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SPECIAL APPLICATIONS HPLC COLUMNS

Enantioselective HPLC columns for specific applications

DAICEL has introduced specific Chiral Stationary Phases to increase the potential for enantiomer separation in special applications :

- **CHIRALPAK® QD-AX & CHIRALPAK® QN-AX HPLC columns**
Anion-exchange HPLC columns for separation of chiral acids
- **CROWNPAK® CR(+) & CROWNPAK® CR(-) HPLC columns**
Crown ether HPLC columns for separation in acidic mobile phases
- **CHIRALPAK® WH & CHIRALPAK® MA(+) HPLC columns**
Ligand-exchange HPLC columns designed for amino-acids separation

ANION EXCHANGE CHIRAL STATIONARY PHASES

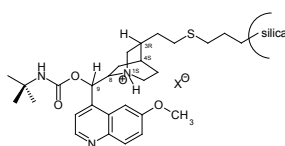
CHIRALPAK® QN-AX & CHIRALPAK® QD-AX are enantioselective weak anion-exchange (AX) HPLC columns. They were developed by Prof. W. Lindner's group in Vienna and are designed specifically for enantioselective HPLC of chiral acids and possess exceptional enantiomer separation capabilities for acidic chiral compounds containing carboxylic, phosphonic, phosphinic, phosphoric or sulfonic groups.

In some cases, weakly acidic compounds such as phenols can also be separated.



CHIRALPAK® QD-AX & QN-AX

Reference	Product Name	Column Length (mm)	Internal Diameter (mm)	Particle Size (µm)	Product Type
• CHIRALPAK® QD-AX					
O-9 (TERT-BUTYLCARBAMOYL) QUINIDINE IMMOBILISED ON A 5 µm SILICA SUPPORT					
31311	CHIRALPAK® QD-AX	10	4	5	Guard Cartridges (x3)
31324	CHIRALPAK® QD-AX	150	4,6	5	Analytical
31394	CHIRALPAK® QD-AX	150	2,1	5	Analytical
31344	CHIRALPAK® QD-AX	150	20	5	Semi-prep
31444	CHIRALPAK® QD-AX SFC	150	20	5	Semi-prep



CHIRALPAK® QD-AX : (8R, 9S)
CHIRALPAK® QN-AX : (8S, 9R)

• CHIRALPAK® QN-AX

O-9 (TERT-BUTYLCARBAMOYL) QUININE IMMOBILISED ON A 5 µm SILICA SUPPORT

32311	CHIRALPAK® QN-AX	10	4	5	Guard Cartridges (x3)
32324	CHIRALPAK® QN-AX	150	4,6	5	Analytical
32394	CHIRALPAK® QN-AX	150	2,1	5	Analytical
32344	CHIRALPAK® QN-AX	150	20	5	Semi-prep
32444	CHIRALPAK® QN-AX-SFC	150	20	5	Semi-prep

These two phases are based on two complementary stereoisomeric quinine (QN) and quinidine (QD) derivatives. Due to their pseudo enantiomeric character they usually reveal reversed elution order for opposite enantiomers.

They can be used in reversed phase (RP) mode or in polar organic mode (non-aqueous, polar organic solvents containing organic acids and bases as buffer constituents). In addition the separation of chiral basic and neutral compounds may also be possible, but usually normal phase (NP) conditions. In this mobile phase mode, **CHIRALPAK® QD-AX & CHIRALPAK® QN-AX** behave like a standard Pirkle type Chiral Stationary Phase.

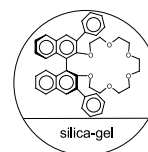
They are compatible with all common HPLC solvents (e.g. methanol, acetonitrile, tetrahydrofuran, 1,4-dioxane or chloroform) as well as in a wide pH range spanning from pH 2 to 8. Typical buffers used in hydro-organic mode are acetate, formate, citrate and phosphate.



CROWNPAK[®] CR(+) & CR(-)

Crown Ether Chiral Stationary Phases

Reference	Product Name	Column Length (mm)	Internal Diameter (mm)	Particle Size (µm)	Product Type
• CROWNPAK[®] CR (+) / (-)					
27711	CROWNPAK [®] CR	10	4	5	Guard
27714	CROWNPAK [®] CR(+)	150	4	5	Analytical
28714	CROWNPAK [®] CR(-)	150	4	5	Analytical



These columns contain a chiral crown ether as a chiral selector, which is coated onto a 5 µm 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.

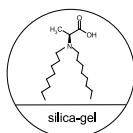
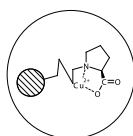
These columns are the reference columns for achieving amino acid separations, with the advantage the elution order of the enantiomers can be reversed when necessary (CR(-) column gives the reversed elution order compared to CR(+) column).



CHIRALPAK® WH & MA(+)

Ligand Exchange Chiral Stationary Phases

Reference	Product Name	Column Length (mm)	Internal Diameter (mm)	Particle Size (µm)	Product Type
• CHIRALPAK® WH					
25622	CHIRALPAK® WH	50	4,6	10	Guard
25625	CHIRALPAK® WH	250	4,6	10	Analytical
• CHIRALPAK® MA(+)					
21822	CHIRALPAK® MA(+)	50	4,6	3	Analytical



The Chiral Stationary Phases in these columns are made of amino acids and its derivatives coated bonded to silica supports (with a particle size of 10 µm for WH and 3 µm 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 specifications in the instruction manual.

