

Flash Chromatography

High Throughput Flash Purification

Flash chromatography is a popular method for isolation and purification of compounds from reaction mixtures and natural product extractions. This technique has been used extensively by organic synthesis and natural product chemists for drug discovery and development, along with researchers isolating substances from food products.

Traditionally flash chromatography apparatus is configured using a glass column with solvent flow generated by air pressure in a glass reservoir. In recent years the glass columns are being replaced by disposable plastic cartridges and the glass reservoir by a pressurized stainless steel tank. However, the use of stainless steel tanks presents several drawbacks as follows:

- The level of solvent cannot be seen causing incomplete separations and unknown solvent volumes.
- The tank requires awkward emptying and refilling for each solvent change.
- The volume of solvent is limited to the tank holding capacity.
- A source of air or nitrogen is still necessary.

A solution to these drawbacks is the replacement of the stainless steel tank with a Micropump positive displacement pump. The pump requires no external air supply and delivers an unlimited volume of solvent to the cartridge. Changing solvent composition is easy with no unused solvent waste.



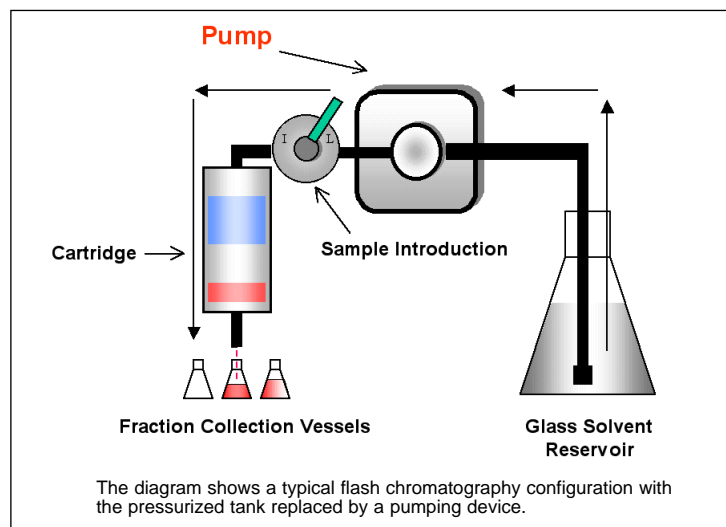
Advantages of a Micropump Positive Displacement Pump

- No pulsations—smooth, continuous flow
- Variable speed—adjustable flow rates
- Easily replaces pressurized solvent reservoirs on flash systems
- Small and compact profile—conserves bench and fume hood space
- Unlimited solvent volume for uninterrupted flow
- Visible solvent volume at all times
- No external air or nitrogen source needed
- Easy solvent changeover from run to run
- Step-gradient and continuous gradient capability

Common Pumping Requirements

Flow rates*	5-50 ml/min
Differential pressure	30-50 psi
Cartridge particle size	40-60 μm
Packing weight	50-100 grams
Sample volume	3-10 ml
Mobile phase volume	100-500 ml

*Higher flow rates (>1000 ml/min) may be found in pilot plants and production facilities.



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Gradients for Flash Chromatography

The capability to quickly change solvent composition to elute strongly retained substances results in faster, sharper separations than when performed under isocratic conditions. The single, air driven solvent tank does not permit easy and rapid solvent changeover. Two tanks assembled with a switching valve is expensive and awkward. Replacing the pressurized tank with a pump permits efficient, economical step-gradient formation as diagrammed below.

Even continuous gradients can be achieved using simple lab apparatus for stirring and blending. As a result the operator has full control of the separation. The ability to process samples for high throughput purification is made simple, economical and fast by the replacement of the pressurized solvent tank with a pump and the addition of a low pressure valve. Continuous gradients can be performed using common laboratory stirring devices.

System Configuration Variations

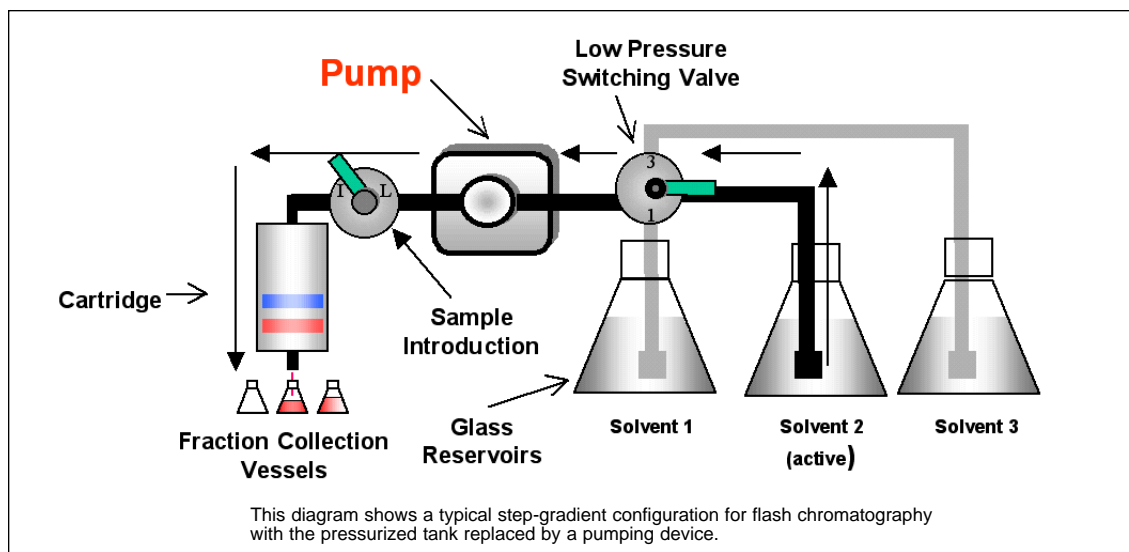
- Step gradient
- Continuous gradient
- Trace enrichment
- Parallel, multi cartridge systems

Pumping Technology

A positive displacement gear pump is ideal for this application. Micropump's models include:

- Series GA (180)
- Series GJ (120)*
- Series GB (200)*

*These models available for higher flow rate requirements.



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