

Liquid Chromatography



Key Features

- Improved productivity – compatible with all UHPLC columns, the Flexar FX-20 Pump can operate at pressures as high as 18,000 psi, providing throughput improvements of as high as 10x.
- Reduced solvent consumption – operation with either UHPLC or SPP column technology, the Flexar FX-20 Pump can reduce solvent consumption by more than 90%, greatly minimizing your operating costs and waste disposal expenses.
- Improved separation efficiency – the Flexar FX-20 Pump improves separation efficiency, allowing better separation of compounds.
- Greater scalability for ultimate flexibility – no other LC pumping system has the range of operating pressure (400 to 18,000 psi) and flow rate (0.001 to 5 mL/min). The FX-20 Pump can be used in either UHPLC or conventional HPLC mode with any analytical LC column you like. You select the mode that best fits each of your application needs.

Flexar FX-20 LC Pump: Ultimate Performance and Flexibility for UHPLC and HPLC

There's no debate. The PerkinElmer Flexar™ FX-20 LC Pump has the ultimate performance, flexibility, and technology for delivering the greatest advantages of both HPLC and UHPLC to your laboratory. Advances in both UHPLC and SPP column technology increased productivity over ten-fold, while reducing solvent consumption by more than 90%. The dramatic increase in throughput, coupled with the significant solvent cost savings and reduction of waste generation, are great reasons to upgrade your LC capabilities with the Flexar FX-20 Pump.

With features and performance unmatched by any other LC system available, the Flexar FX-20 LC Pump is the clear choice for increasing your lab's productivity and profitability while reducing your eco-footprint.

Environmentally responsible productivity – improving throughput and separations while saving solvent

Interest in UHPLC has grown because of the increased throughput and reduced solvent consumption associated with sub-2 μm particle column technology. Decreasing stationary phase particle size improves separation efficiency. Shorter columns mean faster chromatographic runs, while narrower columns mean lower mobile phase solvent consumption.

What a combination – faster, better chromatography with less solvent waste.

Compare the analysis times achieved using conventional HPLC with those achieved using UHPLC. Significant improvements in throughput and reduction in solvent usage can be achieved.

Ultimate power to drive UHPLC performance

Columns with smaller particle size can deliver higher throughput and solvent savings, but small particle packings can also cause higher back-pressures, especially when run at higher flow rates to drive sample throughput. Even when using SPP columns at higher flows,

pressures greater than 6000 psi may occur. So it's important to be sure the LC pump you choose can handle the pressures required and deliver the solvent flow you need.

No other LC pump can provide the operating power of the Flexar FX-20 Pump. This pump delivers flows as high as 5 mL/min even at 18,000 psi pressure – plenty of operating headroom for all of your HPLC and UHPLC applications. Knowing your application can run anywhere within this wide operating range opens the door to improved UHPLC applications, which can streamline analyses such as:

- additives, residues, and toxins in food and agricultural products,
- impurities and contaminants in raw materials, synthetic products, and engineered materials,
- toxic or anthropogenic contaminants in environmental samples.

