

## Viper Capillaries and Fingertight Fitting System



The Viper™ fingertight fitting system provides ease of use and dead-volume-free plumbing of every conventional HPLC and modern UHPLC system. Together with flexible stainless steel capillaries, it opens a new dimension in modern liquid chromatography. The Viper system improves chromatographic results, independent of different connection geometries and system backpressures. Connecting LC modules, valves, and columns quickly, easily, and reproducibly without any additional tools is simplicity defined with the Viper system.

### Features

- Provides zero-dead-volume fingertight connections
- Supports backpressures up to 1,200 bar (17,400 psi)
- Suitable for temperatures up to 120 °C
- Available in different lengths from 150 to 950 mm and in 0.13 mm and 0.18 mm i.d. (0.005" and 0.007")
- Easy to use due to flexible stainless steel capillaries ( $\frac{1}{32}$ " o.d.) and fingertight design
- Works with virtually any valve and any column from any manufacturer
- Fits narrow connections, such as 10-port valves and enables mixed use with different fitting designs
- Paves the way for easy setup of even the most advanced column- and valve-switching configurations

Now sold under the  
Thermo Scientific brand

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Passion. Power. Productivity.

## Designed for Optimal Performance

Extracolumn volumes in HPLC have the most detrimental effects on the separation performance of an LC system and must be minimized. Poor quality capillary connections can have significant effects on peak broadening. Therefore, establishing and maintaining optimal connections between all fluidic components in an LC system is critical to achieving optimum chromatographic performance.

## Viper vs. Conventional Fittings

Conventional fittings, tightened by hand or with tools, present considerable drawbacks which may compromise efficiency (Figure 1):

- Accidental use of wrong ferrules creates dead volumes and risk of leakage
- Ferrules and capillaries can slip, especially during use with the high backpressures generated using UHPLC
- Conventional fitting systems may require laborious use of additional tools
- Dead volumes in each connection are unavoidable
- Change of column or valve requires repositioning of ferrules to re-establish proper connections
- Use of metal ferrules causes wear of connection ports

The Viper fitting system design (Figure 2) overcomes all downsides of conventional fitting systems. It works without ferrules and reduces the dead volume of any fluidic connection to zero. The Viper system unifies robust performance, ease of use, acceptable lifetime, and universal compatibility with virtually all different valves and columns for HPLC users.

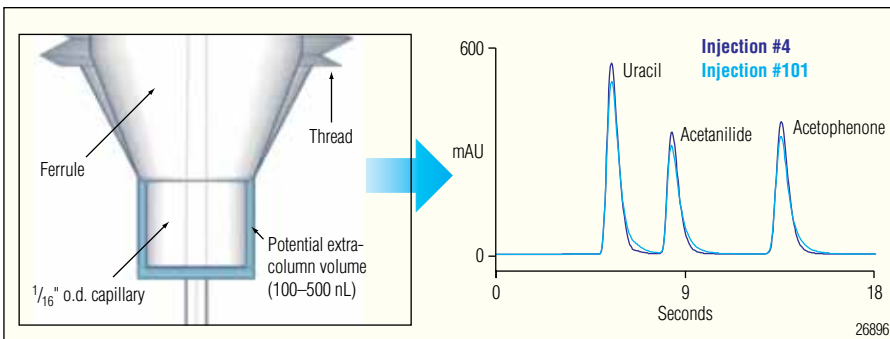


Figure 1. Conventional fitting systems often create extracolumn volumes by incorrect positioning of the ferrule or by slipping off the capillary when subjected to high pressures. The chromatogram demonstrates deteriorated peak shape caused by a slipped capillary at a backpressure of only 600 bar (8,700 psi).

