columns for HPLC

<table>
<thead>
<tr>
<th></th>
<th>Internal Diameter (mm)</th>
<th>Column Length (mm)</th>
<th>Particle Size (μm)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>CROWNPAK® CR(+)</td>
<td>Analytical</td>
<td>4</td>
<td>150</td>
<td>5</td>
</tr>
<tr>
<td>CROWNPAK® CR(+)</td>
<td>Semi-prep</td>
<td>10</td>
<td>150</td>
<td>5</td>
</tr>
<tr>
<td>CROWNPAK® CR(−)</td>
<td>Analytical</td>
<td>4</td>
<td>150</td>
<td>5</td>
</tr>
<tr>
<td>CROWNPAK® CR(−)</td>
<td>Semi-prep</td>
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<td>CROWNPAK® CR</td>
<td>Guard column for Analytical</td>
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<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

*1: Guard column is applicable for both CROWNPAK CR(+) and CR(−).*

## CHIRALPAK® QN-AX/QD-AX

Anion Exchange Chiral Stationary Phases Analytical and Semi-prep columns for HPLC

<table>
<thead>
<tr>
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<th>Internal Diameter (mm)</th>
<th>Column Length (mm)</th>
<th>Particle Size (μm)</th>
<th>Reference</th>
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<td>5</td>
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<tr>
<td>CHIRALPAK® QN-AX</td>
<td>Guard Cartridges *1</td>
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<td>5</td>
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</tr>
<tr>
<td>CHIRALPAK® QN-AX</td>
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<table>
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</tr>
<tr>
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<td>CHIRALPAK® QD-AX</td>
<td>Semi-prep</td>
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<td>150</td>
<td>5</td>
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</tbody>
</table>

*1: 3pc/set (You need Cartridge Holder when using Guard Cartridge.)*
### CHIRALPAK® WH

**Ligand Exchange Chiral Stationary Phases**

<table>
<thead>
<tr>
<th></th>
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### CHIRALPAK® MA(+)

**Ligand Exchange Chiral Stationary Phases**

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### CHIRALPAK® OP(+)/OT(+)

**Polymethacrylate Chiral Stationary Phases**

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</tr>
<tr>
<td>CHIRALPAK® OP(+)</td>
<td>Guard column for Analytical</td>
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<table>
<thead>
<tr>
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</thead>
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<tr>
<td>CHIRALPAK® OT(+)</td>
<td>Guard column for Analytical</td>
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<td>10</td>
</tr>
</tbody>
</table>
Analytical Chromatography Accessories

Guard Cartridge Holder

The HPLC analytical guard cartridges need to be mounted in a cartridge holder to be connected to the analytical column.
For maximum lifetime, analytical columns should be used in series with an appropriate guard cartridge or column.
Both formats are available with the packing material to match the protected column.

- We prepare Guard columns (Analytical & Semi-prep) for CHIRALPAK® AD/AS/OP(+)/OT(+), CHIRALCEL® OA/OB/OC/OD/OF/OG/OJ/OK.

<table>
<thead>
<tr>
<th></th>
<th>Internal Diameter (mm)</th>
<th>Column Length (mm)</th>
<th>Particle Size (µm)</th>
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<tbody>
<tr>
<td>Guard Cartridge</td>
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<td>00011</td>
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</tbody>
</table>

Column Jacket

Column jackets allow operating temperatures of analytical columns to be controlled with a circulating water bath.

<table>
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<th>Particle Size (µm)</th>
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<tbody>
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<tr>
<td>Column Jacket</td>
<td>-</td>
<td>250</td>
<td>-</td>
<td>00025</td>
</tr>
</tbody>
</table>
SFC Chiral Columns

Feature

Supercritical Fluid Chromatography (SFC):
When a material is in a state that the temperature and the pressure exceed the critical point, it becomes a supercritical fluid. In this phase, the density of gas and liquid becomes same. Super critical fluid is a special phase which has either gas and liquid character but different from these.

- Low viscosity: Quick separation with low pressure drop.
- High diffusivity: High unit productivity.
- Low solvent consumption: Environmental friendly. CO₂ can be recycled.
- Acidic behavior of CO₂: No additive such as TFA is required.

CHIRALPAK® IA/SFC

<table>
<thead>
<tr>
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<th>Internal Diameter (mm)</th>
<th>Column Length (mm)</th>
<th>Particle Size (µm)</th>
<th>Reference</th>
</tr>
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</tr>
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<tr>
<td>CHIRALPAK® IA/SFC</td>
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CHIRALPAK® IB/SFC

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CHIRALPAK® IC/SFC

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</tbody>
</table>
# SFC Chiral Columns

## CHIRALPAK® AD-H/SFC

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<th>Reference</th>
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</thead>
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<tr>
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## CHIRALPAK® AS-H/SFC

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## CHIRALPAK® AY-H/SFC

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## CHIRALCEL® OD-H/SFC

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## CHIRALCEL® OJ-H/SFC

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## CHIRALCEL® OZ-H/SFC

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### CHIRALPAK® ID/SFC

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### CHIRALPAK® IE/SFC

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### CHIRALPAK® IF/SFC

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### CHIRALPAK® AZ-H/SFC

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### CHIRALCEL® OX-H/SFC

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