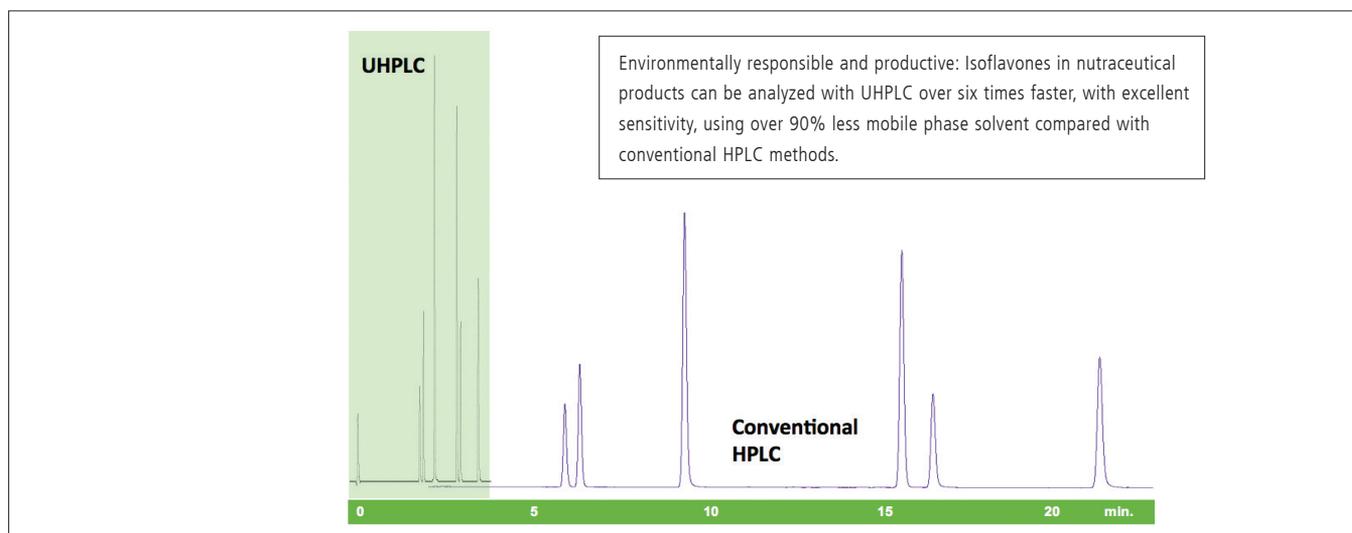


Figure 1. Comparison of HPLC vs. UHPLC results in significant improvements in throughput and reduction in solvent usage.

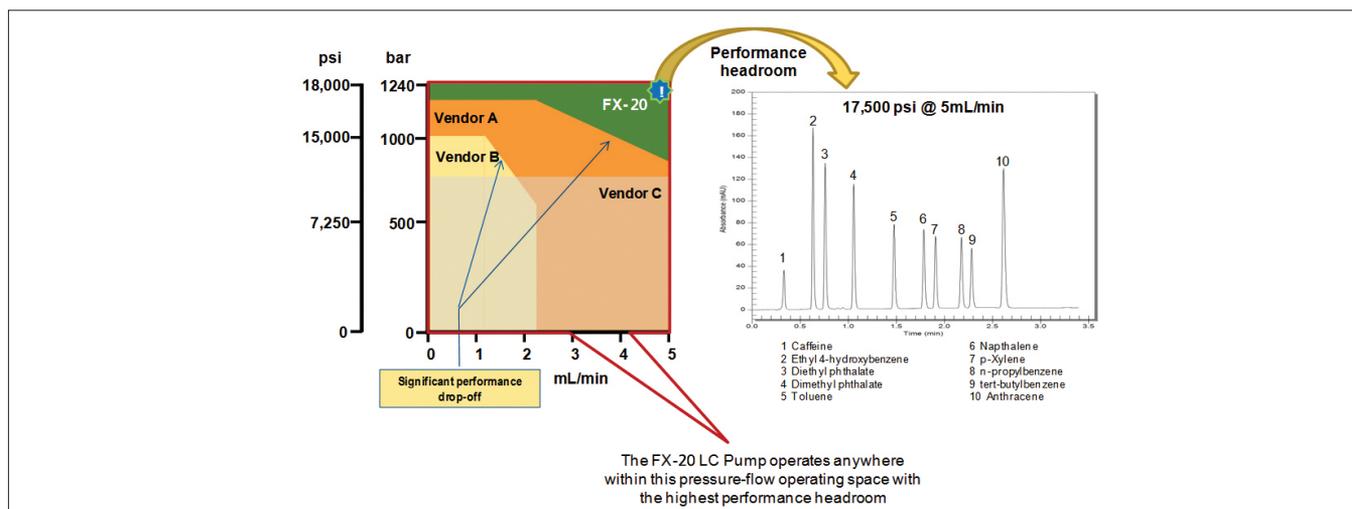


Figure 2. The Flexar FX-20 Pump can handle the pressures required while delivering the solvent flow you need.