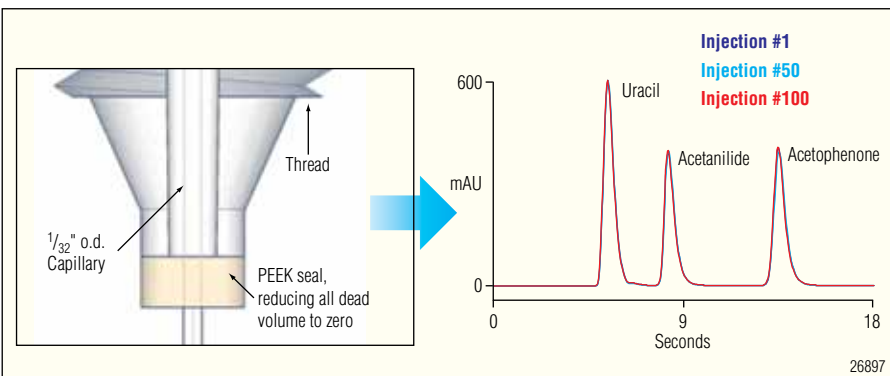


Figure 2. The Viper fingertight fitting system does not use a ferrule and eliminates any extracolumn volumes by design. The chromatogram overlay shows consistent peak shapes under identical conditions to those used in Figure 1.

<b>Table 1. Comparison of Chromatographic Performance Data Achieved with Viper Fittings vs. Conventional UHPLC Fingertight Fitting System</b>					
<b>Acetanilide</b>	<b>Conventional Fingertight Fitting (Slipped)</b>	<b>Conventional Fingertight Fitting (Optimally Mounted)</b>	<b>Viper Fingertight Fitting</b>	<b>Viper vs. Optimal</b>	<b>Viper vs. Slipped</b>
Plates [N]	998	1112	1405	+ 26%	+ 41%
Peak Height [mAU]	308.1	349.8	392.5	+ 12%	+ 27%
Resolution [EP]	4.7	5.0	5.6	+ 12%	+ 19%

## Flexibility and Ease of Use

Today's laboratories require increased flexibility, increased sample throughput, and automation of complex sample preparation procedures.

Together with Dual-Gradient pumps, a range of switching valves, and the intelligent LC (LCi) features of the Chromeleon® Chromatography Data System, Dionex fully meets these demands. You can combine the advantages of ×2 Dual technology with RSLC, and benefit from advanced column-switching techniques and UHPLC.

## Benefits of ×2 Dual LC

- Double your sample throughput with parallel and tandem LC
- Alternate automatically between two different applications with the Automated Application Switching setup
- Automate complex sample preparation and analysis of samples with on-line SPE-LC
- Develop new methods overnight with the method scouting configuration

To equip analytical scientists with an optimized tubing and fitting system from the start, every Dionex RSLC system comes with a set of Viper capillaries. Additional fluidic accessories, including precolumn heaters, postcolumn coolers, and large-volume static mixers, are available with Viper fitting technology.

Even dual-stack systems and advanced ×2 Dual configurations are easy to set up using the Viper fitting system.



Figure 3. Independent of the brand, the Viper system fits even the most narrow spaces, such as 10-port valves. A mix with existing fitting designs is also possible.

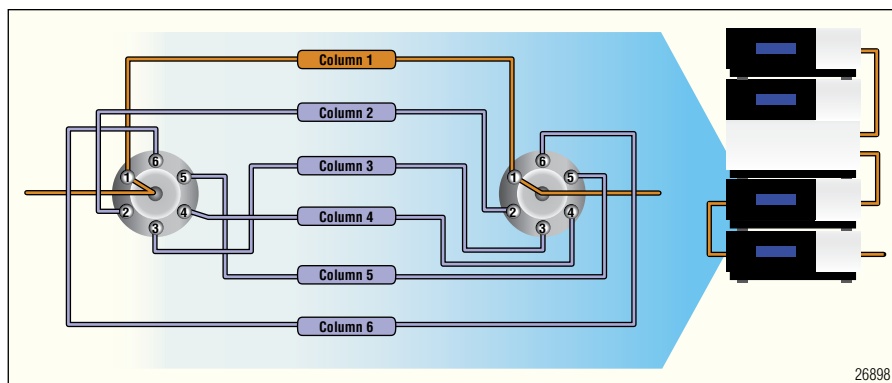


Figure 4. The Viper system allows for easy plumbing of advanced system configurations, such as automated method scouting with column switching of up to six columns.

