

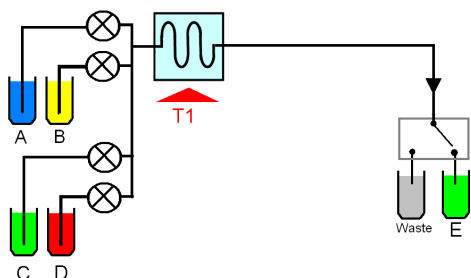
The Benefits of a Multi Pump System

Until recently, flow chemistry systems that were available to buy off the shelf were limited to two pumped reagent channels. Vapourtec have just announced the availability of up to 4 pumps on the R Series Integrated Flow Chemistry Platform, with full support from the Flow Commander™ PC control package, and full pump performance monitoring (to ensure no loss of accuracy caused by trapped air).

This facility (combined with the R Series' four separate temperature control zones), makes a lot of things possible which were simply not possible before. This document briefly outlines them.

Every one of the scenarios illustrated below is possible with

- an off the shelf Vapourtec system requiring no modification
- final product captured in a vial using a standard fraction collector
- many successive cycles executed in a totally automated fashion, with no intervention
- UV traces recorded for each vial of product captured, if required

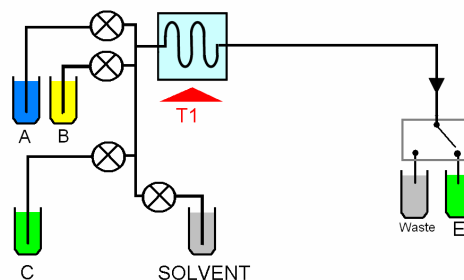


Up to 4 reagents in one reaction

Separating each reaction component into a separate channel permits all the proportions to be optimised. It can also save on reaction preparation time. Tell the control software the molar concentration of each solution and the flow rates can be automatically calculated by the Flow Commander™ software.

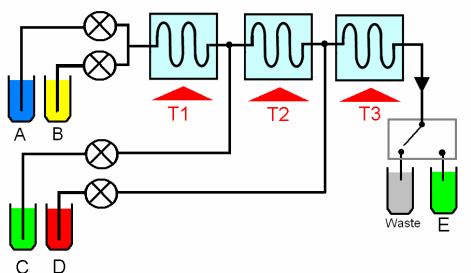
Optimisation of concentration

By using concentrated reagents and a separate channel of reaction solvent, it is possible to include reaction concentration as one of the variables to be optimised.



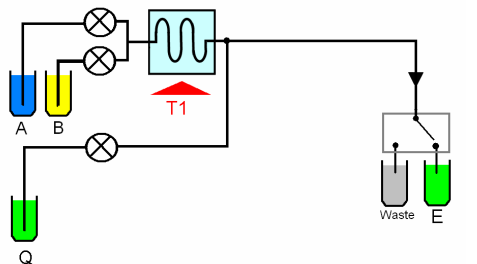
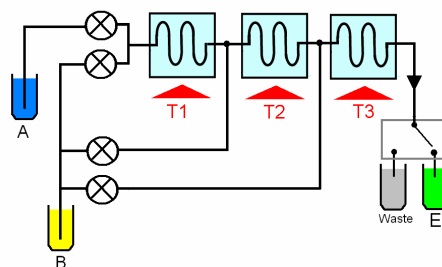
Multi stage reactions

With the Vapourtec "Flow Commander Pro" software, the addition of each intermediate reagent is perfectly timed to arrive when required, ensuring absolutely no waste of reagents.



Partial Additions

It may be beneficial to add a key reagent incrementally rather than all at once at the start of the reaction, to improve selectivity. This can minimise overreaction of product with one of the reagents, or minimise the degradation of any sensitive reagents under reaction conditions.



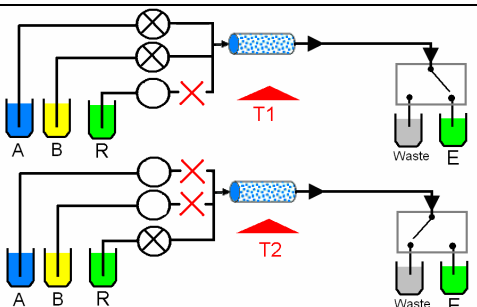
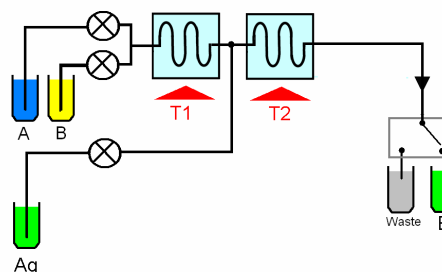
Quenching

Sometimes, with short reactor residence times, it may be necessary to quench the reaction immediately on exit from the reactor. Using a dedicated channel for this permits perfect timing, efficient use of quench reagents, and ensures all product receives the right amount of fresh quenching reagent.



Aqueous Workup

Typically aqueous workup is a fairly crude process. But when proportions, time and temperature can all be controlled and optimised as part of the workup, it becomes a much more precise process.



Automatic regeneration of Columns

Immobilised catalyst columns can be limited by their lifetime before needing regeneration. By dedicating a reagent channel to the regeneration process, it is possible to automate large numbers of cycles and maintain catalyst activity for all reactions.



Catch and Release

By using some channels for the initial reaction and then another for removing the products from the column, it is possible to completely automate any number of successive catch and release reactions.