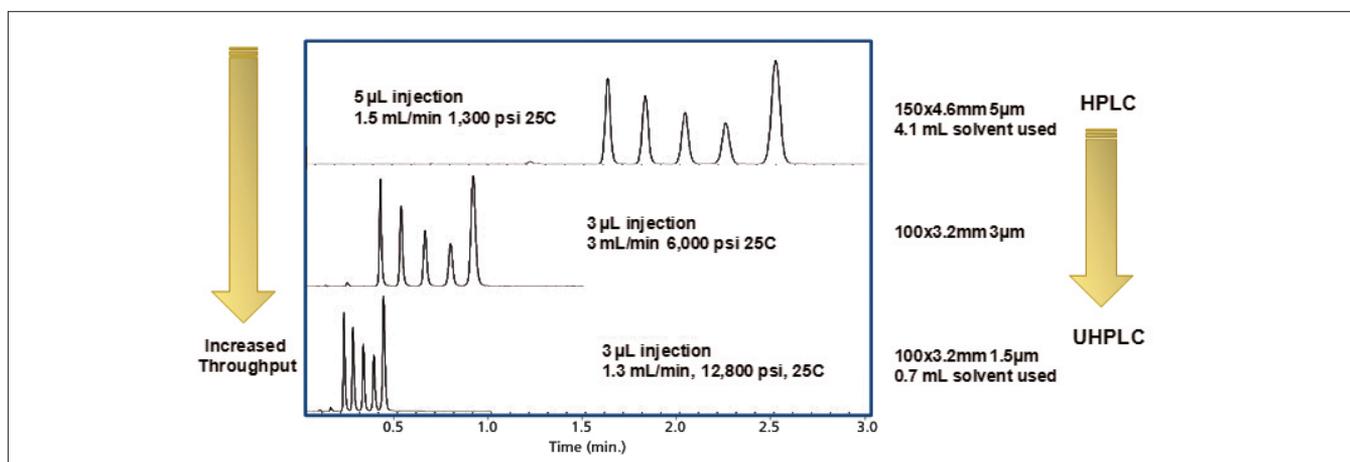


Figure 3. Use the analytical conditions, HPLC to UHPLC, that best suit your application needs with the Flexar FX-20 Pump.

Flexibility for a wide range of applications

While the FX-20 Pump has the horsepower for UHPLC operation, it can easily be applied to conventional HPLC applications as well. This means you can develop the application best suited to your data quality and productivity objectives. So choose the column, flow rate, temperature, and gradient you need, and run it on the FX-20 Pump.

This wide operating range also makes method transfer and validation from HPLC to UHPLC, and vice-versa, easier because everything can be done on a single system. A convenient method transfer tool is also available from PerkinElmer.

GradientLock – better reproducibility you can depend on

Your results are only as good as they are accurate and reproducible. Reliable peak identification and analyte quantification depend, to a large degree, on retention time reproducibility. With the reduced run times typical of UHPLC, retention time reproducibility becomes an even greater challenge. That's why we developed GradientLock™.

Based on optical sensing feedback, Flexar FX-20's GradientLock functionality precisely synchronizes autosampler injection with pump piston position. Always injecting at the same piston stroke position, GradientLock locks in your gradient composition, injection-to-injection, assuring outstanding retention time repeatability, even for peaks with retention times below a few minutes.

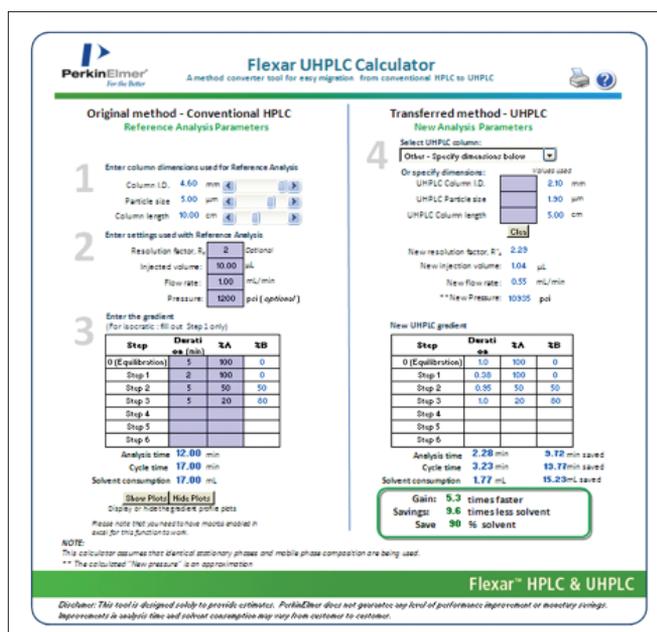


Figure 4. Make HPLC-UHPLC method transfer easy using PerkinElmer's convenient calculator.

