

## HALO™ HPLC Columns - have the cake and eat it too

“Time is money” is one of the slogans of modern economy. This is also true for Chromatography, the more separations per time unit that are achieved the better.

In order to allow faster separations, columns are packed with smaller particles. In smaller particles the diffusion path into and out of the particle is shorter and peakbroadening is reduced. This allows faster mobile phase flow rates which reduces analysis time. Unfortunately back pressure is massive, so that modern fast columns with 1.7  $\mu\text{m}$  particles make special UPLC systems necessary which are expensive as regards purchase price and operation.

An known alternative is the Fused Core Technology. A porous 0.5  $\mu\text{m}$  layer of particles is fused to a solid 1.7  $\mu\text{m}$  silica core. This reduces the diffusion path into and out of the particle, and, in contrast to a phase with 3  $\mu\text{m}$  totally porous particles, allows a faster flow rate. Thus the HALO column generates more separation power and can either be used for faster analysis or more separation power.

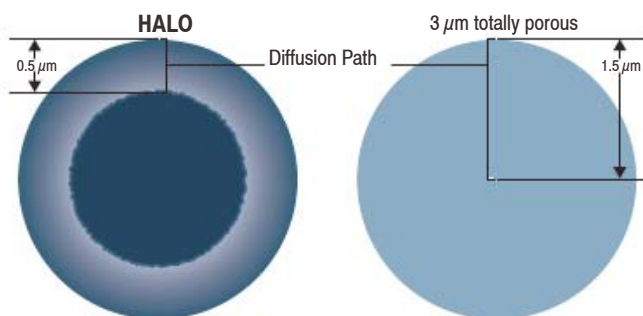
The HALO Column allows faster separation as it is known in UPLC but under “normal” operating pressure of less than 400 bar with “normal” HPLC systems. HALO columns are as robust as any 5  $\mu\text{m}$  column. Experience the advantages of a HALO column. We recommend to start with a 4.6 x 50 mm column for fast separation or a 4.6 x 150 mm column for a maximum separation number.

We are happy to answer your questions or assist with a test column. HALO columns say hello and promise to be the cake you can have and eat in the HPLC laboratory.

## HALO™ HPLC Columns - have the cake and eat it too

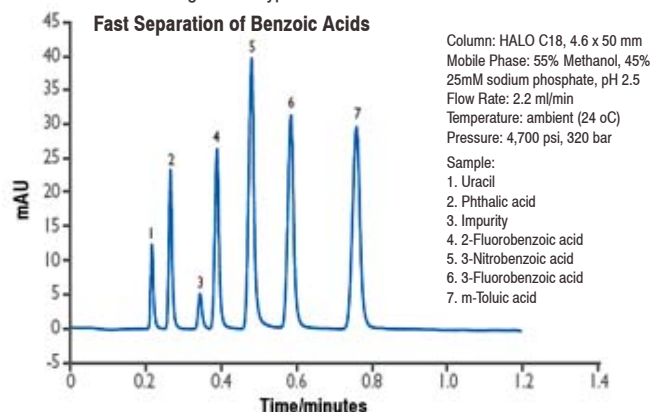
### Design

The shorter diffusion path of HALO reduces axial dispersion



The shorter diffusion path of HALO particles reduces axial dispersion of solutes and minimizes peak broadening. A Halo particle has only a 0.5 µm diffusion path compared to the approximately 1.5 µm diffusion path of a 3 µm totally porous particle. Because of the shorter diffusion path, the performance advantages of HALO become even more apparent when separating larger solute molecules and operating at faster mobile phase flow rates.

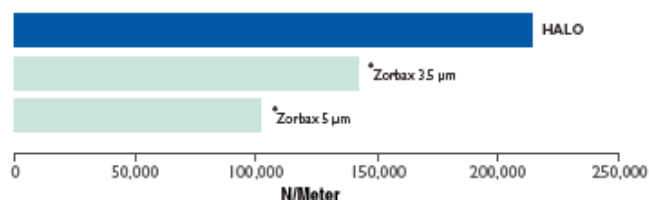
HALO columns are designed for hyper-fast HPLC



HALO columns are designed for hyper-fast separations so that higher sample throughput can be achieved. In this example, the HALO column separated seven compounds in less than 48 seconds with better than baseline resolution for all peak pairs.

