Reduce Solvent Consumption with Narrow Bore Columns

Agilent PLgel MiniMIX Columns

Technical Overview

Introduction

Narrow bore GPC columns offer high performance, excellent solvent compatibility and mechanical stability. These columns can be used with conventional GPC equipment and provide high performance, comparable to Agilent's conventional ID columns, the benefit of ~ 70 % reduction in solvent consumption, increased operator safety and reduced solvent disposal costs.

To maintain the same linear velocity through the column, the volumetric flow rate must be reduced to 0.3 mL/min, in line with the column cross sectional area. This provides significantly lower solvent consumption. Sample loadings are scaled down in line with the reduced column volume, and system dead volume minimized to avoid excessive band broadening.

A major advantage in the application of narrow bore columns is the reduction in solvent consumption. This arises because, in order to equate the linear flow velocity through the column, the volumetric flow rate must be adjusted in the ratio of the square of the column ID:

$$\text{Flow rate col 2} = \frac{(\text{ID col 2})^2}{(\text{ID col 1})^2} \times \text{Flow rate col 1}$$

Thus, for a narrow bore GPC column with 4.6 mm ID compared to a conventional column with 7.5 mm ID running at a conventional flow rate of 1.0 mL/min, the equivalent flow rate would be:

$$\text{Flow rate 4.6 mm ID} = \frac{(4.6)^2}{(7.5)^2} \times 1$$

This represents a 62 % reduction in solvent consumption.

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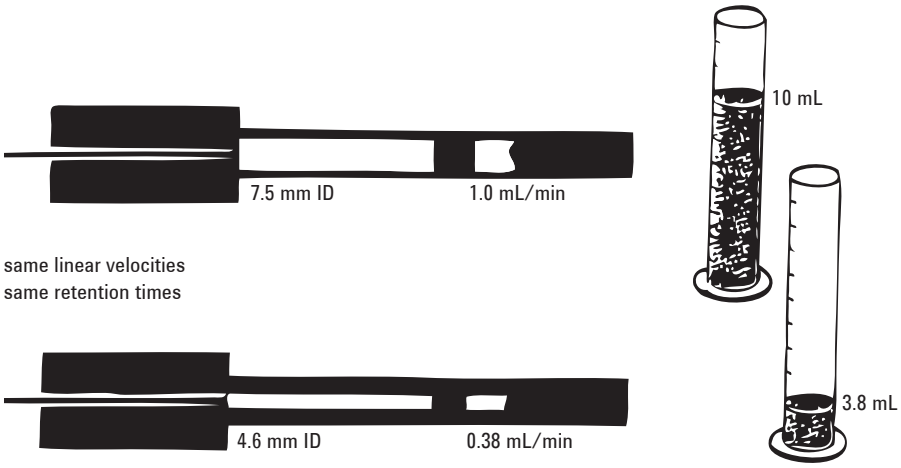

Figure 1. Diagram shows how solvent consumption is reduced by using narrow bore columns

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Published in UK, September 20, 2010
SI-01742

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