Table 1. Flexar FX-20's GradientLock feature synchronizes injection with piston position to assure outstanding retention time reproducibility for short UHPLC runs. Conditions: 4-minute UHPLC chromatogram. Gradient 50-100% acetonitrile/H₂O, initial 12,000 psi, 0.7 mL/min.

Peak	1	2	3	4	5	6	7	8	9
Retention Time (min)	0.7	1.0	1.2	1.7	2.1	2.5	2.8	3.0	3.7
Std. Dev. (min)	0.0050	0.0066	0.0065	0.0061	0.0053	0.0050	0.0053	0.0057	0.0052
%RSD	0.72%	0.66%	0.54%	0.36%	0.25%	0.20%	0.19%	0.19%	0.14%

Delivering flow accuracy and precision

An innovative check-valve “T” prevents channel-to-channel cross talk, even at high UHPLC pressures, to assure that no backflow will affect compositional accuracy. Combined with a sophisticated compressibility compensation algorithm, the Flexar FX-20 Pump also exhibits exceptional compositional accuracy.

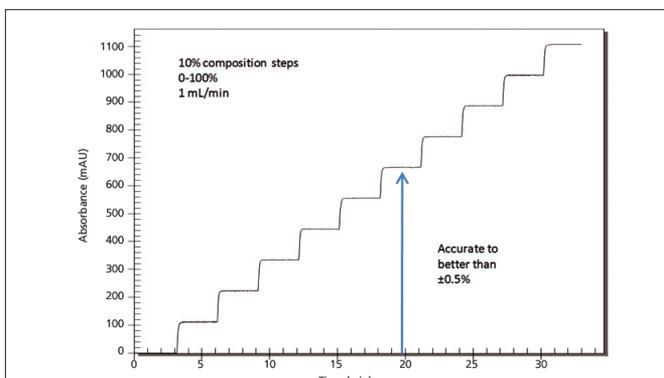


Figure 5. The Flexar FX-20 Pump can handle the pressures required while delivering the solvent flow you need.

Carefully tuned electronic flow programming with real-time pressure feedback also delivers exceptional pressure stabilization and pulse-free flow stability. All of this assures the ultimate in retention time repeatability and eluent gradient composition – two key success factors in high performance chromatography.

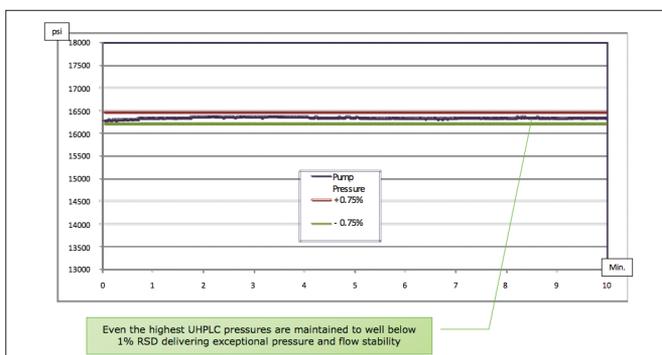


Figure 6. Electronic flow programming with real-time pressure feedback assures stable pressure and flow delivery. Experimental conditions: 1 mL/min, 16,300 psi, C18 1.7 μ m particle column.

Table 2. Design factors for low-cost of ownership. Rugged design for routine operation keeps cost of ownership low and uptime and ROI high.

Design factor	Ownership benefit
High-endurance, pressure-rated check valves (18,000 psi)	Exceptional flow accuracy and precision; long-term reliability. No need for regular preventative maintenance replacement – lower ownership costs
Universal piston saddle mount	Self-centering piston travel reduces seal wear, keeping maintenance low and uptime high
High strength sapphire single-crystal pump pistons	Superior strength and pressure tolerance; worry-free operation
Automatic recirculating piston wash	Keeps pump piston clean, reducing seal wear and maintenance costs
Compatibility with any HPLC or UHPLC column	Open architecture – use the column you deem the best for your application and the most cost-effective

Rugged design to handle the pressure and keep cost of ownership low.

