

# TN-1125 APPLICATIONS

## UHPLC Column Protection Dramatically Extends UHPLC Column Performance and Lifetime

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UHPLC columns can significantly improve chromatographic separations, but they also present unique challenges. Once the UHPLC system components are optimized, perhaps your greatest concern is protecting the column from the damaging effects of microparticulates and sample contaminants.

An ultra-high performance column protection system, specifically designed for UHPLC systems using sub-2 $\mu\text{m}$  and core-shell particle columns, can be used to extend column lifetime (saving both money and time through less frequent column replacement), while minimizing system troubleshooting and downtime.

### Results and Discussion

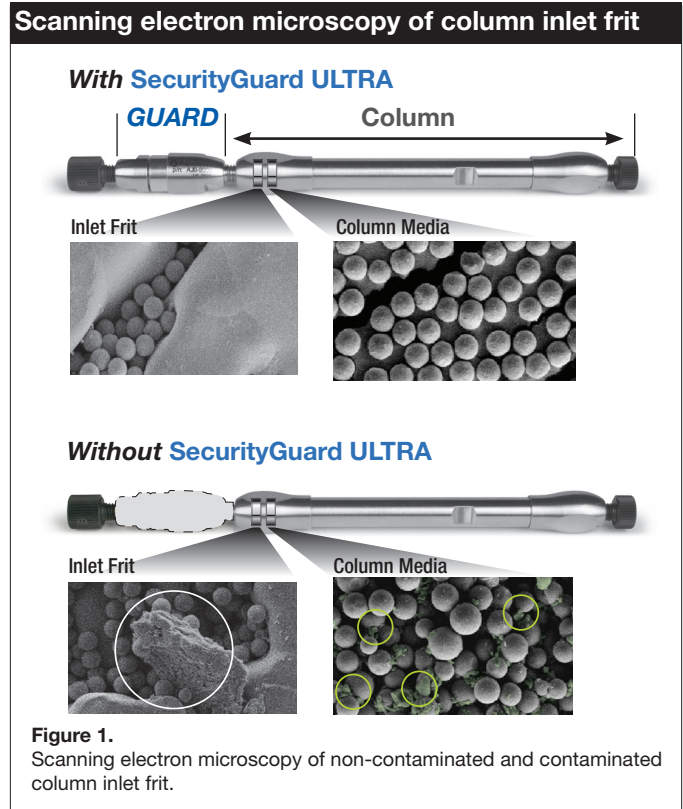
It is well known that UHPLC systems and columns require higher levels of care and attention than traditional HPLC in order to reap their full ultra-high chromatographic performance benefits. Once system components are optimized, chromatographic cleanliness is vital to maintain UHPLC performance, and column protection is compulsory. Unprotected columns may suffer from reduced performance and lifetime, and may lead to an increased need for system troubleshooting and/or downtime.

UHPLC columns packed with sub-2 $\mu\text{m}$  particles tend to clog much more rapidly than traditional HPLC columns packed with larger 3 $\mu\text{m}$  and 5 $\mu\text{m}$  particles. This may be due to the fact that, not only is the interstitial space between the particles much smaller, but columns packed with sub-2 $\mu\text{m}$  particles also use frits with a much smaller porosity compared to conventional HPLC columns. With a "tighter", more restricted flow path, any undissolved matter or particulates from the sample, the mobile phase, or the system (such as microparticulates shedding from piston seals and injection valve rotors), will quickly and irreversibly foul your UHPLC column.

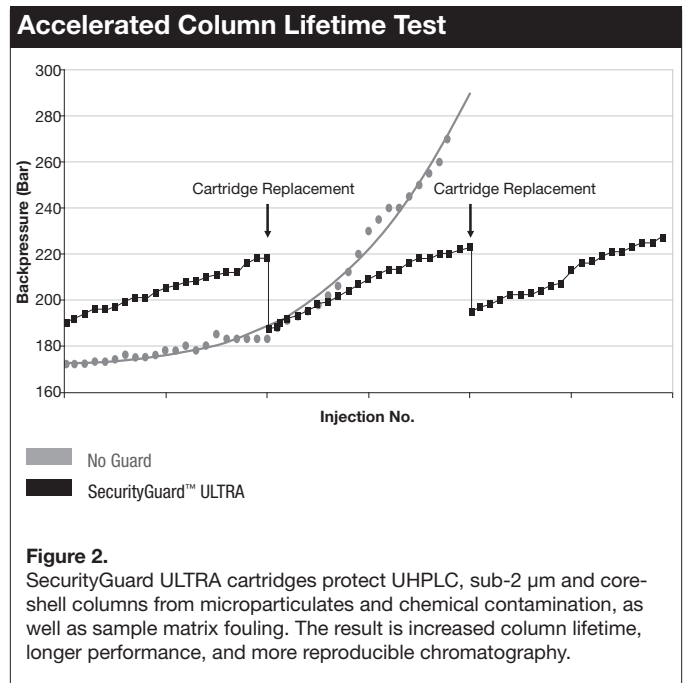
An easy way to extend the performance and lifetime of your UHPLC columns (either sub-2 $\mu\text{m}$  fully-porous or core-shell media) is to prevent any contaminants from reaching the column by using the SecurityGuard<sup>™</sup> ULTRA guard cartridge system (**Figure 1**).

