



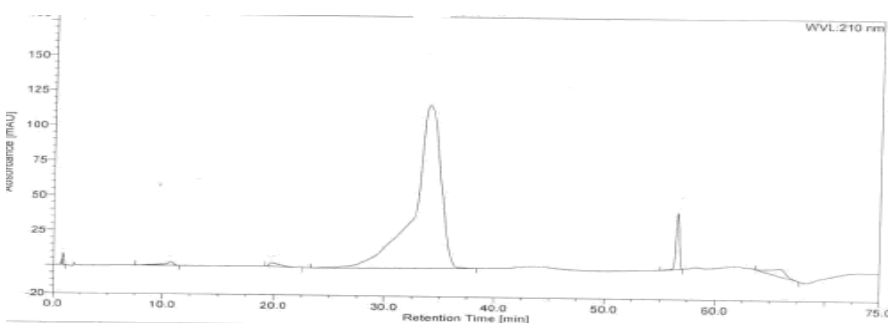
Peak Fronting

The most common causes for peak fronting are overloading the column (too much injection mass on-column) or a column installation error (such as fittings swaged to a port depth different than that of the column in use).

Another possible cause could be a matrix mismatch with the injection solvent (sample diluent) and the mobile phase. Such mismatches could include different pHs, injection solvents of a significantly stronger elution strength than the mobile phase, or immiscible solvents.

An installation error would tend to cause all peaks to front, while a difference in pH would potentially distort only specific peaks that correspond to some particular ionizable compounds. If the injection solvent is of a greater elution strength than the mobile phase, the earliest eluting peaks would tend to be the most effected, and injecting immiscible solvents would tend to yield the most erratic effects, including random peak shape distortions, unpredictable retention time shifting, missing peaks, and baseline distortions.

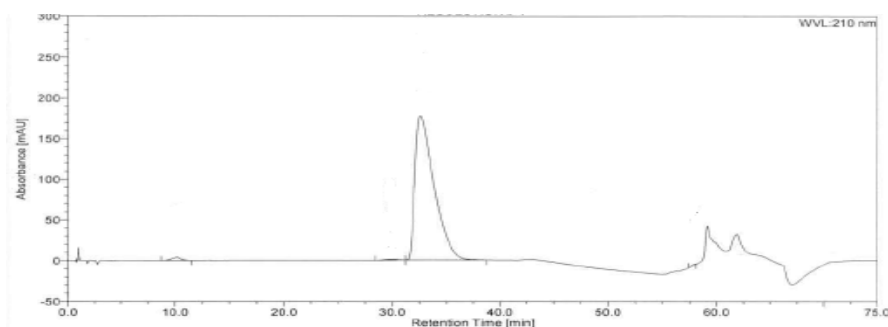
The first chromatogram below is of a conditioning injection on a new column for an established reversed phase method.



The overall response appeared comparable to what was typically observed on that system for this method, and PEEK fingertight connective fittings were used, essentially ruling out overloading and installation errors.

It was however uncovered that a normal phase method was being run on this system just prior, and after further examination, it was realized that the mobile phase lines were properly flushed prior to introducing reversed phase solvents; however the injector and needle wash remained in an iso-octane based solution.

After purging the injector loop and replacing the needle wash with reversed phase solutions, the following chromatogram was obtained from the same sample in a subsequent injection.



This is still not an ideal chromatogram for this method, but shows the improvement as the residual iso-octane that was inadvertently introduced to the column is eluting (which can take extensive flushing, and in some cases be impossible to completely remove).