The Flexar FX-20 Pump is designed for routine operation in a high-productivity environment. It's fitted with high-pressure check valves, titanium-tipped purge valves, and rugged, high-tensile strength sapphire single-crystal pump pistons that are proven reliable in tens of thousands of LC pumps worldwide. This pump can handle the pressures of UHPLC while delivering accurate, precise flow.

An automated piston wash function is built in to keep the piston clean, particularly when used with buffers. Circulating throughout all four heads of the dual reciprocating pump network, this dedicated recirculation flush function operates automatically, actuated by the piston drive function itself. So, there's no mistakes – no turning it on or off – it operates automatically!

A self-centering piston saddle houses a 15 μ L displacement micropump piston, ideal for accurate and precise low-flow operation. The universal piston saddle mount assures unidirectional piston travel, keeping seal wear down and maintenance costs low. Compare the preventative maintenance costs of the Flexar FX-20 Pump with any other, and you'll be impressed at the low cost of ownership for such a high performance pump. This is the kind of assurance you need to get your work done, hassle free.

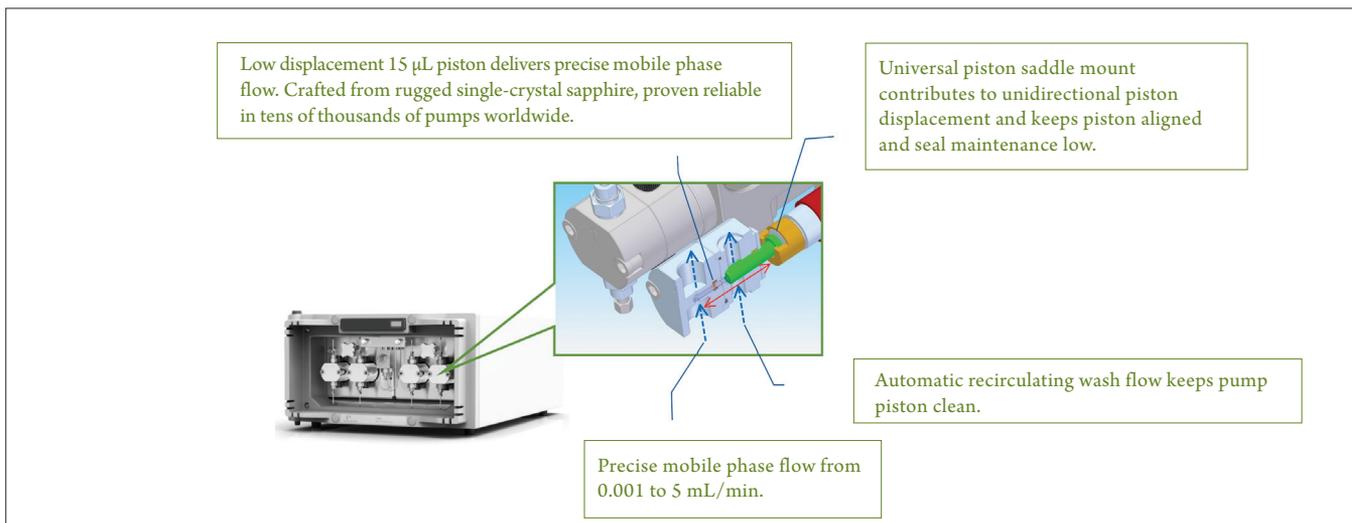


Figure 7. Next-generation FX-20 dual reciprocating pump design.

Reach for more choice with Flexar

The Flexar FX-20 Pump is part of the Flexar product family and can be combined with a wide array of Peltier ovens, fast auto-samplers with low carryover, sensitive detectors, efficient degassers, and a wide range of columns and other accessories. Customize a system with extremely low system bandwidth that best meets your specific application needs.

The FX-20 Pump is controlled by either Chromera® or TotalChrom® chromatography data platforms assuring compatibility across a wide range of laboratory environments. Thinking MS? This pump is an ideal platform for an exceptionally fast and versatile high performance front-end for SQ, TQ, or TOF MS. And because it's also compatible with PerkinElmer's wide consumable product range, from columns to sample vials to mixers and connectors, Flexar FX-20 LC systems are powerful, integrated solutions ready for even the toughest analytical challenges.



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