Presented in **Figure 2** is an accelerated lifetime test using an endogenous biological matrix injected onto a core-shell column (Kinetex 2.6 $\mu\text{m}$  C18 50  $\times$  4.6mm column Phenomenex, Inc. Torrance CA, USA). With the unprotected column (grey dots), sequential injections of the matrix lead to a steady and irreversible increase in backpressure. Without SecurityGuard ULTRA column protection, the increase in backpressure becomes exponential. This increase in backpressure will eventually lead to degraded chromatography, including band broadening and possibly peak splitting. As a result, method sensitivity, quantitation and peak identification may also be adversely affected.

However, column lifetime is greatly extended by using the SecurityGuard ULTRA (black boxes). In this case, sequential injections of the matrix will still lead to an increase in pressure, but this is due to the particulates being captured in the SecurityGuard ULTRA itself, rather than in the UHPLC/HPLC column. Thus, by simply replacing the SecurityGuard ULTRA cartridge at regular intervals, backpressure returns to starting levels and effective column lifetime can be greatly extended.



**Figure 1.** Scanning electron microscopy of non-contaminated and contaminated column inlet frit.



**Figure 2.** SecurityGuard ULTRA cartridges protect UHPLC, sub-2 $\mu\text{m}$  and core-shell columns from microparticulates and chemical contamination, as well as sample matrix fouling. The result is increased column lifetime, longer performance, and more reproducible chromatography.

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## Ordering Information

### SecurityGuard™ ULTRA Cartridges (3/pk)



Material	Description	pH Stability	Column ID (mm)		
			2.1	3.0	4.6
<b>Cartridges for General Purpose/Pharmaceutical</b>					
XB-C18 & C18	(ODS, Octadecyl)	1.5 – 8.5*	AJO-8782	AJO-8775	AJO-8768
C8	(MOS, Octyl)	1.5 – 8.5*	AJO-8784	AJO-8777	AJO-8770
PPF	(Pentafluorophenyl)	1.5 – 8.5*	AJO-8787	AJO-8780	AJO-8773
HILIC	HILIC	2.0 – 7.5	AJO-8786	AJO-8779	AJO-8772
Phenyl-Hexyl	(Phenylhexyl)	1.5 – 8.5*	AJO-8788	AJO-8781	AJO-8774
<b>Cartridges for Protein and Polypeptide Reversed Phase</b>					
C18-Peptide	(ODS, Octadecyl)	1.5 – 8.5*	AJO-8948	—	AJO-8946
Widopore C18	(ODS, Octadecyl)	1.5 – 8.5*	AJO-8783	—	AJO-8769
Widopore C8	(MOS, Octyl)	1.5 – 8.5*	AJO-8785	—	AJO-8771
Widopore C4	(Butyl)	1.5 – 8.5*	AJO-8899	—	AJO-8901

\*pH stable 1.5 - 8.5 under gradient conditions. pH stable 1.5 - 10 under isocratic conditions.

Designed for sub-2 µm, core-shell, and UHPLC columns.  
Pressure rated to 20,000 psi (1378 bar).

### SecurityGuard ULTRA Holder



Part No.	Description	Unit
AJO-9000	SecurityGuard ULTRA Cartridge Holder	ea

AJO-9000 is the universal holder designed for use with 2.1 mm, 3.0 mm and 4.6 mm ID cartridges.



If SecurityGuard ULTRA cartridge protection system does not perform as well or better than your current guard cartridge system of similar phase and dimensions, return the product with comparative data within 45 days for a FULL REFUND.

#### Terms and Conditions

Subject to Phenomenex Standard Terms and Conditions, which may be viewed at [www.phenomenex.com/TermsAndConditions](http://www.phenomenex.com/TermsAndConditions).

#### Trademarks

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#### Disclaimer

Comparative separations may not be representative of all applications.

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