SCALING DOWN THE GRADIENT TABLE

INTRODUCTION

SCALING DOWN THE GRADIENT TABLE FOR IMPROVED THROUGHPUT

Scaling down a separation on a longer length column to a shorter 20 mm IS^{TM} column begins with reducing the gradient times. In scaling the gradient we are scaling the column volume. Keeping the column diameters and flow rates constant, the ratio of the lengths of the columns are multiplied by the gradient time on the longer column to determine the new gradient time.

- EQUATION FOR SCALING DOWN THE GRADIENT TABLE

To scale a gradient

$$\frac{L_1}{L_2} \times t_{g_1} = t_{g_2}$$

 $L_1 = Long$ column length $L_2 = Short$ column length

 t_{g1} = Gradient time on long column

 t_{a2} = Gradient time on short column

Where column diameters and flow rate remain constant

- Gradient Table

Time	Profile			
(min)	%A	%В	%С	
0.0	80	10	10	
20.0	50	40	10	
21.0	80	10	10	
25.0	80	10	10	

Our example shows that we have a 20 minute gradient, 25 minute cycle time on a 4.6 x 150 mm column. It has been determined that the optimum flow rate for a 20 minute gradient on this dimension column, with an injection volume of 10µL is 1.4 mL/min.

-NEW GRADIENT TABLE

Time	Profile		
(min)	%A	%В	%C
0.0	80	10	10
2.7	50	40	10
2.8	80	10	10
3.3	80	10	10

The new gradient table can be calculated using the gradient table equation. The 2.7 minute gradient time has been established. This gradient method was run on the 20mm column with a flow rate of mL/min. Same injection volume as on the 150 mm column.