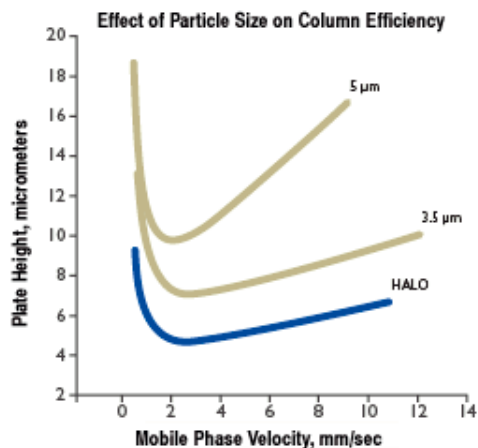
### Separation Power

HALO columns deliver more separating power



### Efficiency

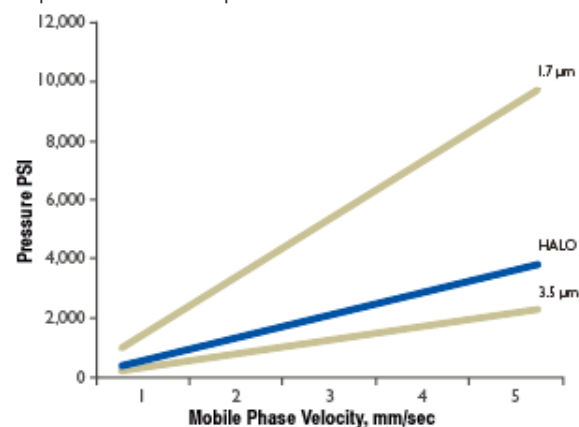
Comparison of van Deemter plots



Van Deemter plots are a convenient way to compare the efficiency of HPLC columns. In this comparison we see that HALO columns are more efficient than columns packed with 5 µm or 3.5 µm particles and that they can be run at higher mobile phase linear velocity and still maintain their resolving power.

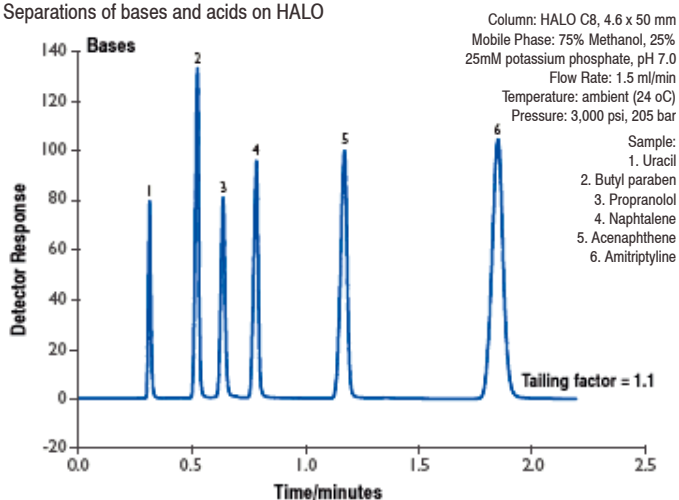
### Back Pressure

Comparison of column back pressure



Most HPLC systems have operating pressure limits of 6,000 psi (400 bar), or less. As the column packing particle size decreases, the column back pressure increases rapidly. To use columns packed with sub-2 µm size particles at their optimum flow rate, pressure that exceeds 6,000 psi is often encountered. This necessitates purchasing very expensive "ultra-pressure" equipment to achieve optimum performance. HALO columns, even though they do generate slightly higher back pressure than columns packed with 3.5 µm particles, can be used with most existing HPLC equipment.

## Separations of bases and acids on HALO



Peak tailing trace metals or silanol groups is essentially non-existent on HALO stationary phases. The examples here show the excellent peak shape that can be achieved for either bases or acids when using a HALO column. The conditions used for the bases were chosen to encourage any potential silanol interference. Note the excellent peak shape for amiriptryline under these conditions.

## Dimensions

2.1 x 30 mm, 2,7 µm
2.1 x 50 mm, 2,7 µm
2.1 x 75 mm, 2,7 µm
2.1 x 100 mm, 2,7 µm
2.1 x 150 mm, 2,7 µm
3.0 x 30 mm, 2,7 µm
3.0 x 50 mm, 2,7 µm
3.0 x 75 mm, 2,7 µm
3.0 x 100 mm, 2,7 µm
3.0 x 150 mm, 2,7 µm
4.6 x 30 mm, 2,7 µm
4.6 x 50 mm, 2,7 µm
4.6 x 75 mm, 2,7 µm
4.6 x 100 mm, 2,7 µm
4.6 x 150 mm, 2,7 µm

## HALO C18

8AM-92812-302	289.00
8AM-92812-402	394.00
8AM-92812-502	436.00
8AM-92812-602	494.00
8AM-92812-702	573.00
8AM-92813-302	289.00
8AM-92813-402	394.00
8AM-92813-502	436.00
8AM-92813-602	494.00
8AM-92813-702	573.00
8AM-92814-302	289.00
8AM-92814-402	394.00
8AM-92814-502	436.00
8AM-92814-602	494.00
8AM-92814-702	573.00

## EUR/pc

## HALO C8

8AM-92812-308	289.00
8AM-92812-408	394.00
8AM-92812-508	436.00
8AM-92812-608	494.00
8AM-92812-708	573.00
8AM-92813-308	289.00
8AM-92813-408	394.00
8AM-92813-508	436.00
8AM-92813-608	494.00
8AM-92813-708	573.00
8AM-92814-308	289.00
8AM-92814-408	394.00
8AM-92814-508	436.00
8AM-92814-608	494.00
8AM-92814-708	573.00

## EURpc

## As Guard Column we recommend an OPTI-GUARD® 1 mm

The OPTI-GUARD® Guard Column is in size equal to a finteright fitting and can also be installed like one without the need of tools. The floating tube stem of the OPTI-Guard® provides a zero-dead-volume connection. The integrated Guard Column has a 1 x 14 mm packed bed in the internal flow path.

### OPTI-Guard® C18; colour purple

10-02-00007 = EUR 240.00/Pack of 5 pcs.

### OPTI-Guard® C8; colour yellow

10-02-00010 = EUR 240.00/Pack of 5 pcs.