## SPECIFICATIONS

Connection principle: Fingertight	Inner diameter: 0.13 mm (0.005") or 0.18 mm (0.007")
Maximum pressure: 1,200 bar (17,400 psi)	Temperature compatibility: 120 °C
Tubing type: Flexible stainless steel (SST)	Available lengths: 65 mm, 150–950 mm in 100 mm steps
Outer diameter: 0.79 mm ( $1/32$ " )	Wetted materials: PEEK™, SST

## ORDERING INFORMATION

In the U.S., call (800) 346-6390 or contact the Dionex Regional Office nearest you. Outside the U.S., order through your local Dionex office or distributor. Refer to the following part numbers:

### Individual Viper Capillaries, RS/Micro

Viper SST Flex.-Cap., i.d. × L 0.13 × 65 mm .....	6040.2307
Viper SST Flex.-Cap., i.d. × L 0.13 × 150 mm .....	6040.2315
Viper SST Flex.-Cap., i.d. × L 0.13 × 250 mm .....	6040.2325
Viper SST Flex.-Cap., i.d. × L 0.13 × 350 mm .....	6040.2335
Viper SST Flex.-Cap., i.d. × L 0.13 × 450 mm .....	6040.2345
Viper SST Flex.-Cap., i.d. × L 0.13 × 550 mm .....	6040.2305
Viper SST Flex.-Cap., i.d. × L 0.13 × 650 mm .....	6040.2310
Viper SST Flex.-Cap., i.d. × L 0.13 × 750 mm .....	6040.2320
Viper SST Flex.-Cap., i.d. × L 0.13 × 850 mm .....	6040.2330
Viper SST Flex.-Cap., i.d. × L 0.13 × 950 mm .....	6040.2340

### Individual Viper Capillaries, SD/Analytical

Viper SST Flex.-Cap., i.d. × L 0.18 × 65 mm .....	6040.2357
Viper SST Flex.-Cap., i.d. × L 0.18 × 150 mm .....	6040.2360
Viper SST Flex.-Cap., i.d. × L 0.18 × 250 mm .....	6040.2385
Viper SST Flex.-Cap., i.d. × L 0.18 × 350 mm .....	6040.2375
Viper SST Flex.-Cap., i.d. × L 0.18 × 450 mm .....	6040.2365
Viper SST Flex.-Cap., i.d. × L 0.18 × 550 mm .....	6040.2355
Viper SST Flex.-Cap., i.d. × L 0.18 × 650 mm .....	6040.2395
Viper SST Flex.-Cap., i.d. × L 0.18 × 750 mm .....	6040.2370
Viper SST Flex.-Cap., i.d. × L 0.18 × 850 mm .....	6040.2380
Viper SST Flex.-Cap., i.d. × L 0.18 × 950 mm .....	6040.2390

### Viper Capillary Kits, Single Systems

Viper Capillary Kit, RS. Contains 2 capillaries with 0.13 mm i.d. and 1 capillary with 0.18 mm i.d. to connect an RS/Micro system. ....	6040.2301
Viper Capillary Kit, SD. Contains 3 capillaries with 0.18 mm i.d. to connect an SD/Analytical system. ....	6040.2302

### Viper Capillary Kits, ×2 Dual RSLC Systems

Viper Capillary Kit, RS System, Online SPE .....	6040.2801
Viper Capillary Kit, RS System, Tandem Operation .....	6040.2803
Viper Capillary Kit, RS System, Parallel Setup .....	6040.2809
Viper Capillary Kit, RS System, Application Switching .....	6040.2805
Viper Capillary Kit, RS System, Method Scouting .....	6040.2807

### Viper Capillary Kits, ×2 Dual LC Systems

Viper Capillary Kit, SD System, Online SPE .....	6040.2802
Viper Capillary Kit, SD System, Tandem Operation .....	6040.2804
Viper Capillary Kit, SD System, Parallel Setup .....	6040.2810
Viper Capillary Kit, SD System, Application Switching .....	6040.2806
Viper Capillary Kit, SD System, Method Scouting .....	6040.2808

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